



A hybrid ANP evaluation model for electronic service quality

Tsuen-Ho Hsu^{a,*}, Li-Chu Hung^b, Jia-Wei Tang^c

^a Department of Marketing and Distribution Management, National Kaohsiung First University of Science and Technology, No. 2, Zhuoyue Rd., Nanzi District, Kaohsiung City, 811, Taiwan

^b Department of Food and Beverage Management, National Kaohsiung University of Hospitality and Tourism, 1 Sung-Ho Rd., Hsiao-Kang District, Kaohsiung City, Taiwan

^c Graduate School of Management, National Kaohsiung First University of Science and Technology, No. 2, Zhuoyue Rd., Nanzi District, Kaohsiung City, 811, Taiwan

ARTICLE INFO

Article history:

Received 3 February 2010

Received in revised form 22 February 2011

Accepted 15 September 2011

Available online 24 September 2011

Keywords:

Analytic network process (ANP)

Consistent fuzzy preference relations method

Electronic service quality (e-SQ)

ABSTRACT

Previous research has developed evaluation measurement for electronic service quality (e-SQ) but has ignored the interdependence perspective of the criteria and sub-criteria for e-SQ evaluation. Therefore, this study aims to propose a hybrid analytic network process (ANP) model as an improved method to evaluate multiple-criteria and sub-criteria of e-SQ with the interdependence perspective. This hybrid ANP model was proposed by utilizing a process of algorithm that combines the consistent fuzzy preference relations method with the ANP approach to evaluate e-SQ. Moreover, this model overcame the problems while using the ANP in ranking options during multiple-criteria decision-making, such as the lack of consistency, the complexity, and the inability to handle information uncertainty. By using online travel websites as empirical application, this study demonstrated the hybrid ANP evaluation model that could capture expert's knowledge existing in the form of incomplete and vague information as well as identify the most important criteria based on interdependent perspective when evaluating e-SQ for websites. The results indicated that the interdependence perspective among criteria and sub-criteria should be taken into consideration by practitioners looking to improve their e-SQ. This study also suggested practitioners who manage websites that is sufficient and necessary to evaluate e-SQ under considered interdependence perspective for criteria and sub-criteria in order to obtain more in-depth findings and potential knowledge to discover the truly important criteria and sub-criteria of e-SQ when improving quality of websites. Such efforts will create overall improvement instead of isolated improvements in individual areas.

© 2011 Elsevier B.V. All rights reserved.

1. Introduction

Electronic service (e-service) is now considered as one of the key determinants of successful electronic commerce. Zeithaml et al. [1] first introduced the concept of electronic service quality (e-SQ), stating that service quality on the Internet is “the extent to which a website facilitates efficient and effective shopping, purchasing, and delivery of products and services.” Essentially, this term refers to the ability of a website to facilitate customer activities related to online shopping. Many researchers have pointed out that e-SQ is the most important determinant of long-term success for online retailers, and also indicated that good e-SQ is prerequisite for companies to operate e-commerce on the Internet. Thus, previous research has developed evaluation scales for e-SQ, including SITEQUAL [2], WebQual [3], eTailQ [4], and E-S-QUAL [5], indicating the different criteria for e-SQ evaluation within various

industries [6]. In particular, such research has mainly used multi-dimensional and hierarchical structures and has ignored questions of interdependence and feedback between criteria and sub-criteria [7]. Using the analytic network process (ANP) approach, which is capable of addressing interdependent relationships among criteria and sub-criteria, we examine the e-SQ evaluation process from this approach.

However, using the ANP approach requires $n(n-1)/2$ judgments for n criteria to compute a pairwise comparison matrix, and problems may arise that may seriously affect the evaluation results, including a lack of consistency and complexity and the inability to handle information uncertainty [26]. Therefore, this study uses the consistent fuzzy preference relations method in tandem with the ANP approach, as this strategy only requires the use of $(n-1)$ judgments to compute a pairwise comparison matrix that have n criteria, and the increase in the number of criteria or sub-criteria reduces the number of comparisons required and enhances the efficiency and accuracy of the decisions [8]. Therefore, the purpose of this study is to discover the interdependence perspective of criteria and sub-criteria for e-SQ evaluation, and to propose a three phases of measurement that combines the consistent fuzzy

* Corresponding author. Tel.: +886 7 6011000x4217; fax: +886 7 6011069.

E-mail addresses: thhsu@nkfust.edu.tw (T.-H. Hsu), julia@mail.nkuht.edu.tw (L.-C. Hung), jiaweitang701111@gmail.com (J.-W. Tang).

preference relations method with the ANP technique to evaluate multiple-criteria and sub-criteria of e-SQ with the interdependence perspective.

2. Literature review

2.1. Electronic service quality

According to Rust and Lemon [9], online retailers should pay more attention to the increasing number of dissatisfying experiences that customers have online. This might include service breakdowns, lost orders, or inadequate complaint handling. Consequently, practitioners of e-service operations today must ensure high-quality electronic services for success, and the bar for electronic service quality is rising quickly due to the pace of competition and the ease of duplicating service features within online business [10]. Service quality delivery has a positive impact on attitudinal, behavioral, and financial outcomes [11]. With the development of the Internet and the rapid growth of online business-to-customer e-commerce in recent years, service quality delivery through electronic platforms has become one of the most important issues for online retailers [1,12]. That is, service quality is expected to be an important determinant of success not only in traditional environments but also in online environments [4]. Lin and Sun [13] also pointed out website service quality could positively influence customer e-satisfaction and e-loyalty.

Research during the past decade has demonstrated that service quality influences customer consumption decisions [14,15], and these findings have also been applied to e-commerce [16]. The most important and evident difference between traditional and electronic commerce environments is the replacement of interpersonal interactions with human-machine interactions. In the online retailing context, there are almost no face-to-face interactions. Instead, online retailers often communicate with customers via Internet-based communication tools such as e-mail, chat rooms, and message boards [17]. Because of this distinction, it is important to develop e-SQ evaluation for assessing the e-commerce environment. As in other e-services, travel websites facilitate the interaction between the travel service provider and the customer through the Internet [18]. In electronic travel services, the interaction between the customer and the travel website is a process dimension (it creates the user interface), and therefore, online providers should ensure e-service quality as well as outcomes [19].

2.2. The analytic network process

The ANP is the most comprehensive decision-making technique that is used to handle the complex interrelationships and feedback among criteria in multi-criteria decision-making (MCDM) research. The power of ANP lies in its use of special ratio scales to capture all types of interactions between tangible or intangible criteria and thereby make accurate predictions and better decisions. It also facilitates both interaction and feedback within clusters of elements (inner dependence) and between clusters (outer dependence) [20]. In recent years, the ANP has been widely used in MCDM research for the business and management sectors, including in business performance measurement [21], location selection [22], logistic service provider selection [23], and service quality evaluation [20]. In addition, pairwise comparison in the ANP context assumes that the decision-maker can compare any two criteria and provide a ratio that indicates their relative importance. It also requires $n(n-1)/2$ judgments for n criteria when establishing pairwise comparison matrices, and the number of comparisons increases as the number of criteria increases.

Consequently, decision-makers' judgments will most likely be inconsistent [8].

However, the ANP method deals only with crisp comparison ratios. Due to the vagueness and uncertainty in the decision-makers' judgment with internal inconsistency, the crisp pairwise comparison in the conventional ANP may be insufficient and imprecise to capture the right judgments of decision-makers. Therefore, several researchers have applied the fuzzy theory to tackle ambiguities involved in the process of decision-making. Buyukozkan et al. [24] used FANP to prioritize design requirements by taking into account the degree of the interdependence between the customer needs and design requirements and the inner dependence among requirements. Chang et al. [25] applied FANP in the project evaluation of precision diamond cutting machines, and the result enhances the potential of the FANP for dealing with imprecise and uncertain human comparison judgments. Lin and Hsu [26] also applied FANP to evaluate the synthetic importance index of brand images in department stores, which can reflect inherent interaction among diverse information resources. Besides, FANP techniques also exist in transportation mode evaluation and selection [27] and marketing strategy selection [28].

Based on the literature review, the ANP and FANP have two main drawbacks that should be highlighted. (1) In most cases, the judgments of decision-makers are not perfect; they might be considered as approximations of exact but unknown priority ratios that satisfy the equalities in the ANP. The pairwise comparison matrix is thus said to be inconsistent, and the derived priorities can be used to approximate the initial judgments. (2) The decision-maker is generally unsure of his preferences because information is incomplete and uncertain. Some of the decision criteria used in the ANP are subjective and qualitative, so the decision-maker cannot easily express the strength of his preferences or provide exact pairwise comparisons. Therefore, this study combines the consistent fuzzy preference relations method with the ANP technique to overcome these two drawbacks.

2.3. The consistent fuzzy preference relations method

Herrera-Viedma et al. [29] propose consistent fuzzy preference relations as a way of constructing decision matrices for pairwise comparisons that are supposed to ensure better consistency in preference relations indicated by decision-makers and avoid inconsistent solutions within the decision-making processes. Under this method, only $(n-1)$ repetitions are required to complete the pairwise comparison matrix that have n criteria, and the increase in the number of criteria and sub-criteria reduces the number of comparison required and enhances the efficiency and accuracy of the decisions made. Because consistent fuzzy preference relations are faster to execute and more efficient at addressing the inconsistencies involved in multiple decision-making problems than are conventional methods, a great many studies related to decision-making have used this strategy in recent years [8,30,31]. Therefore, we utilize the consistent fuzzy preference relations method proposed by Herrera-Viedma et al. [29] to overcome the consistency problems associated with decision-maker judgments and eliminate the computational burden of checking the consistency index (CI) and consistency ratio (CR) in the ANP model. We also aim to increase computing efficiency in this way and to avoid inconsistent estimation in constructing the decision matrices.

Researchers have used the fuzzy preference relations method in different fields in recent years. Wang and Chang [30] proposed an analytic hierarchical prediction model based on reciprocal additive consistent fuzzy preference relations to help organizations become aware of the essential factors affecting knowledge management implementation, forecasting the chances of successful knowledge management initiatives, and identifying the actions

متن کامل مقاله

دریافت فوری ←

ISIArticles

مرجع مقالات تخصصی ایران

- ✓ امکان دانلود نسخه تمام متن مقالات انگلیسی
- ✓ امکان دانلود نسخه ترجمه شده مقالات
- ✓ پذیرش سفارش ترجمه تخصصی
- ✓ امکان جستجو در آرشیو جامعی از صدها موضوع و هزاران مقاله
- ✓ امکان دانلود رایگان ۲ صفحه اول هر مقاله
- ✓ امکان پرداخت اینترنتی با کلیه کارت های عضو شتاب
- ✓ دانلود فوری مقاله پس از پرداخت آنلاین
- ✓ پشتیبانی کامل خرید با بهره مندی از سیستم هوشمند رهگیری سفارشات