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Green practices of the hotel industry: Analysis through the windows of smart tourism system

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ABSTRACT

Inspired by the generative characteristics of information on online travel review systems, this study revisits the relationship between the hotel industry's green practices and customer satisfaction in a more realistic setting. The results show that although a higher intensity of green practices enhances customer satisfaction, it does so only indirectly, through perceived relative quality. From these findings, we provide useful implications for the hotel industry. We also suggest further research to conceptualize the generativity of the information system's content both in general and in the context of the smart tourism system.

1. Introduction

Online travel review services (e.g., TripAdvisor, Yelp, and Trustyou), which allow consumers to evaluate and share the attributes and performance of businesses that they have patronized, have emerged as an active area in the smart tourism system. When successful, these platforms demonstrate a self-reinforcing mechanism (i.e., the sites attract more businesses and users to the platform, thus enlarging the user community). Most online travel agencies such as Expedia.com and Hotels.com also publish customer reviews. Consequently, a massive amount of data accumulates on the major online travel sites (Yoo & Gretzel, 2011).

Online travel review sites then can be a good source of information that can be utilized for various purposes in addition to those that were originally intended. For example, hotel managers actively monitor online reviews to analyze customer preferences. Noone, McGuire, and Rohlfs (2011) quote a case in which hotel managers read customer reviews on TripAdvisor and use the information to modify their food and beverage services to increase value. More formally, data from TripAdvisor have been commercialized as a tool for hotels to benchmark their customer satisfaction score against their competitors in the market (Noone et al., 2011).

In this sense, the information content of online travel review sites shares the core characteristics of the generativity of the information system. Generativity has been primarily defined in terms of a technological platform that "enables the generation of new valuable uses, which are easy to distribute and in turn could be the sources of further innovation" (Zittrain, 2008). Extending the concept of generativity of the technological platform, Zhao and Zhu (2013) define the generativity of user-generated online contents (UGC) in terms of the three dimensions of process, content, and users. Among these dimensions, content generativity was defined as the capability of individually generated online content to contribute to presenting, illustrating, or clarifying information.

Although the generativity of information from online systems has not been directly mentioned in research, a number of empirical studies in various disciplines have actively used information drawn from those systems. In the IS literature, Oh, Agarawal, and Rao (2013) have used data from Twitter to analyze social crises, and Aggarwal and Singh (2013) have used information from blogs to analyze venture capitalists' decision making.

In a similar spirit, we utilize the information aggregated in the online travel review system and analyze certain consumer behaviors in a potentially less biased way. Specifically, we investigate the relationship between the hotel industry's green practices and customer satisfaction. Instead of customer reviews on the Internet, survey methodology has been widely used to test theories with respect to customers' perceptions. However, it has been reported that certain issues, such as ethical buying or green consumption, are prone to a social desirability bias—that is, individuals' tendency to

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answer survey questions in ways that they consider socially desirable (Auger & Devinney, 2007; De Pelsmacker, Driesen, & Rayp, 2005; Follows & Jobber, 2000). Under this bias, consumers tend to over-report the strength of their environmental attitudes or intentions (Norwood & Lusk, 2011; Peattie, 2010). Thus, self-reported surveys might have limitations in addressing these issues. In contrast, the validity of online consumer evaluations is expected to be more powerful because data voluntarily provided at one's own discretion may provide a more truthful description of actual experience, thus reflecting a real-life environment (Rhee & Yang, 2015).

In response to society's growing green awareness, the hotel industry is implementing green practices as part of its competitive strategy (Dief & Font, 2009; Han, Hsu, & Lee, 2009; Manaktola & Jauhari, 2007). Additionally, cost saving is another important motivation for green practices in the hotel industry, which is a highly energy-intensive sector (Lin & Ho, 2011; Revilla, Dodd, & Hoover, 2001; Schubert, Kandampully, Solnet, & Kralj, 2010). The difficulty of implementing green practices at a hotel is that these practices can limit the guests' comfort level. For example, customers may complain about too low lighting levels or too cold/hot room temperatures that they are unable to adjust. Often, the criticism singles out green policies that are intended to cut costs by sacrificing guest services.

Still, according to *Forbes* magazine (4/22/2013), nearly two-thirds of travelers reported that they often or always consider the environment when choosing hotels, transportation, and meals (Bender, 2013). Certain green activities, such as recycling cans, bottles, and paper, may have become a part of daily life, and consumers are likely to be environmentally conscious when they travel, especially while staying at a hotel, which is commonly referred to as a "home away from home". However, other studies suggest a different view. Wearing, Cynn, Ponting, and McDonald (2002) report that the proportion of people who perform green activities while on vacation is substantially smaller than the proportion of those who do so at home (Wearing et al., 2002). Indeed, a recurring theme within the green consumer research is the attitude-behavior gap, which describes the phenomenon in which positive attitudes toward environmental issues commonly fail to translate into actual purchases of green products or participation in green activities (Peattie, 2010).

The possible social desirability bias and the attitude-behavior gap associated with green consumer behavior raise a question about the relationship between green practices and customer satisfaction. In academic research on this relationship, empirical evidence has not been conclusive. Slevitch, Mathe, Karpova, and Scott-Halsell (2013) find a positive relationship between green practices and guest satisfaction that is moderated by the hotel's core attributes. Robinot and Giannelloni (2010) report that among the various green attributes, only energy-related factors (the use of clean and renewable energies) have a positive impact on customer satisfaction. These previous studies use survey methodology or experimental design in which respondents were asked to assume a hypothetical setting or recall certain situations.

Alternatively, in this study, we revisit this issue by utilizing data from online travel sites, which provide customer-generated satisfaction scores and detailed information about individual hotels' green attributes. Green policies are largely set at the brand level, whereas the intensity of green practices varies widely among individual establishments. Thus, it is essential (albeit difficult) to collect property-level data. However, now details about individual hotels' green attributes have become available on the online sites. For example, TripAdvisor.com provides four levels of green status—Bronze, Silver, Gold, and Platinum—determined by an evaluation of the applicant hotel's green attributes. Thus, the purpose of this study is to provide an illustrative example of the generativity of the information content of the smart tourism system (and more specifically, the information content of online travel sites) and to investigate the relationship between green attributes and customer satisfaction in a more realistic setting for the hotel industry. For a theoretical basis of the relationship between satisfaction and green attributes, we refer to cognitive dissonance theory (Festinger & Carlsmith, 1959).

This study extends the existing literature in several ways. First, we apply the concept of generativity in the context of the data and information content instead of the technological platform. The core concept of generativity refers to the capacity to create beneficial and desirable outcomes that were not initially anticipated (Avital & Te'eni, 2009). A wealth of user-generated data online has shown remarkably diverse applications beyond its original purpose. For example, Twitter data are used to detect flu epidemics (Lampos & Cristianini, 2010). This study provides an example of using user-generated content in the smart tourism system as a window for investigating consumer perceptions of green practices at hotels. Second, most previous studies on green consumer behavior used a survey methodology based on hypothetical or recalled experiences. Instead, we utilize voluntary customer reviews from online travel sites. This study illuminates the observed intention-behavior gap in the green consumer behavior. Our findings suggest that consumers may positively evaluate the green attributes, which may lead to higher intentions to buy or pay more. However, the action may not occur as an equivalent of those expressed intentions because green attributes are not a direct factor for consumer satisfaction. Third, we investigate a broad range of actual hotels with varying degrees of green attributes. Utilizing the rich information provided in the smart tourism system, we tested the validity of the impact of green features while controlling for the star-rating category, chain affiliation, and brand information, which are the factors known to affect customers' evaluations of a hotel. As more hotels become green for both external and internal reasons, understanding of green issues will provide valuable insights into the industry with respect to effective green strategies.

Although many terms are currently used to describe pro-environmental issues, such as "environmentally friendly" practices, "eco-friendly" operations, or "green" hotels, in this study, we use "green" to refer to the business practices, product attributes, and consumer behaviors intended to reduce waste, conserve energy, and generally promote environmental friendliness (Rahman, Reynolds, & Svaren, 2012).

In the next section, we present related literature of online reviews and green consumer behavior. We also briefly define the smart tourism system. In Sections 3 and 4, we develop our research hypotheses and the conceptual model. We present the results and implications in the final sections.

2. Literature review

2.1. Online travel reviews

Customer reviews have become widely available online for an extensive range of tourism-related products and services. Online travel review systems are recognized as a part of smart tourism systems. Formally, the term smart tourism system (or ecosystem) refers to "tourism systems that take advantage of smart technology in creating, managing and delivering intelligent touristic services/experiences, characterized by intensive information sharing and value co-creation" (Gretzel, Sigala, Xiang, & Koo, 2015). The core function of the smart tourism system is collecting, processing and exchanging tourism-relevant data within the ecosystem (Zhang, 2012), which is referred to as the "informatization" of tourism (Guo, Liu, & Chai, 2014). Information aggregation is particularly prominent in the system that contains online review

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