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Availability management of hotel rooms under cooperation with online travel agencies

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ABSTRACT

Hotels are required to pay high commission fees when cooperating with online travel agencies (OTAs) to manage online marketing channels. Thus, to maximize their revenues, hotels protect their income through their own (traditional) marketing channels and save on considerable commissions by optimizing room availability for their cooperative OTAs. The present paper proposes a method to manage such availability in the context of a hotel cooperating with an OTA on room booking service. Customers can make reservations directly through the distribution channel of the hotel or indirectly through the OTA, if applicable, during the selling period. The hotel then forecasts room demand base on distribution information after receiving enough room bookings and optimizes room availability with respect to its maximum revenue by determining whether on-hand rooms are available for the OTA. Results indicate when hotel rooms become unavailable for the cooperative OTA. Numerical studies reveal that this method is conducive to the improvement of hotel revenue.

1. Introduction

The Internet has played a significant role in travel behavior, and it has been embraced by travelers as a crucial channel for booking hotel rooms (Gazzoli et al., 2008; Pan et al., 2013). A survey from the China Tourism Academy (2011) indicates that the Chinese tourism e-commerce market in 2010 was as high as CNY 200 billion (approximately USD 32 billion), or nearly 15% of the total tourism revenue. A large percentage of customers booking electronically reserve rooms via OTAs, such as Expedia and Orbitz (Kim et al., 2007; Morosan and Jeong, 2008). Toh et al. (2011a) report that in 2011, 80% of leisure travelers used the web to search for hotel rooms, among which 67% booked rooms online, and as high as 30% of online-booking customers reserved rooms by OTAs.

The popularity of OTAs has resulted in their increasingly significant role in the distribution systems of hotels (Pan et al., 2013; Park et al., 2007; Yang et al., 2014a). Efficient and convenient OTAs can attract a large number of customers for hotels and improve their occupancy rates (Guo et al., 2014; Kracht and Wang, 2010; Law and Cheung, 2006). However, hotels must pay high commission for each sold room (Ling et al., 2014). Toh et al. (2011b) reveal that the commission paid to OTAs is as high as 15–30%, especially for small hotels. Thus, numerous hotels, particularly small hotels with less negotiation power, harbor resentment against such commission rates.

Consequently, hotels have displayed an ambivalent attitude toward cooperation with OTAs because cooperating with OTAs means having to pay considerable commission fees; however, they risk losing a large online market share in this e-commerce era if they do not cooperate with OTAs. Considering that hotel rooms are highly perishable and cannot be reserved for future use (Hung et al., 2010; Stringam and Gerdes Jr., 2010), hotels must make a tradeoff between potentially higher revenues of reserving rooms by themselves and lower revenues of selling them through OTAs. Hence, hotels have taken the challenge of developing applicable cooperative mechanism with OTAs.

It is observed that certain hotel rooms are sold out on the webpage of OTAs while they are available from the brand website of hotels. This phenomenon is practiced commonly. For example, Hotel ICON cooperates with Expedia (http://www.expedia.com/?v=b) to sell rooms to online customers. Fig. 1 shows that Club 36 Harbour View Rooms for free cancellation for May 15, 2015 were all sold out on Expedia. By contrast, Fig. 2 illustrates that this type of room was available on the brand website of Hotel ICON (http://www.hotel-icon.com/) for the same day. In this paper, the same types of rooms with different properties are defined as different products. For example, in Fig. 1, Club 36 Harbour View rooms for free cancellation are different from rooms that are non-refundable. In view of this phenomenon, this paper proposes a new method for a

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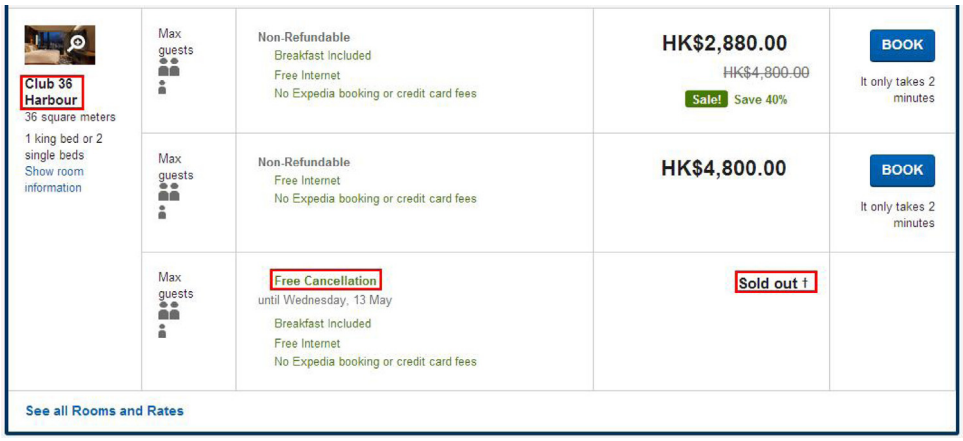

Fig. 1. Club 36 Harbour View Rooms for free cancellation of Hotel ICON on Expedia.

hotel to cooperate with an OTA by announcing its room unavailability to cooperative OTA before the target date to cut the commission fee and maximize profit. At the beginning of the booking horizon, the hotel cooperates with the OTA. Thus, customers can book hotel rooms directly through the traditional distribution system of the hotel or indirectly through the OTA. The hotel then forecasts future demands with the observed room bookings and determines the optimal time for announcing the unavailability of its rooms to the OTA. Afterward, the hotel rooms become unavailable on the OTA and can only be booked through the hotel.

A mathematical model is developed to describe the decision process of the hotel, and optimal results are obtained. In the numerical example, the hotel utilizes committed orders received to forecast future demands and announces to the OTA that no rooms are available two days before the target. The model proves that hotel revenue is improved compared with when the hotel cooperates with the OTA on room booking throughout the selling period.

The rest of the paper is organized as follows. Section 2 reviews related literature on hotel revenue management and cooperation of hotels with OTAs. Section 3 elaborates the cooperation problem between a hotel and an OTA and proposes a new cooperation method for the hotel. Section 4 presents the optimal solution methodology for the problem. Section 5 provides the numerical example to illustrate the solution process. Section 6 concludes the paper, summarizes its limitations, and provides specific research directions for future study.

2. Literature review

Studies related to hotel revenue management and cooperation of hotels with OTAs are discussed in this section. The differences and relationships between these previous studies and the present paper are elaborated.

2.1. Hotel revenue management

Hotel revenue management has long been a popular topic not only in academic research but also in practice. Kimes and Chase (1998) consider hotel revenue management as controlling customer demand to improve profits through variable pricing and

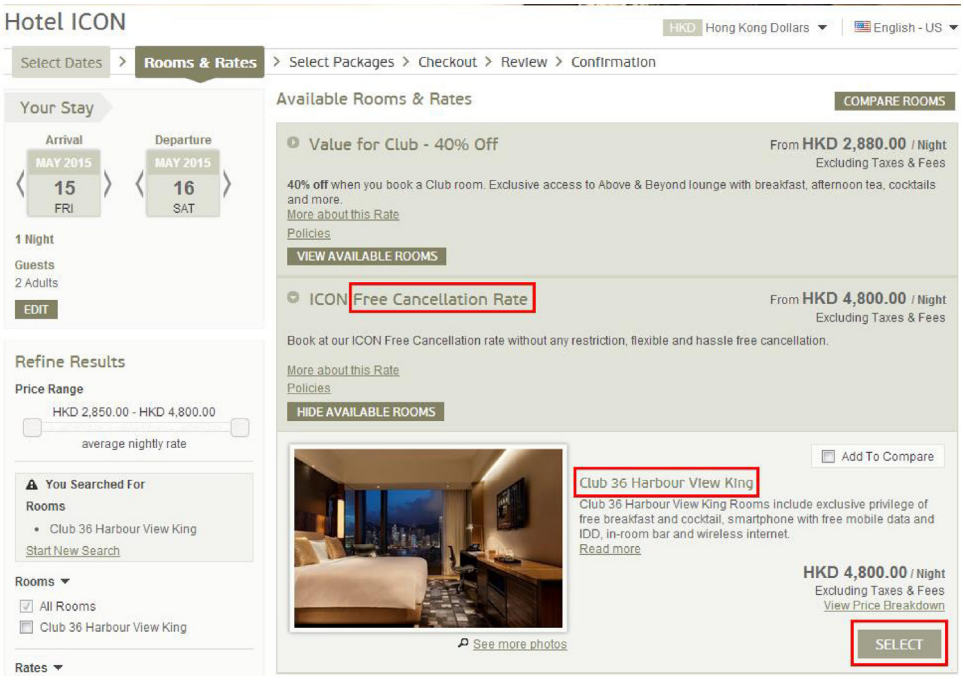

Fig. 2. Club 36 Harbour View Rooms for free cancellation of Hotel ICON on its brand website.