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A dynamic decision support system for evaluating peer-to-peer rental accommodations in the sharing economy

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ABSTRACT

Accommodation accounts for one of the biggest expenses while traveling, and deciding where to stay is often confusing and time-consuming. Fortunately, travelers have more options than ever before because of the substantial growth of the peer-to-peer (P2P) short-term rentals in the sharing economy. Designing a user-friendly system that considers travelers' preferences in choosing the right accommodation can enhance customer satisfaction and increase profitability. We propose a dynamic decision support system based on the theory of multi-criteria decision making to assist travelers in personalizing their preferences and finding quality accommodations in the dominant P2P market that aligns with those preferences. We use the fuzzy best-worst method to measure the intensity of the user's preferences and the fuzzy technique for order of preference by similarity to the ideal solution (TOPSIS) to score and evaluate alternative P2P rental properties. We present a case study in the P2P rental accommodations industry to demonstrate the applicability of the method proposed in this study.

1. Introduction

The leading businesses advancing the concept of sharing economy are no longer newcomers. The hospitality and tourism industry has been dramatically affected by the emergence of peer-to-peer (P2P) rental accommodations in the sharing economy (Rianthong et al., 2016). The P2P companies such as Airbnb and HomeAway are a popular online marketplace for guests to rent homes or rooms according to their individual preferences. The main advantage of these alternatives for guests is the possibility to find affordable accommodation in areas where hotel rooms are costly or hard to find. These companies collect feedback from guests and provide an overall average score of the previous customer ratings, often in the form of one to five stars (Narangajavana and Hu, 2008). Customers are also encouraged to leave their opinions or criticisms in the form of short comments. Some companies such as HotelsCombined, Booking.com, Hotles.com, Love Home Swap, Expedia, and Eroomsplus use multi-criteria scoring systems based on customers' feedback. This feature allows visitors and potential customers to choose alternatives that are closer to their ideal vacation home. Booking.com has gone one step further by filtering customers' comments based on keywords such as location, parking, convenience, and accessibility, among others (Mariani and Borghi, 2018). Despite the recent technological advances in the P2P platforms, no dynamic system has been developed for ranking alternative accommoda-

tions based on travelers' preferences. The main purpose of this study is to fill this technological gap by developing a dynamic decision support system (DSS) to rank alternative P2P accommodations according to the travelers' preferences.

We propose a dynamic DSS grounded in the theory of multi-criteria decision-making (MCDM) to assist travelers in utilizing their preferences when looking for quality accommodation in the P2P market. Evaluating P2P accommodations are often difficult for tourists and travelers. Although various recommendation systems have been developed over the last decade to help travelers with choosing a place to stay, these systems rarely consider individual traveler's preferences (Ramzan et al., 2019; Young et al., 2017; Hsu et al., 2012; Loh et al., 2003). Most interactions with the P2P platforms involve sorting and filtering data or database queries. The system returns all the sorted or filtered choices that are related to given queries and overwhelms the travelers with a large number of accommodation alternatives. It is also difficult to evaluate alternatives based on textual reviews, votes, ratings or the number of video views. Searching for the most valuable and relevant content among a large amount of information is often as hard as looking for a needle in a haystack for travelers. The online searches of the P2P platforms for suitable accommodations have become time-consuming due to the presence of a huge amount of online information.

In response, some tourism systems and companies have used importance-performance analysis (IPA) proposed by Martilla and James (1977) to simultaneously analyze attribute performance and at-

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