

The Evaluation Analysis of Online Hotel Booking

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Abstract: This paper gives out questionnaires to the industry by using Delphi Method, ultimately confirms a target system of evaluating online booking based on economy hotels, including enterprise strength, enterprise value, site quality, and cooperation costs, etc., four primary indicators and fourteen secondary indicators, and applies the principle of analytic hierarchy process to confirm weight of evaluation indicators by combining with Delphi Method. Moreover, this paper combines with fuzzy comprehensive evaluation to construct a practical evaluation model, finally applies this evaluation model to do an empirical research and carries out analysis of empirical results.

Introduction

Information plays a very important role on the decision-making process of consumers ^[1]. Particularly in the network environment, consumers not only search for product feature information, such as price, type and brand, etc., but also pay close attention to post-purchasing comments of other consumers^[2]. Hotels provide a kind of typical experience-oriented service ^[3]. Because consumers can't make an accurate comment on service content and quality before reservations, it is necessary for consumers to use lots of information for references and reduction of perceived risk. With the rapid expansion of the internet, online travel booking has been thriving and developing gradually. Moreover, it becomes an important for trading travel products. Literature reviews display that influence factors of network consumption behavior and traditional consumption behavior have a great difference. Online comments, as the emerging network communication means and platform, have already become a significant external factor to impact customer decisions and are remarkable to booking intentions of traveling.

For managers of economy hotels, how to choose a suitable online travel operator to help hotels to realize network marketing is a critical issue. Therefore, the research significance of this paper lies in picking up a suitable third party of online travel booking service providers for managers of economy hotels, providing a reference model, making it become a foundation on evaluation future partners, as well as providing a measurement and tool for online travel booking.

Construction of the Evaluation Model for Online Travel Booking Service

This paper selects 8 experts, who have management experience in economy hotels and online travel booking enterprises to constitute an expert group of the paper and present hierarchical indicators and related research background to everyone. Members of the expert group apply an anonymous way to judge hierarchical indicators. After summarizing judgment opinions of experts, the author presents the summary to every expert. Then experts use it for reference and judge initial indicators again and their opinions tend to be consistent after passing through two rounds of repetition. Evaluation indicators on online travel booking service providers are ultimately formed. By applying the same method, this paper also screens out enterprise strength, enterprise value, site quality and cooperation costs, etc., in index level and secondary indicators and finally chooses 14 indicators as the index level. According to the thought of analytic hierarchy process, this paper constructs evaluation indicators in three levels of online travel booking service providers from the perspective of economy hotels: the target layer is the comment of online travel booking service providers, and criterion layer is secondary evaluation indicators, including enterprise competitiveness, enterprise

value, site quality and cooperation costs. Moreover, this paper also conducts a specific analysis of secondary indicators, draws a conclusion that factors of impacting secondary indicators are corresponding three-level indicators(index level), and constructs a hierarchical model based on analytic hierarchy process. The structure model of constructing analytical hierarchy process is shown in Figure 1.

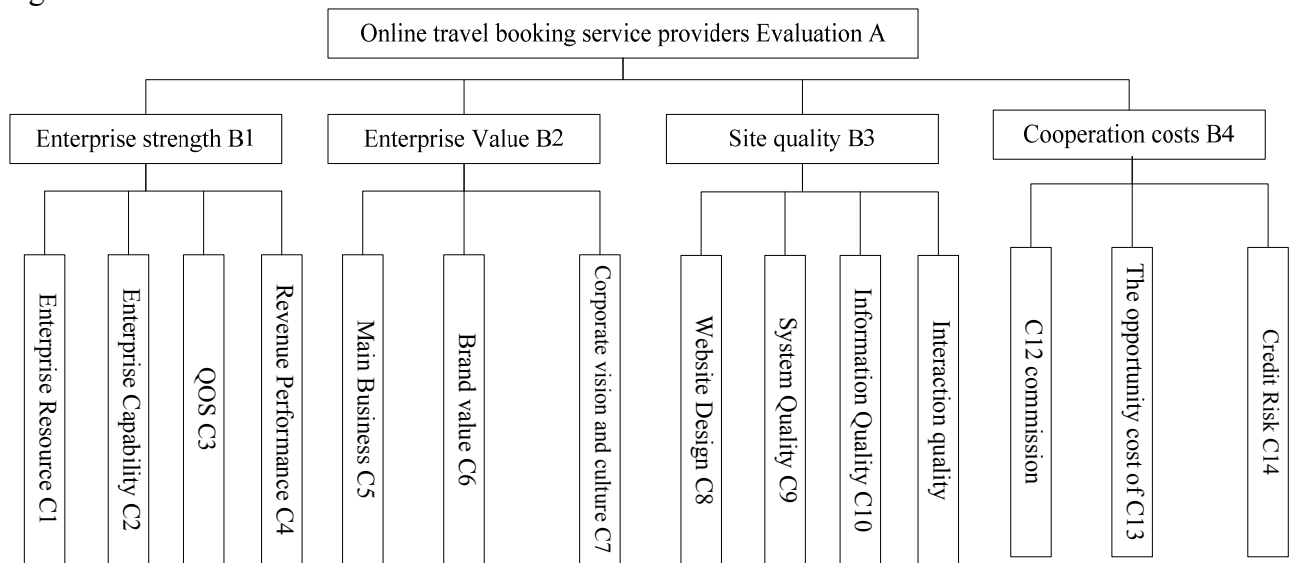


Figure 1: Evaluation Hierarchical Model Structure of Online Travel Booking Service Providers

The criterion layer includes four factors. The paper compares to the relative importance of two factors on the target A, uses a_{ij} to present comparative results of the i^{th} factor corresponding to the j^{th} factor in the criterion layer(For example, a_{12} represents the relative importance of enterprise strength B1 and enterprise B2 on the target layer, and applies 1-9 scale quantization table proposed by Professor Satty to construct a judgment matrix $A = a_{ij}$ (4*4) in accordance with the principle of pairwise comparison:

$$A = (a_{ij})_{4 \times 4} = \begin{bmatrix} a_{11} & a_{12} & a_{13} & a_{14} \\ a_{21} & a_{22} & a_{23} & a_{24} \\ a_{31} & a_{32} & a_{33} & a_{34} \\ a_{41} & a_{42} & a_{43} & a_{44} \end{bmatrix} \quad (1)$$

The value of judging matrix embodies decision-markers' recognition on importance degree of elements. Generally speaking, the 1-9 scale method presented by the Professor Satty of operational research is adopted to assign the importance degree. The scale and meaning are shown in Table 1:

Scale a_{ij}	Meaning statement
1	It means that i and j are equally important by comparing with them.
3	It means that i is slightly more important than j by comparing with them
5	It means that i is relatively more important than j by comparing with them
7	It means that i and j are very important by comparing with them
9	It means that i and j are absolutely important by comparing with them
2,4,6,8	The importance degree is between two adjacent degrees.
Reciprocal of the above-mentioned value	By comparing with two factors, the importance scale between the latter and the former

By constructing the judgment matrix of pairwise comparison of evaluation indicators for booking service providers, the relative importance between factors in target layer and factors in criterion layer can be obtained. Then influencing degree of factors in target layer on a factor in criterion layer can be confirmed.

To judge product M_i of every element, solve N root of M_i and conduct normalization processing.

$$M_i = \prod_{i=1}^n \prod_{j=1}^{j=n} a_{ij} \quad (2)$$

$$\overline{W}_i = \sqrt[n]{M_i}, i = 1, 2, 3, \dots, n; \quad (3)$$

$$W_i = \frac{\overline{W}_i}{\sum_{j=1}^n \overline{W}_j} \quad (4)$$

Calculate the largest eigenvalue λ_{\max} of the matrix. In order to satisfy a roughly consistent requirement and avoid from producing too larger deviation, it needs to conduct consistency check. Random index is used for measuring inconsistent degree. The expressive form is shown as follows:

$$CI = \frac{\lambda_{\max} - n}{n - 1} \quad (5)$$

When judging a matrix has consistency, $CI=0$, CI is larger, and consistency of the matrix is worse.

Define CR as the consistent proportion. If $CR \leq 0.1$, it is proved that matrix consistency can be acceptable. When $CR > 0.1$, it is proved that matrix consistency has inconsistency. Then it is necessary to adjust matrix values until it conforms to the consistency.

An Evaluation Method of Online Travel Booking Service Providers

Hotel products have intangible characteristics, so consumers are facing with a higher perceived risk, when they purchase it. Particularly, they need more information to assist to make a decision. When consumers experience these experience-oriented service products under the network environment, influences of information on decision-making will be more obvious. Online travel booking service providers can be divided into two kinds: one is the transaction platform and gives priority to online travel booking products. Another is a marketing platform and gives priority to provide marketing service of online tourist enterprises. This study, based on the economy hotels, defines online travel booking service providers as: the online travel service providers who have the purpose of bringing product booking and increasing intangible sources of products for hotels by means of internet technology and signing a cooperation agreement, so as to realize enterprise development.

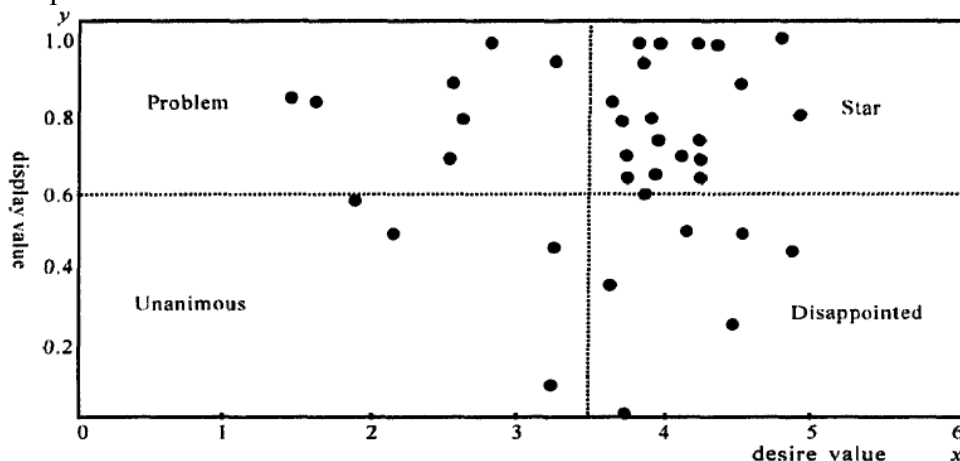


Figure 2: Target Value Model Evaluation Data of Travel Websites

As shown in Figure 2, through target-value framework, travel websites transfer result analysis of consumers. There are 18.42% website characteristics, which make users unsatisfied, namely these users have a higher expectation on the functionality. However, the actual effect is unsatisfied. Such a problem is urgent for websites to improve it. Meanwhile, we also should notice that there are 18.42% of them belong to problem quadrant, namely user expectation is not high. However, the actual reflection is higher than user expectation. Such a situation may be caused by websites, which can't grasp actual demands of users. In addition, product content can't satisfy user demands completely. On the contrary, it wastes resources in some tiny things. As dividing hierarchical structure, analytic hierarchy process uses an expert scoring method to measure problems with qualitative analysis by

using quantitative data. By comparing with advantages of expert scoring method, it ultimately adopts an appropriate mathematical model to give quantitative data for these qualitative problems. Such a method is extremely suitable for study that conducts target value on some difficultly acquired data. This paper selects this method as an evaluation method for booking restoration.

According to the principle of fuzzy comprehensive evaluation method, evaluation elements of the study are evaluation indicators for the above, namely c_1, \dots, c_{14} , expressing as $o = \{c_1, \dots, c_{14}\}$. Orders of evaluation can be four grades: excellence, good, general and worse, expressing as $V = \{v_1, v_2, v_3, v_4\}$. This grade conducts evaluation basis on the above-mentioned evaluation indicators of the index level through Delphi Method. Therefore, it is necessary to conduct quantity conversion on the judgment of indicators, namely order of evaluation is quantified and endows a certain value to each order of evaluation $\{v_1, v_2, v_3, v_4\} = (100, 80, 60, 40)$.

According to the step of applying the fuzzy comprehensive evaluation method to quantify qualitative index, confirm membership of secondary indicators under every first evaluation indicator to compose of fuzzy judgment matrix. For example, for the candidate enterprise 1, secondary fuzzy judgment matrix of enterprise strength indicators is:

$$R_1 = \begin{bmatrix} 0.3 & 0.5 & 0.1 & 0.1 \\ 0.4 & 0.4 & 0.2 & 0 \\ 0.2 & 0.5 & 0.2 & 0.1 \\ 0.5 & 0.3 & 0.1 & 0.1 \end{bmatrix} \quad (6)$$

According to the above-mentioned method, fuzzy judgment matrixes R2, R3 and R4 of secondary indicators of enterprise value, site quality and cooperation costs can be obtained. According to model $M(\bullet, \oplus)$, secondary indicator factor set under the enterprise strength can conduct a comprehensive evaluation, namely

$$B_1 = W_{B_1} \times R_1 = (0.326 \ 0.463 \ 0.141 \ 0.07) \quad (7)$$

Here, WB1 is the weight of secondary indicators relating to primary indicators under the primary indicator of enterprise strength. Line in B1, B2, B3 and B4, establish judgment matrix of primary indicator factor set of evaluating total targets to conduct a comprehensive evaluation, namely

$$R_T = W_B \times B = (bw_1 \ bw_2 \ bw_3 \ bw_4) \times [B_1 \ B_2 \ B_3 \ B_4]^T = (r_{T1} \ r_{T2} \ r_{T3} \ r_{T4}) \quad (8)$$

According to number value endowed by order of evaluation, final evaluation value of candidate enterprises can be calculated.

$$S = R_T \times V^T = (r_{T1} \ r_{T2} \ r_{T3} \ r_{T4}) \times (v_1 \ v_2 \ v_3 \ v_4)^T \quad (9)$$

Here: S refers to the final evaluation value of candidate enterprises; v1, v2, v3 and v4 refer to numerical value of each order of evaluation.

The Empirical Analysis of Online Hotel Booking Evaluation Model

The original data studied in this paper come from the ctrip.com This website nowadays is the biggest online travel service provider in China(In 2014 its market shares were 51.6%). It owns the biggest client group and presents representative information. Historical data are relatively complete and are convenient for checking and collecting. This paper selects hotels of ctrip.com in Beijing, Shanghai, Guangzhou, Shenzhen, Sunzhou, Hangzhou, Wuxi, Qingdao, Dalian, Ningbo, Nanjing, Xi'an Xiamen and Sanya and regards them as samples of this empirical analysis. Considering that hotels with different scales will play an impact on customer comment quantity by providing quantity of guest rooms, so as to impact the comparability between similar hotels, this paper generally speaking follows the principle that the number of online comments is greater than the total guest rooms +If to screen.

Through data collection and settlement, ultimately 2000 hotels are chosen to act as research samples, including 300 five-star hotels, 200 four-star hotels and three-star hotels. Data containing variables of recommended information(2) and hotel characteristic information on the hotel booking platform can be obtained from the website directly, while variable data that embody online comments(5) should be utilized, after it is processed.

$$B_1=(0.4272 \ 0.3180 \ 0.2548 \ 0); B_2=(0.3730 \ 0.3438 \ 0.2562 \ 0.027); B_3=(0.4 \ 0.3698 \ 0.2302 \ 0);$$

$$B_4=(0.3568 \ 0.2432 \ 0.3412 \ 0.0588);$$

$$R_1=(0.4032 \ 0.3275 \ 0.2577 \ 0.0116);$$

$$S_1= 0.4032*100+ 0.3275*80+ 0.2577* 60++ 0.0116*40=82.446$$

$$S_2=90.608$$

$$S_4=83.106$$

Results obtained by relying on this model are relatively closed to the fact. Moreover, cooperation with another two candidate service providers also can obtain a good benefit. However, cooperation with candidate service provider II can obtain the biggest earning, because this service provider is the lead in the industry of online travel booking. No matter in organization structure or business range, or market shares, it has an absolute advantage.

The above calculated results can obtain scores and total scores of primary indicators for three candidate enterprises(refer to Table 2 below):

Table 2: Primary Indicator Value of Three Candidate Service Providers

Service provider	Total scores	Enterprise strength	Enterprise value	Site quality	Cooperation costs
I	82.446	40.32	26.056	15.462	0.644
II	90.608	68.07	14.408	7.686	0.444
III	83.108	44.53	22.024	16.134	0.42

It can be observed from Table(2) that in three candidate service providers, enterprise strength of candidate service provider I is the strongest and has the highest scores. Meanwhile, it is the best partner, because

(1) In four primary indicators, enterprise strength has the biggest weight. This indicates that when economy hotels select online travel booking service providers, enterprise strength is relatively important. Online travel industry is a special industry that regards information as a main resource. Enterprises invest in information technology, while profitability, entire service quality and continuous innovation determine the ability for online travel booking service providers to attract tourism resource suppliers. Online travel booking service providers must have certain strength to carry out business and bring earnings to suppliers and enterprises.

(2) In the evaluation process of enterprise value for booking service providers, the weight only ranks the second place of enterprise strength. In candidate booking service providers, scores of service provider I are the highest and have obvious difference with other service providers. This indicates that service provider I has higher enterprise value, mainly including brand value, vision and culture, range of main business, which are highly accepted by partners.

(3) In the process of evaluating site quality, the result shows that scores of booking service provider II are the lowest and have larger difference with other two candidate service providers. However, the total scores of candidate service provider II are the highest. Therefore, for managers of economy hotels, influences of site quality on partners are not sensitive to hotel managers. Hotel operators care about whether booking service providers can bring about orders to booking service providers. In the actual operation process, it relatively conforms to the reality.

(4) As evaluating and selecting partners and in terms of other indicators, influence of cooperation costs is the smallest, because competitors of the same industry are more. Therefore, technical and service quality can be duplicated within the short period. Thus, difference of commission charged by booking service providers for pursuing for partners will not be larger. Cooperation costs of candidate service provider II are the smallest, namely costs for hotel managers for customers are the smallest. Based on it, booking service provider II also is a relatively suitable partner.

This research conclusions enlighten online management of hotels for online travel service providers, as follows:

First of all, hotel online information should conduct classification management, because consumers pay attention to different emphasis on information for hotels with different types, while page information presentation sequence will impact attention and acceptance of consumers on

information obviously. For five-star hotels, geographic position, hotel price and house type should be marked in a key area, while for economy hotels, consumer comments should be presented to consumers more conveniently, rapidly and comprehensively, so as to make them conduct a comprehensive evaluation.

Secondly, this study contributes to realizing individual management on different customer groups. Hotels should concern demand characteristics of different customer groups, no matter when customers search for a hotel in a booking platform or a booking platform recommends a hotel, so as to increase customer identification for hotel products.

Ultimately, for three-star hotels and economy hotels, as important online booking hotel types, though three kinds of information issued on an online service platform will impact purchase decision of consumers, hotel facilities, service levels, and surrounding information will be their focus. However, the practice that these hotels provide multiple grading and recommendations covering page on online service platform may not conform to real demand of consumers. In addition, for managers of three-star hotels and economy hotels, health and price will not impact consumption obviously anymore.

Summary

When this paper applies established evaluation indicator system, by using Analytic Hierarchy Process(AHP), this paper confirms weight of primary indicators and secondary indicators. It also can construct an evaluation model for practical operation by combining with fuzzy comprehensive evaluation method. Based on this model, managers of economy hotels can make use of scientific calculation methods to obtain the final value, after summarizing opinions of stakeholders. Then evaluation results of evaluation objects can be expressed by using accurate data. This not only can reflect concentrated membership of evaluation factors in order of evaluation, but also can conduct horizontal and longitudinal comparison on evaluation objects. Ultimately, advantages and insufficiency of evaluation objects can be confirmed. In addition, comprehensive situation of evaluation objects can be ranked, so as to be convenient for selecting suitable partners for their development demands.

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