



A genetic algorithm-based learning approach to understand customer satisfaction with OTA websites



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H I G H L I G H T S

- Developed a GA-based approach to evaluate customer satisfaction with OTA websites.
- Help understand customer preferences on different criteria for different segments.
- Help determine how customers gain overall satisfaction across different criteria.
- Followed the design science paradigm by emphasizing the importance of relevance.
- Findings exemplified the importance of human factors in tourism.

A R T I C L E I N F O

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A B S T R A C T

In an extremely competitive marketplace, it is increasingly important for online travel agencies (OTAs) to understand customer satisfaction of different segments. The survey method has been widely used to gain such understanding. However, few previous studies on the tourism and hospitality business have proposed intelligent solutions to analyze such survey data to understand customer preferences on different criteria for different segments, and to determine how customers obtain overall satisfaction across different criteria. In this study, we follow a design-science research paradigm to develop a genetic algorithm-based learning approach to understand customer satisfaction and their psychometric reasons. We further validate this approach through an empirical study for evaluating OTA websites. The results show that different customer segments have different opinions on the importance of various evaluation criteria. The results also reveal that customers tend to judge OTA websites in terms of certain important criteria, instead of by the weighted average of every factor concerned. The proposed approach and the findings of this study can provide constructive suggestions to practitioners and researchers for developing customized marketing campaigns and improving the services of OTA websites.

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1. Introduction

The exponential increase in the popularity of online shopping and the unprecedented growth in the number of online travel agencies (OTAs) have created an extremely competitive marketplace. OTA websites play an essential role in every fabric of tourism, which includes information distribution, transaction facilitation, destination marketing, and connections among travelers (Ip, Law, & Lee, 2011; Law, Qi, & Buhalis, 2010). Moreover, mobile technology and global roaming services make it possible to shift transactions

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from pre-trip planning to actual traveling. Consequently, managers and researchers now pay more attention to customer satisfaction with their websites, and they increasingly turn to advanced analytical technologies for insights into making their OTA sites more competitive (Chaudhuri, Dayal, & Narasayya, 2011; Davenport, 2006; Fuchs, Abadzhev, Svensson, Höpken, & Lexhagen, 2013; Min, Min, & Emam, 2002; Turban, Sharda, Aronson, & King, 2008).

Customer satisfaction leads directly to repeat purchases and increased likelihood of making recommendations for OTAs (Anderson, Fornell, & Lehmann, 1994; Chon, 1989; Oliver, 2010). Several studies have followed the behavioral-science paradigm (Hevner, March, Park, & Ram, 2004) to investigate and measure nomological networks of customer satisfaction (e.g., Baker & Crompton, 2000; Del Bosque & San Martin, 2008; Szymanski & Hise, 2000; Yoon & Uysal, 2005; Yüksel, Yüksel, & Bilim, 2010). The evaluation of customer satisfaction is also critical for OTA web design (Ip et al., 2011; Law et al., 2010). However, some researchers (Hevner et al., 2004; Yüksel & Yüksel, 2003) have argued that without a specific managerial focus, it is difficult for current customer satisfaction theories to produce actionable information for business practice. Although many studies have analyzed the features of OTA websites, most of them have focused on the breadth of features without considering which technical details are most important for satisfying specific segments of customers (Ting, Wang, Bau, & Chiang, 2013). Different segments of customers have various requirements and psychological features with regard to their satisfaction with OTA websites (Buhalis & Law, 2008; Law et al., 2010). This diversity requires that new advanced analytical methods be designed to integrate different algorithms and theories from related disciplines and to capture the dynamic psychometric characteristics of customer satisfaction with OTA websites (Ip, Law, & Lee, 2012).

Therefore, we propose an innovative approach to understand customer satisfaction and their psychometric reasons for preferring OTA websites. Particularly, we develop a genetic algorithm- (GA-) based learning approach to answer the following research questions:

1. What are the preferences on the satisfaction criteria for customers in different segments?
2. How do different customer segments obtain overall satisfaction across various criteria?

The remainder of this paper is organized as follows. Section 2 reviews the related literature. Section 3 formalizes the process of website evaluation with fuzzy synthetic evaluation. Section 4 elaborates the proposed GA-based approach to understand customer satisfaction. Section 5 describes empirical specifications to validate the proposed approach. Section 6 discusses the results. Finally, Section 7 concludes this paper with theoretical and practical implications.

2. Literature review

Customer satisfaction has been well studied in relation to the behavioral aspects of marketing research. Oliver (1980, 2010) explains that customer satisfaction involves an attitude or judgment toward a product or service that successfully provides a pleasurable level of consumption-related fulfillment. Customer satisfaction is considered one of the most important outcomes of all marketing activities by market-oriented firms (Kandampully & Suhartanto, 2000). In the tourism and hospitality field, the study of customer satisfaction has evolved into an important research stream over several decades.

Customer satisfaction is a basic parameter used to evaluate the performance of tourist products and services. Many studies on factors that influence customer satisfaction have been conducted for the sake of improving the services offered by destinations, hotels and travel agencies (e.g., Haber & Lerner, 1999; LeBlanc, 1992; Macintosh, 2002; Ryan, 1995). In the tourism and hospitality literature, most studies have concentrated on the behavioral aspects of tourists. Research themes include tourist satisfaction measurement models (e.g., Del Bosque & San Martin, 2008; Haber & Lerner, 1999; Ryan & Cliff, 1997; Song, Van der Veen, Li, & Chen, 2012; Tse & Wilton, 1988), relationship between satisfaction and loyalty, expectation and service quality (e.g., Baker & Crompton, 2000; Chen & Xiao, 2013; Deng, Yeh, & Sung, 2013; González, Comesaña, & Brea, 2007; Yoon & Uysal, 2005; Yüksel et al., 2010), and regional and cultural differences of tourist satisfaction (e.g., Bowen & Clarke, 2002; Crotts & Erdmann, 2000; Truong & Foster, 2006; Turner, Reisinger, & McQuilken, 2002; Yu & Goulden, 2006).

As in most marketing research on customer satisfaction, the above-mentioned studies have generally followed the research paradigm of behavioral science, in which researchers seek to develop and justify theories that explain or predict organizational and human phenomena (Hevner et al., 2004). In behavioral science, rigor in terms of theoretical foundations and research methodologies has usually been of greater concern than social relevance (Hevner et al., 2004). Accordingly, some tourism researchers (e.g., Yüksel & Yüksel, 2003) have pointed out that studies of customer satisfaction have been either oversimplified or overly complicated, and they have generally lacked a managerial focus. In most cases, such studies have not produced actionable information or identified relevant organizational strengths and weaknesses.

Studies on customer satisfaction have used various statistical techniques for data analysis such as multiple linear regression, factor analysis, cluster analysis or structural equation models. However, advanced analytical methods such as GA and fuzzy mathematics have been neglected in mainstream studies (Law et al., 2010). Statistical techniques based on probability theories are effective tools for studying randomness, but these techniques cannot process fuzziness in human cognition because of linguistic uncertainty (Ip et al., 2012; Zadeh, 1965). Law et al. (2010) suggest that more sophisticated methods that integrate knowledge from multiple disciplines are required in tourism study.

Several marketing studies have demonstrated that the tourist market is not homogenous (Pizam & Milman, 1993). However, most studies on tourist satisfaction have focused on the aggregate market and have neglected the distinctions between customer segments. Only a few studies have examined segment-based customer satisfaction. Anselmsson (2006) finds that different segments of customers have different perceptions of satisfaction with shopping malls. After studying the dining experiences of tourists, Yüksel and Yüksel (2003) identify several distinct dining segments with various sets of dimensions that affect their degrees of satisfaction. Oh and Jeong (1996) report that segment-focused satisfaction analyses provide a clear understanding of the market and a robust prediction of customer satisfaction. Gitelson and Crompton (1984) conclude that marketing efforts which are directed primarily toward persuading new customers to visit a destination may be entirely inappropriate for encouraging previous customers to return.

In considering the above-described findings, we conclude that the study of customer satisfaction in the tourism and hospitality field needs design-science research that analyzes customer satisfaction with advanced analytical methods. Design science emphasizes problem solving and creates innovations that define ideas, methods, and products in contrast to behavioral-science paradigm. Designing new methods to help business managers

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