



# Opening the online marketplace: An examination of hotel pricing and travel agency on-line distribution of rooms



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## HIGHLIGHTS

- Study the pricing game with OTAs when hotels open online marketing channel.
- Propose a game model to describe the channel competition between hotels and OTAs.
- Find the optimal pricing policy for hotels to maximize the profit.
- Give suggestions for hotels how to choose appropriate online partners.

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## ABSTRACT

This paper studies the optimal pricing strategy of a hotel that establishes an online distribution channel through cooperation with an online travel agency (OTA). The OTA promotes the hotel and sells hotel rooms through its website and receives commission from the hotel for rooms sold. Through a sequence game model, this paper derives the optimal decision on the unit commission of the hotel and the optimal response of the OTA to that commission. The paper notes management implications, including (1) occupancy rate of a hotel before opening online marketing is an important metric for securing cooperation with an OTA; that is, a hotel with lower occupancy rates is more inclined to cooperate with an OTA to achieve an improvement in profits; and (2) a hotel is inclined to establish an online channel through an OTA with many online customers and/or few listed hotels.

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## 1. Introduction

Owing to the rapid development of information technology, more and more travelers reserve travel services online, such as flight tickets, hotel rooms and car rentals. According to Wu, Law, and Jiang (2013), one-third of the outbound travelers in Hong Kong searched for hotel information online, and approximately 50 percent of them made room reservations through the websites from which they obtained the information. Furthermore, from a survey of 249 leisure travelers, Toh, DeKay, and Raven (2011) found that 80 percent of the travelers searched for hotel information using web tools, with more than half making their bookings through hotels' host websites or third-party websites (i.e., online travel agencies, OTAs). The findings of studies on customer behavior suggest that the online channel plays a crucial role in the tourism

and hospitality industry. As further evidence, approximately 6.5 percent of web inquiries are related to travel (Jansen, Ciamacca, & Spink, 2008), and more than 50 percent of the sales of major brand hotels was attributed to online marketing channels in 2010 (Pan, Zhang, & Law, 2013).

Many of the online bookings for hotel rooms are made through OTAs (Pan et al., 2013). Due to their small market scale and low popularity (Bastakis, Buhalis, & Butler, 2004; Ling, Guo, & Liang, 2011), some hotels usually pay a commission fee for cooperation with an OTA (such as Expedia, hotels.com, and Kuoni) that provides a large number of visitors. As demonstrated by Pan et al. (2013), hotels usually obtain more attention and clicks when ranked near the top of a search result list displayed on an OTA webpage. However, hotels have to pay a reasonable commission fee to an OTA to secure such desirable positions. Hence, hotels are faced with a tradeoff between obtaining a desirable position and paying a high commission fee. It is very important for hotels to obtain an optimal position in a search result list at an appropriate commission fee when establishing an online marketing channel through OTAs. Although numerous scientific researchers have demonstrated the

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importance of online marketing channels by studying customer behaviors in online searching and booking, little literature in the hospitality and tourism fields has studied the pricing problem of cooperation between hotels and OTAs.

To fill this gap and provide some suggestions for hotel managers on establishing their online marketplace through cooperation with OTAs, this paper proposes a game model to describe decision interactions in a tourism supply chain consisting of a hotel and an OTA. The hotel and OTA play a principal-agent game in which the hotel, as the principal player, determines the unit commission for the OTA's sales and the OTA, as the agent, distributes the hotel's information and sells rooms online. Some studies have shown that many travelers search for hotel information through OTAs first and then make reservations through a hotel's call center or host website (Toh, DeKay, et al., 2011; Wu et al., 2013). To induce travelers to make reservations through their website, OTAs undertake extra effort, such as providing discounts on travel packages (Toh, DeKay, et al., 2011), coupons or cash-back (Guo, Zheng, Ling, & Yang, 2014). Consequently, the OTA in our model ranks the hotel and determines its effort level for attracting travelers according to the commission fee paid by the hotel.

Based on an analysis of the game equilibrium reached in the centralized scenario in which the hotel and the OTA play as an integrated system and that reached in the decentralized scenario in which the two make decisions autonomously, we provide suggestions on how hotel managers can cooperate with OTAs. The rest of the paper is organized as follows. Section 2 reviews the related literature. Section 3 describes the problem of cooperation between an OTA and a hotel, and Section 4 models the cooperation. Section 5 presents the first-best and second-best solutions for cooperation in both the centralized and decentralized scenarios. Section 6 presents the results of numerical analyses. Section 7 concludes this paper by summarizing some of the managerial implications obtained and presenting future research issues.

## 2. Literature review

This section reviews two distinct of literature about online marketing: behavioral research focusing on consumer behavior to demonstrate the importance of online marketing and decision studies focusing on the strategic management between hotels and third parties.

### 2.1. Empirical literature about consumer behavior online

At the beginning of online marketing era, the growth of online travel booking was mainly attributed to three aspects: price transparency, the perception of lower prices (O'Connor, 2003; Sahay, 2007), and the economies of bundling (Toh, DeKay, et al., 2011). Today, more and more travelers search for travel information and make reservations online as a result of the convenience of e-commerce (Guo, Ling, Dong, & Liang, 2013).

Because online marketing has become an important part of the tourism and hospitality industry, numerous academic researchers have studied the behavior of online travelers to understand their requirements and desires. Kim, Wei, and Ruys (2003) used an artificial neural network to determine the variable that most significantly influences senior travelers' decisions and make market segmentations according to their findings. Using chi-square tests, Kim and Kim (2004) identified the most significant factors that affect online hotel consumer's intentions to purchase, including age, education level, personal preference, and time of Internet use. Grønflaten (2009) used the same method to select relevant variables and built a logistic regression model to forecast traveler's choices based on information sources and purchasing channels.

Moreover, Law and Hsu (2006) tested the important attributes that differentiate online purchasers from non-purchasers through *t*-tests. Similar research can be found in the existing literature (e.g., De La Viña & Ford, 2001; Morosan & Jeong, 2008; Wong & Law, 2005).

Among studies concerning consumer behavior, researchers have found that some online travelers obtain hotel information from third-party websites or OTAs but make reservations through the hotel's host website (Garrow, Ferguson, Keskinocak, & Swann, 2006) or even switch to other booking channels, primarily by phone (Toh, DeKay, et al., 2011; Wu et al., 2013). In this regard, Toh, Raven, and DeKay (2011) studied how hotels can attract consumers to their own websites and call centers to save on considerable commission fees. Toh, DeKay, et al. (2011) indicated the percentage of online searchers who make a purchase online. Ting, Wang, Bau, and Chiang (2013) and Pan et al. (2013) studied which characteristics of websites and hotels are attractive to travelers.

### 2.2. Decision-making studies on managing the cooperation between hotels and OTAs

Clearly, channel conflict exists between OTAs' booking systems and hotels' hosted channels, including hotels' host websites, call centers, or reception desks. Some researchers have studied the cooperation problem between hotels and third parties. Medina-Munoz and García-Falcon (2000) identified the decisive factors that lead to successful cooperation between hotels and third-party companies. Abbott and Lewry (1999) and Tso and Law (2005) indicated that travel agencies and other third-party companies enjoy low room rates (i.e., room price) from their cooperating hotels. Hence, pricing is not only a key strategic lever deployed by hotels to manage revenue (Kimes & Chase, 1998) but also an important tool for building and enhancing cooperation. A few researchers have provided suggestions on pricing for online hotel distribution channels. Ling et al. (2011) studied the optimal pricing strategy for the cooperative third-party websites of hotels through a wholesale pricing model. However, the authors' assumption that the room rates of a hotel listed on different websites can be different is not currently common practice. In a supplemental study, Guo, Ling, Dong, et al. (2013) discussed the cooperation contract between hotels and OTAs through a network framework in which the room rates of a hotel in all channels are identical. Additionally, Guo and He (2012) and Dong, Ling, and Guo (2013) studied the pricing issue in which a hotel room is considered part of a packaged deal, which is also a common phenomenon in online marketplaces.

However, no study has addressed the problem of a new hotel that wants to open its online marketing channel by cooperating with OTAs. In this situation, the hotel has little information and experience regarding online marketplaces and knows little about how to obtain an appropriate position on an OTA's webpage by providing a reasonable commission fee. To enrich the scientific literature and provide some suggestions to hotels on how to pursue online marketing, this paper studies the optimal pricing strategy of hotels through the analysis of a simple supply chain composed of a single new entering hotel and an OTA.

## 3. Cooperation description

Considering the considerable market share of online travel in the tourism and hospitality industry, a hotel with capacity *C* cooperates with an OTA to open its online marketing channel. Without affecting the findings of this paper, suppose that all of the *C* rooms are identical and one room accommodates one customer (Guo, Ling, Dong, et al., 2013; Ling et al., 2011). Before opening the online channel, the hotel sells its accommodations at a standard

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