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Integrated model of hot spring service quality perceptions under uncertainty

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ABSTRACT

Integrating service quality perceptions from customer expectation and employee performance groups in subjective and objective functions are the main concern of service business today. However, to evaluate service quality criteria in linguistic preferences are difficult to present as exact numerical values. Hence, this study proposes a fuzzy extension of Decision Making Trial and Evaluation Laboratory (DEMATEL) in perceptions to address intertwined criteria by applying fuzzy set theory to evaluate the subjective and objective functions and applies extension of DEMATEL to evaluate the model for strategic goals. The empirical result shows that two groups of perceptions can be combined into a visual model to further develop the strategic concerns.

1. Introduction

Understanding, building and integrating service quality perceptions (subjective and objective functions) from customer expectation and employee performance groups are the main concerns of business today. It is now a leading firm strategy to develop a service quality model from these two group's perception measures. Service quality expectations/performance can be interpreted as a prediction of service, an ideal standard, or important criteria. Smith [1] contends that a number of service quality researchers have directly substituted importance measures for perceptions [2–5]. At times, there is a discrepancy in the perceived service quality between customers and employees, which might cause an unsatisfactory service quality gap [6,7]. The spring water minerals contain alkaline and iodine, which is salty with a light sulfuric smell, helps treat skin disease and neuralgia, and is effective for curing skin allergies, alleviating exhaustion, and beautifying the body. Hot springs are an important natural resource and asset in Taiwan. However, service quality affects all service activities and accelerates the development of a hot spring. Hot spring performances are usually measured with multiple alternatives for customers to judge the best service quality performance. A hot spring can acquire the competitive advantage by improving service quality. Thus, improving service quality, increasing assessment and improving reliability are critical as competition continues to increase in order to acquire and retain customers. Service quality conditions might influence a firm's competitive advantage by retaining customer patronage and thus market share and ultimately profit [8,68].

In prior studies, service quality has been developing for several years, evaluating service quality perceptions is critical to make hot springs aware of the importance of service quality perceptions. A considerable number of studies have been conducted emphasizing the criteria to be considered for evaluation [9–11]. Service quality is measured to assess service performance, diagnose service problems, and manage service delivery. The criteria used for service quality evaluation are numerous and influence one another [6,7,12]. In recent years, numerous studies have focused on service quality in the hotel industry [13–16]. The outcomes of these studies have produced several contributions for understanding the analytical structure of the service quality of hotels. This study addresses the imperative issue of how to enhance hot spring competitiveness in terms of a set of service quality criteria with dependent relationships between customer expectations and employee performances with subjective and objective functions. Integrating the perception of service quality of these two groups (customer expectation and employee performance groups) into a visual model is the major challenge of this study. Unfortunately, no current study has been published that has integrated two group perceptions in considering subjective and objective functions into a visual model.

In that sense, current evaluation methods are deficient and do not have an evaluation guideline and therefore are not useful to resolve this issue. In real service quality assessments, there are too many evaluation criteria to determine dependence or independence among the criteria. Customer perception of services and employee performance are vital to the success of all service organizations. It is generally understood that service quality perceptions

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are determined by human subjective and objective functions. Currently, studies have interpreted human judgment in social science with concrete numbers [17–19]. Because some of the evaluation criteria are subjective and objective and because they involve linguistic preferences, it is very difficult for the respondents to express their preferences using exact numerical values; thus, it is more desirable for researchers to apply fuzzy set theory. Fuzzy set theory resembles human reasoning in its use of approximate information and uncertainty to generate the result. It has the advantage of mathematically representing uncertainty and vagueness, and it provides formalized tools for addressing the imprecision intrinsic to many social science problems.

However, the studied criteria have intertwined relations and synthetic utility. Originally, the Decision Making Trial and Evaluation Laboratory (DEMATEL) method [20] illustrates the relationships among criteria, finds the central criteria that are the most effective descriptors, and avoids overfitting for evaluation. The advantage of the fuzzy DEMATEL approach is that it can evaluate the causal and effect relations among the criteria [21–24]. However, the fuzzy DEMATEL is only able to solve the subjective portion of the problem and uses a single respondent group approach. Tseng [24] proposed extension of DEMATEL to integrate the perceptions of the two groups (customer expectation and employee performance groups) based on linguistic preferences. However, the objective function has been ignored. Therefore, there is a need to include the objective function in a more reasonable solution to the perception problem, which includes subjective and objective functions.

The aim of this study is to justify an integrated visual diagram using this novel approach to provide valuable insight regarding hot spring perceptions (customer expectation and employee performance groups). An empirical study of L.J. hot spring located in Guanziling, Taiwan is presented using Fuzzy EDEMATEL to demonstrate an integrated cause and effect diagram [25]. The contribution is to propose the subjective and objective parameters to be considered in extension of DEMATEL under uncertainty and provides empirically proven explanations for management to differentiate the effects of customer expectation and employee performance integration efforts under uncertainty. The remainder of this paper is organized as follows: Section 2 is a literature review; Section 3 describes the novel approach, which includes fuzzy set theory and an extension of DEMATEL; Section 4 applies the application approach to the perceptions problem for hot springs and presents a visual diagram of the proposed criteria. The concluding remarks are given in Section 5.

2. Literature review

Firms need to be aware of the service quality expectations from customers and their performance compared to that of their competitors [26,27]. In the literature, service quality is often conceptualized as a comparison between service expectations and actual performance perceptions [28–31]. These studies showed that service quality attracts new customers and increases business performance. Sultan and Simpson [32] investigated service quality perceptions and expectations of European and American passengers of European and United States (US) airline carriers. Similarly, research by Cunningham et al. [33] focusing on the perceptions of passengers coming from two reports (Taiwan and mainland China) significant differences in service quality perceptions between Korean and US airline passengers. Various studies on service quality emphasize its various dimensions, whereas analysis of service quality perception is limited. However, service quality perception has received extensive attention from both researchers and practitioners [18,34].

Parasuraman et al. formulated a service quality model and identified 10 original determinants using in-depth interviews of executives and focus group interviews of consumers in 1985. Furthermore, they developed the SERVQUAL instrument to measure service quality in 1988. The available literature provides many service quality measurement methods proposed by various researchers [6,7,35–39]. The SERVQUAL instrument consists of five dimensions of service quality: tangibility, reliability, responsiveness, assurance and empathy [7]. (1) Tangibility includes physical evidence of services, such as physical facilities, tools or equipment, appearance of employees, and other customers. (2) Reliability involves consistency of performance and dependability. It means that the firm performs the service correctly the first time and honors its promise. (3) Responsiveness concerns the willingness or readiness of employees to provide service. It includes timeliness of services (e.g., setting up an appointment quickly). (4) Assurance means knowledgeable courteous employees and their ability to convey trust and confidence. (5) Empathy is providing care and individual attention to customers by staff. The SERVQUAL has been used productively as the theoretical basis for many empirical studies to measure customers' perceptions of service quality [2,3,40,41]. An important advantage of the SERVQUAL instrument is that it has been proven valid and reliable across a wide range of service contexts. Furthermore, Parasuraman, Zeithaml and Berry (PBZ) [6] indicated that the SERVQUAL instrument could be revised and refined to fit a wide range of contexts while maintaining its basic content, structure, and length. Landrum and Prybutok [42] proposed a modified version of the SERVQUAL instrument to determine how effectively it measures service quality within the information service industry. The researchers and practitioners have only focused on the service quality criteria content. Most of them have used a traditional statistical approach to present the expectation and performance. Few researchers have improved the evaluation method.

Currently, the SERVQUAL has been tested in various settings, including hotels, rural accommodations, tourist sites, IT services, and health care institutions. The term "service quality" has been used to describe how the customers evaluated the service quality, and numerous contributions in the literature have attempted to establish the criteria needed to evaluate the service quality for difference fields [32,43]. Researchers have classified service quality as strategic, inter-organization and internal service quality to improve a firm's competitiveness.

The SERVQUAL instrument has generated debate concerning its dimensionality [44,45], the need to measure expectations [43,46], the reliability and validity of the difference-score formulation [40,43], and the interpretation and operationalization of expectations [35–37]. However, developers have presented counterarguments, clarifications, and additional evidence to reaffirm the instrument's psychometric soundness and practical value [12,26,42,47,48]. Undoubtedly, SERVQUAL, with modification and refinement, is appropriately applied to measure customer service quality expectations for hot springs.

Perceived service quality is derived from a service encounter between the customer and the service provider during which the customer evaluates quality and develops satisfaction or dissatisfaction [49]. The service experience is evaluated by consumers based on their a priori expectations and is used to evaluate quality, determine satisfaction and form expectations about future consumption experiences [50–52]. This preliminary literature review illustrates the fact that customer perceptions of service quality are critically important for the success of hot spring hotels. However, the criteria that describe service quality are lacking because of environmental uncertainty, and no study has presented integrated causal and effect relationships from the two groups (customer expectation and employee performance groups) in prior research. With this background, this study extrapolates previous results related to