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PERFORMANCE EFFECTS OF INNOVATION IN TWO-SIDED MARKETS: THE PARADIGMATIC CASE OF OTAS

Abstract

Online Travel Agents (OTAs) play an important intermediary role in the two-sided travel distribution market. A critical factor that enhances a firm's competitive advantage is innovation. Yet, the analysis of innovation in the OTA context is scarce. The main objective of this article is to fill this gap and examine the effect of OTA innovations on firm performance. We analyze the effect of two-sided market specific innovations (same-side and cross-side) on performance and contribute to the literature by expanding the theoretical understanding of innovations. We find that producer-to-consumer innovations have a greater effect on OTA performance than producer-to-producer and consumer-to-consumer innovations. A fundamental managerial implication is that exchange management is an area to be enhanced when innovating in travel market distribution.

Keywords: innovation; performance; online travel agency; intermediation; distribution

Introduction

Long before the advent of the internet, the tourism industry had established itself as a pioneer in harnessing advances in computer technology, with companies like American Airlines incorporating Global Distribution Systems (GDS) as far back as the early 1960s (Ozturk and Medeiros, 2022). Technological revolutions have brought about revolutions in tourism (Law, Buhalis and Cobanoglu, 2014), and it was not surprising, therefore, that the arrival of the internet precipitated significant changes across the industry (Quaglione et al., 2020), including adjustments to how tourism products were distributed. Digital intermediaries like online travel agencies (OTAs) emerged, for instance, as significant players in the distribution process (García

and Ruiz, 2022a), supplementing and sometimes even displacing traditional channels. OTAs originated in the United States with Expedia.com in 1995 (Leung, Au, Liu, and Law, 2018), and quickly became a viable outlet for producers in the travel industry, such as hotels, airlines and car rental companies, to sell their products to prospective travelers. The specific distributional platforms under which OTAs operate would be seen in the Economics literature as an application of the theory of two-sided markets (Rochet and Tirole, 2003), wherein exchange networks of producers and consumers have been further developed through the internet. The examination of the OTA market under the two-sided network lens is helpful in understanding the relationship between OTAs and the aforementioned producers in the travel industry. More importantly – at least from the perspective of this study – the two-sided lens provides an analytical framework conducive to measuring the impact of OTA innovations, which is the central goal of this research. In fact, while OTAs and intermediaries represent the other side of the coin, the innovations they go through are different from hotels or airlines, and these differences become even more striking when the two-sided market model is included in the argument. Precisely, this point motivates this research so that we can distinguish the results from previous studies focused on innovation made by producers such as hotels (e.g. Nicolau and Santa Maria, 2013) or airlines (e.g. Nicolau and Santa Maria, 2012).

Although making choices on OTAs is not always an easy task—in fact, customers tend to resort to heuristics to make their decisions (Tanford, Choi and Joe, 2019)—the use of OTAs provides customers with a host of benefits in comparison with traditional distribution channels. Not only are OTAs attractive to consumers from a financial standpoint (see Hao, Yu, Law, and Fong, 2015), but in comparison with traditional distribution channels, they provide users with an increased speed in transactions (Buhalis and Law, 2008; Agag and El-Masry, 2016) and offer a broader variety of products and services (Liu and Zhang, 2014). These factors have contributed to the popularity of these portals, and resulted in an environment where producers in the travel industry routinely collaborate with OTAs to sell their products. Collaboration between OTAs and producers also occurs along other dimensions. The rise of business models based on peer-to-peer trading (Dolnicar, 2019), Airbnb and the sharing economy has disrupted the consumption ecosystem of travel and tourism (Buhalis, Andreu and Gnoth, 2020), forcing both hotels and OTAs to adapt to the threat posed by the alternative platform. There is a certain level of substitution between hotels and Airbnb (La, Xu, Hu and Xiao, 2021), and to the extent that hotels

are negatively impacted, so too are distribution channels on which they sell, including OTAs. In this regard, OTAs and hotels might certainly consider cooperation as the more viable strategy.

Despite the cooperation along these and other dimensions, travel firms listing on OTAs pay a substantial percentage in commission to OTAs. Selling through OTA also means producers have less control over pricing (Egger and Buhalis, 2011; Hayes and Miller, 2011). For these reasons, many travel firms list on OTAs only when necessary, and prefer instead to use direct channels as much as possible. These issues result in a highly complex marketplace in which OTAs operate. Elements of both competition and cooperation occur, in fact, other several applications of two-sided markets too. For instance, a computer manufacturer like IBM might sell products on a platform like Amazon, but at other times prefer to sell directly through its website.

In such markets, innovation plays a critical role (Bilotkach and Rupp, 2014; Muzellec, Ronteau, and Lambkin, 2015) in attaining platform success. Innovation strategies helps OTAs increase their competitive advantage (Hjalager, 2002), grow (Love, Roper, and Bryson, 2011) and survive (Hjalager, 2002).

However, even though innovation is frequently highlighted in the literature to be a prime enhancer of firms' performance (Ottenbacher, 2007; Salem, 2014), the tourism and hospitality scholarship has not paid much attention to intermediary specific innovation and the resulting impact on performance. When innovation and firm performance have been examined in this literature, the focus has tended to be on the *producer* of travel services. This literature includes, for instance, the performance effects resulting from innovations in the hotel industry (Nicolau and Santa Maria, 2013) and the airline industry (Nicolau and Santa Maria, 2012). Yet, hotels and airlines – as well as other producers of service like cruise operators and car rental companies – are only one side of what is a two-sided travel market platform. Also part of the platform, albeit in an entirely different role, are OTAs. In order to truly understand what constitutes platform success, one must also understand how OTA innovation contributes to performance. Following Hjalager's (2010) call for studying the effect of innovation actions on firms' performance, we examine the effect of innovation on the market value of OTAs. In addition, our study analyzes innovation types specific to two-sided markets so that potential differential performance related effects can be detected.

In this respect, this study fills a gap in the literature by examining the performance related effects of innovations in a two-sided platform setting, in the context of OTAs. In particular, two-sided markets innovate primarily in two ways: i) same-side innovations, mainly used to build capabilities in managing users, that include either producer-to-producer innovations or consumer-to-consumer innovations; and ii) cross-side innovations, used to increase the capabilities in the exchange management side, that include producer-to-consumer innovations. Note that while most studies on innovation have focused on the taxonomy provided by the Organization for Economic Co-operation and Development (Hjalager, 2010), our paper responds to the literature that calls for studies that estimate the effect of two-sided innovations on performance (McIntyre and Srinivasan, 2017) by connecting two-sided platform innovations to the market value of OTAs.

Literature Review: OTAs and Tourism Distribution

Digital business models have reshaped many aspects of global commence (Buhalis et al., 2019; Zentner and Spremić, 2021), including the distributional networks used. In a relatively short period of time, companies like Amazon, eBay and Netflix were successful in establishing extensive electronic distribution platforms connecting buyers and sellers. Tourism too has become increasingly platform-mediated in recent years with firms like Airbnb changing accommodation and experience landscapes (Capinieri and Romano, 2021). In the travel booking market specifically, although travel agencies have existed since the 1800s (Ruiz and García, 2022), the market in which they operate was radically redefined with the entrance of OTAs as digital intermediaries. OTAs enable customers to use the internet to obtain information and book all kinds of travel products (Kim et al., 2007), and these firms enjoy considerable market penetration. In Western countries these intermediaries already dominate the market, but OTAs are also becoming increasingly popular in emerging economies (Mensah, Sakyi, and Forson, 2022).

Success on platforms in travel and tourism tends to depend, however, not merely on the capacity of the intermediaries to connect buyers and sellers, but on also on how much value the intermediary is able to add (see Cocola-Gant, Jover, Carvalho and Chamusca, 2021). Having the right online standing is seen an important driver for financial success (Anagnostopoulou et al., 2021). In this regard, OTAs are able to assist producers in the travel industry enhance their

online presence, thereby ultimately contributing the bottom line. Past research shows that for hotels, distributing rooms through OTAs yields a return on assets (ROA) of 3.03 percent (Abdullah et al., 2021). Smaller and medium sized enterprises tend to lag behind when it comes to technology adoption (Buhalis and Kaldis, 2008), and for these firms OTAs can be especially crucial in establishing a sufficient online presence.

OTAs create value in a number of ways. Certainly, they serve as a portal that provides consumers with considerable product variety (Liu and Zhang, 2014). Additionally, OTAs enhance product visibility and accessibility, reduce administrative as well as technical hurdles associated with online distribution, and provide efficient translation and payment systems (Abdullah, Van Cauwenberge, Vander Bauwhede, and O'Connor, 2021). As intermediaries, OTAs are also to create value for the consumer by bundling different travel components and selling them at a lower price than if each component had been sold separately (Busby and Huang, 2022). Given that value creation is critical to the formation alliances (Buhalis and Crotts, 2000), it is not surprising that producers from nearly all major travel subindustries including hotels, airlines, car rentals and cruise lines partner with OTAs. Despite these advantages, producers are sometimes unwilling to list on OTAs especially when there is confidence the sale could be made directly on producer owned channels like hotel and airline website. Usually, this is because listing on OTAs entails considerable expenses in the form of commissions. In fact, commissions can be as high as 15-30 percent (Jørgensen, 2022). Complex pricing agreements between OTAs and producers also mean that the producer has less control over pricing across channels (Egger and Buhalis, 2011; Hayes and Miller, 2011). Therefore, notwithstanding the genuine cooperation along certain dimensions, a substantial level of competition also underlines the relationship between OTAs and producers in the industry.

At the same time, at least in some markets, OTAs face competition from traditional brick and mortar travel agents. In parts of Europe, brick and mortar travel agents are popular even today (García and Ruiz, 2022), and remain a source of competition for OTAs. Moreover, new and disruptive business platforms like Airbnb and the rise of the sharing economy also threaten the OTA business model. Furthermore, OTAs also face pressure from other types of disruptive business models like blockchain that promise to eliminate middlemen (see, for instance, Aghaei, Naderibeni and Karimi, 2021). What is nonetheless apparent is that the popularity of OTAs has meant that relationships between key market members in the travel industry have been

transformed (Chen and Kao, 2010; Eastes, 2010; Stangl, Inversini, and Schegg, 2016). In order to remain relevant in such multifaceted environments and withstand the competitive pressures, OTAs must constantly update existing practices such that value is created for consumers as well travel industry partners they serve. This is true whether OTAs operate under the agent model, wherein OTAs receive commissions from tourism providers based on sales, or the merchant model, under which OTAs add a margin to the price charged by service providers.

In order to quantify the impact of innovations on OTA performance it is useful to examine the platform relationships in the context of Rochet and Tirole's (2003) contributions to the theory of two-sided markets.

Innovation and Performance on the Two-Sided OTA Platform

Two-sided markets are platforms that link two separate classes of companies and/or customers together (Rochet, 2006). OTAs operate in such two-sided markets, and provide a platform where transactions are facilitated between travelers on one side and service providers, such as hotels and airlines, on the other (Bilotkach and Rupp, 2014). Although these platforms are not a novel phenomenon (Dietl, Grutter, and Lutzenberger, 2009), the use of two-sided market theory explains the nature of platform competition, and also provides a relevant theoretical and analytical framework conducive to measuring the effects of innovations. Previous studies in the tourism and hospitality literature have investigated the impacts of innovations by other players on the two-sided platform – such as hotels and airlines (see Nicolau and Santa Maria, 2012; Nicolau and Santa Maria, 2013) – but the effect of innovations by platform intermediaries like OTAs also warrants attention.

Other examples of two-sided markets include newspapers networks, which connect readers with advertising firms, and ridesharing company, Uber, which puts in contact drivers and passengers. With the creation of the internet, two-sided markets became especially widespread (Dietl, Grutter, and Lutzenberger, 2009). These markets having few assets to offer, but by building internet networks of producers and consumers they facilitate exchanges among them (Muzellec, Ronteau, and Lambkin, 2015). Airlines, hotels and other producers of travel goods and services can sell their tickets/rooms either by using their direct methods such as their own websites or through indirect methods such as travel agents. Hotels and other tourism producers post their fares and rates on computer reservation systems, from where travel agents

book tickets for their customers (Bilotkach and Rupp, 2014; Kim, Franklin, Philips and Hwang, 2020).

The main two advantages of these two-sided markets are their "capability in managing users who participate in the interaction and in managing exchange" (Zhang and Tang, 2019). As further elaborated later, a way for these markets to stay competitive and survive is to innovate these fundamental capabilities (Choudary, 2015; Parker, Van Alstyne, and Choudary, 2016). Both producers, i.e., hotels, airlines and other travel firms that list on OTAs, and consumers, i.e., prospective travelers are categorized as users of these two-sided platforms (Choudary, 2015), and they embody the supply and demand sides of these platforms. Because OTAs do not generate the services dealt with and exchanged on their platforms, the demand generated by the consumers on these platforms is met by the service providers on the other side of these platforms (Choudary, 2015). Therefore, OTAs are the enhancers of value of these platforms (Evans, 2003). Producers benefit on the supply side from the presence of OTAs as new customers are brought into the platform, whereas customers benefit on the demand side from the easier access to hotel related information (Gao and Bi, 2021).

The topic of innovation itself has, of course, extensively been studied in the literature. Drucker's (1985) highly cited sources of innovation remain relevant even today – under this taxonomy innovations follow from chance, the incongruence of need with supply, market structures, necessity, demographics, changing perceptions and the unexpected. From this classification of sources of innovation, especially pertinent to the OTA platform is its unique market structure – usually an oligopolistic structure with few firms that enjoy considerable market share. This structure is explained by the presence of network effects (see also Armstrong, 2010)– the platform characteristic wherein the value that each side on the network gets depends on the number of users there are on the other side. In the OTA market, this suggests that consumers are drawn to the platform if numerous hotels, airlines, and other travel industry producers list on the OTA website. On the other hand, producers are likely to list on particular OTA platform if consumers use that platform. As the intermediary, OTAs create value on the network by sustaining the links between the two sides. The few OTAs that do exist would typically have established networks large enough to dissuade new firms from being able to enter. The pursuit of larger networks is indeed a priority for OTAs and might explain why the OTA market experiences such frequent mergers and acquisitions. After years of consolidation,

Jørgensen (2022) observes that at the global level only three main OTAs remain: Expedia Group (under which are Hotels.com, Vrbo, Hotwire.com, Travelocity, Orbitz, Trivago, CarRentals.com); Trip.com Group Ltd.(under which are Qunar , Ctrip, Trip.com, Skyscanner,); and Booking Holdings (Booking.com, Priceline.com, Momondo, Kayak.com, Agoda.com, Cheapflights, OpenTable, Rentalcars.com).

Platform value is also enhanced via consumers commitment to the platform and their "continuous consumption" on that platform (Parker et al., 2016). To sustain the flow between producers and consumers, platforms must place additional efforts in managing users, where innovation also plays a fundamental role (Chakravarty, Kumar, and Grewal, 2014).

The relevance of innovation in OTAs' two-sided market is reflected by the following factors:

1) Specific two-sided market functions. Efficient exchanges in the two-sided platforms are contingent on the following main functions (Parker et al., 2016): filtering, matching, facilitating, and curating. First, the filtering function guarantees the pertinence of the unit of value in the exchange (for example, the option that allows the users from each side to filter the services listed); second, the matching function enhances productivity by effectively connecting users (for example, a system that allows users to set matching criteria); third, the facilitating function creates exchange-friendliness and reduces exchange barriers (for example, a friendly-user payment system); and fourth, the curating function establishes the exchange quality (for example, a rating system). Two-sided platforms must build their capability in managing exchange through the intermediation service (Grewal, Chakravarty, and Saini, 2010; Perren and Kozinets, 2018), and thus, they must keep innovating this service that originates from improving the four main exchanged functions listed previously (Parker et al., 2016).

2) OTA platforms face intense competition. Not only do OTAs have to compete with other OTAs but also with hotels, airlines and other tourism providers (Angeloni and Rossi, 2020; Tseng et al., 2021), which prefer to sell through their own distribution channels to avoid commission fees. Although the dependence of hotels and airlines on OTAs is increasing (hotels listed on OTAs' platforms—especially independent hotels—benefit from an increase in their booking because OTAs' websites are more visible on the internet than hotels' direct booking websites (Anderson and Ming, 2017)), in order to survive in this highly competitive environment, OTAs must constantly reevaluate their current strategies and adopt new and

innovative strategies. Also, in the context of two-sided markets with intense competition, the concept of "multihoming" applies, so that a customer has the ability to operate simultaneously on many separate platforms (Armstrong, 2006). In fact, Armstrong and Wright (2007) show that competitive bottlenecks emerge when one of the two sides do "multihoming" and the other does "singlehoming" because "platforms are viewed as homogenous by sellers but heterogeneous by buyers".

Therefore, OTAs differentiating themselves from their competitors is key to avoiding the "multihoming" effect, resulting in a competitive advantage (Gawer and Cusumano, 2014), with the potential above-average profits. As a way to differentiate themselves, and be sustainable in the long run, these firms must innovate (McWilliams and Siegel, 2000).

Interestingly, despite this competition, rivals in the two-sided markets often cooperate to improve their capabilities (Gnyawali and Park, 2011). Previous studies such as Estrada, Faems, and De Faria, (2016) and Bouncken, Claub, and Fredrich (2016) have shown a positive effect of cooperation on innovation through the acquisition of external knowledge (Pereira and Leitao, 2016), and the facilitation of crucial resources and capabilities access (Carayannis and Alexander, 1999). When companies face limits in their internal knowledge and resources that drive their innovation capabilities (Camiso-Zornoza, Lapiedra-Alcami, Segarra-Ciprés, and Boronat-Navarro, 2004), these external exchange of knowledge, capabilities, and resources play an important role in innovation (Brolos, 2009). Thus, this coopetition is not only valuable for sharing these resources, knowledge, and capabilities, but also it creates relationships to jointly expand novel resources and knowledge (Ritala, Golnam, and Wegmann, 2014), thereby improving the power of these two-sided platforms innovation (Bonel and Rocco, 2007).

Thus, because of the desirable enhancement of the specific two-sided market functions (filtering, matching, facilitating, and curating) and the intense competition, innovation becomes a critical element for the OTAs' survival and their attainment of long-term profits, with the subsequent positive effect on their performance. Consequently, the following hypothesis is stated:

H1: *Innovation has a positive influence on OTA performance as reflected in market value*

Additionally, innovation in two-sided markets has some idiosyncrasies. Innovation actions can be categorized into two main types: same-side and cross-side innovation. Same-side

innovations describe novel offerings that affect one of the two sides, i.e., the production behavior of sellers and the consumption behavior of buyers and are mainly used to build capabilities in managing users. Under this category, there are producer-to-producer and consumer-to-consumer innovations. As an example of a producer-to-producer innovation, Expedia in 2017, launched a new feature called Rev+ to help hotels manage their properties and collect the price of hotel rivals automatically so that hotel managers could use it for planning price strategies. As for a consumer-to-consumer innovation, Expedia in 2011 launched Expedia Rewards Loyalty Program to keep customers returning to the platform instead of booking through rival OTAs as well as airlines and hotels.

According to Choudary (2015), both producer-to-producer and consumer-to-consumer innovations positively affect the platform as they benefit producers as well as consumers. Landsman and Stremersch (2011) find that a producer-to-producer innovation may increase producers' multi-homing and switching cost, keeping producers on board, leading to an increase in subsequent value production. Furthermore, consumer-to-consumer innovations are found to increase customers' future consumption as a result of an increased consumer engagement (Algesheimer, Dholakia, and Herrmann, 2005).

However, these innovations can also harm the platform's performance. Bandyopadhyay, Barron, and Chaturvedi (2005) claim that hyper-competition among same-side users can arise from same-side innovations, and consequently drive producers or consumers to abandon the platform. Afuah (2013) examines how on each side, consumers and producers, can utilize these innovations for boosting their own profits, subsequently affecting negatively the platform performance. Furthermore, Grewal et al (2010), observed that producer-to-producer and consumer-to-consumer innovations are sometimes utilized by producers as empowering tools, making them more influential users on these platforms, as well as encouraging more users from each side to come on board, creating more exchange. Sometimes, more does not mean better for the platform. Gradually, as the exchange magnitude becomes larger, the platform becomes more reliant on these users, causing them to negotiate an increasingly higher share of the platform's profits (Chakravarty et al., 2014), and derive more value from the platform. This is a consequence of the idea that the more productive the exchange on the platform, the more growth the platform experiences. The larger the exchange is, the more important the users on the two sides are for these platforms as they are considered the fuelers of this growth.

Therefore, as the magnitude of these exchanges is larger, the more "protected" these users are when collecting additional gains from the platform since these platforms will lose more than gain when penalizing these users and scaring them away (Evan and Schmalensee, 2010). For instance, according to Algesheimer et al (2010), users develop more selectiveness and effectiveness by utilizing the new tools these innovations offer, causing the decline of a platform's gains. As previously mentioned, hotels could use the Expedia Rev+ innovative tool to collect competitors' information and be more efficient in their pricing strategies, and in that way become more influential users on Expedia.

Cross-side innovations, encompassing producer-to-consumer innovations, describe novel offerings that substantially modify the exchange roles in a platform's interaction, which includes the functions of "filtering, matching, facilitating and curating" (Parker et al, 2016). As an example, Priceline introduced in 2013 a functionality to enhance searching on their iPad app providing better exchange through the platform. Often, producer-to-consumer OTA innovations are designed to keep up with changing consumer preferences. For instance, in response to the trend of consumers wanting the option of being able to cancel existing reservations and rebooking if prices drop, OTAs began to offer price monitoring and automated rebooking services (Masiero, Viglia and Nieto-Garcia, 2020).

These innovations positively affect the platform's performance as a result of different factors. First, because this type of innovation assures a large significant "value unit", the rate of successful exchanges through the platform should increase (Parker et al., 2016; Zhang and Tang, 2019). Second, these innovations should result in user satisfaction as they may lower the transaction costs between the consumers and the producers (Zhang and Tang, 2019). Third, these innovative actions are also expected to strengthen the platform's trust mechanism by providing these platforms a better control over users' behavior and over the exchanges (Afuah, 2013; Grewal et al., 2010). Fourth, producer-to-consumer innovations, which alter the facilitating and curating functions on the platform, are able to generate more interactions by fostering additional trades on the platform, thereby increasing platform performance (Grewal et al., 2010).

Unlike the negative effects of same-side innovations derived from a high growth of the platform, these cross-side innovations assist these platforms in managing the active exchanges that occur on those platforms. More specifically, producer-to-consumer innovation, when used to

innovate the filtering and matching functions on OTA platforms, raises the relevancy of exchange, thereby increasing the platform's revenue (Grewal et al., 2010).

Consequently, considering that producer-to-producer and consumer-to-consumer innovations may bring about positive and negative effects on performance, they may neutralize each other, and taking into consideration the positive effect of the producer-to-consumer innovations on these platforms, we hypothesize that the effect of producer-to-consumer innovations is greater than the effect of producer-to-producer and consumer-to-consumer innovations.

H2: *Producer-to-consumer innovations have a greater impact on OTA performance as reflected in market value than producer-to-producer and consumer-to-consumer innovations.*

Data and Methodology

To analyze the impact of innovation on the performance of OTAs and test hypothesis 1, the event study methodology is used to assess changes in market value based on the quantification of abnormal returns. Although the approach is well established in the broader business and social science literature, the use of event analysis to examine the impact of new developments on firm performance has been growing in the travel scholarship (see for example, Zach, Nicolau and Sharma, 2019; Nicolau and Sharma, 2020; Su and Chen, 2020; Corbet et al., 2021). To test hypothesis 2 a regression analysis is conducted to identify differential performance effects of distinct two-sided market specific innovations.

Following Mackinlay's (1997) approach, we implement the event study methodology to determine abnormal returns created by innovation announcements in OTAs.

Intuitively, in the event study methodology, we compare the performance of a firm—measured through the reaction in the stock market—on the day an announcement was made with the performance on that same day if that announcement had not been made. This way, we are able to capture the value that an announcement is adding (or reducing) to the market value of a firm. If the difference between the actual return and the expected return is positive, the announcement is considered to be positive; and negative, otherwise, Precisely, this difference—if significant—is used as dependent variable in a regression model to determine the explanatory factors.

More formally, based on the efficient market theory, this method suggests that stock prices fully depict a firm's publicly available information. Therefore, only unpredictable information, in our case the release of innovation information, will alter and change stock prices (Fama, Fisher, Jensen, and Roll, 1969) and result in abnormal returns. Consequently, utilizing financial market data, this method examines the effect of a single event on a firm's market value (Dyckman, Philbrick, and Stephan, 1984), by comparing normal to abnormal stock performance.

McWilliams and Siegel (1997) suggest a methodological procedure that begins with the identification of event dates, determining the length of the event window, detecting potential confounding effects, estimating the market model, and finally testing abnormal returns.

First, it is important to specify the date when the novel unpredicted information was received by the market. Uncertainty regarding the event date would make it complex to determine the time period during which to evaluate the effect of the event. In our context the event date is defined as the day the innovation information was first released to the public. For this reason, we conducted a keyword search in the Factiva database between 2000 and 2018 that includes the major OTAs trading on the US stock market, Expedia, Priceline, Orbitz, Trivago and Travelocity, followed by key words related to innovation such as "innovation", "innovate", "technological innovation", "new product", "new service", "new process", "new procedure", "new system" or "new technology". Initially, 61 announcements are detected; however, after removing announcements that were too close to each other, the final sample has 53 announcements distributed as follows: Expedia 27, Priceline 12, Orbitz 8, Trivago 3 and Travelocity 3. The announcements span more than three decades, and certainly the OTAs in the dataset have undergone mergers and acquisitions in this period. However, if the dates associated with each the announcements correspond to a time when the particular firm traded independently on the stock market, the OTA must, of course, be treated as independent.

Then, these innovations are categorized into the three types that are characteristic of the two-sided market: producer-to-producer, consumer-to-consumer, and producer-to-consumer innovations. The categorization was done by each of the authors independently for each announcement in the list, and then for the few announcements where discrepancies were observed between the categorization conducted by each author, a consensus was reached after a discussion.

Second, according to Mackinlay (1997), event windows must include a few days prior to and following the announcement, as "the periods prior to and after the event date may also be of interest" to capture leakages and potential delays. To guarantee that potential rumors and announcement leakages as well as delays in processing the information are accounted for, this study uses a 5-day period starting at t=-2 and ending at t= +2.

To calculate normal returns, we retrieve stock market data from the Bloomberg database and estimate the market model proposed by Sharpe (1963) over a period of 150 days preceding to the event. This model is defined by:

$$R_{it} = \alpha_i + \beta_i R_{mt} + \varepsilon_{it}$$

where:

R_{it} = firm i's daily return on day *t*

R_{mt} = market index return on day *t*

α_i = constant reflecting market-independent returns of firm *i*

β_i = effect of the market returns on firm *i*

ε_{it} = error term following an autoregressive conditional heteroskedasticity model GARCH (1,1)

The generalized autoregressive conditional heteroskedasticity model (GARCH) (Bollerslev, 1986) captures the momentum in conditional variance h_{it} (Lamoureux and Lastrapes, 1990). Being an autoregressive model, it estimates the present variance relying on previous squared observations and historical variance. The conditional variance is illustrated as:

$$h_{it} = c_i + \lambda_i \varepsilon_{it-1}^2 + \gamma_i h_{it-1}$$

where $\varepsilon_{it} = h_{it}^{1/2} \eta_{it}$, where ε_{it} / ε_{it-1} , ε_{it-2} , … ~N(0, h_{it}), and η_{it} is independently and identically distribute with E(η_{it}) = 0 and E(η_{it}^2) = 1. Finally, c_i, λ_i, and γ_i are parameters to be estimated.

Next, abnormal returns are computed by the expression:

$$AR_{it} = R_{it} - (a_i + b_i R_{mt})$$

where, for a period of *t* days before the event, a_i and b_i are the estimated parameters from the market model.

To test the significance of the abnormal returns, Pilotte's (1992) cross-sectional test is used, which is defined as:

$$t = \frac{\frac{1}{N}\sum_{i=1}^{N} AR_i}{\sqrt{\frac{1}{N(N-1)}\sum_{i=1}^{N}\left(AR_i - \sum_{i=1}^{N}\frac{AR_i}{N}\right)^2}}$$

where N is the number of announcements and AR_i is the abnormal return on each day of the event window.

Results

Table 1 shows the effects of innovation announcements on OTA performance . There is a positive and statistically significant ($p<0.05$) reaction on the same day an innovation is announced. In particular, abnormal returns of 1.05% are detected. This result supports Hypothesis 1 that innovation has a positive influence on OTA performance. Innovation announcements signal to the market that the OTAs making news has the ability to differentiate their products and services from competitors, earning a competitive advantage in line with Gawer and Cusumano (2014); this competitive advantage should in turn lead to greater profits, and thus to a higher market value.

Table 1. Effect of innovation on OTA market value

Date	Abnormal returns	Corrado's test
-2	-0.0118	-0.8335
-1	-0.0014	-0.3338
0	0.0105	2.0469a
+1	0.0037	0.6423
+2	0.0101	1.7886

a=p<0.05

To test the differential effects of the two-sided market specific innovations we run a regression model where the dependent variable is the abnormal returns of each announcement and the independent variables are the two-sided market specific innovations: same-side with producer-to-producer and consumer-to-consumer innovations—the former being used as the base reference to estimate the model—and cross-side with producer-to-consumer innovations. The results of the parameter estimates are as follows (t-statistics in parentheses):

$$AR_i = \underset{(-1.379)}{-0.0205} + \underset{(1.3717)}{0.0249}CC + \underset{(2.1710)}{0.0365}PC$$

The results show that the parameter associated with producer-to-consumer innovations is significant and positive, meaning that this parameter is higher than the parameters associated with consumer-to-consumer and the base reference producer-to-consumer. This result supports Hypothesis 2 that producer-to-consumer innovations have a greater impact on OTA market value than producer-to-producer and consumer-to-consumer innovations as the expected positive effect of producer-to-consumer innovations show a clearer signal to the market than potentially neutralizing effects of producer-to-producer and consumer-to-consumer innovations.

Concluding Discussion

Although the topic of innovation has been extensively studied in the travel literature (see for instance, Williams and Shaw, 2011; Rodriguez, Williams, and Hall, 2014; Williams, Rodriguez, and Makkonen (2020); Buijtendijk, van Heiningen, and Duineveld, 2021; Scuttari, Pechlaner, and Erschbamer, 2021) comparatively little attention has been paid to innovation in

the context of innovation in OTAs and other distributional intermediaries. OTA firms are significant actors in today's hospitality and tourism world. However, their risk of obsolescence is high if they are not capable of implementing innovations related with the management of users and exchange. Through an econometric event study used to ascertain firm performance, this study shows that innovation has a positive effect on the market value of OTAs. Specifically, the empirical application detects a positive 1.05% statistically significant ($p<0.05$) reaction on the same day OTAs announce the introduction of an innovation.

Also, under the assumption that not all innovations affect the market value of OTAs in the same way, this article tests the differential effects of two-sided markets specific innovations, namely, same-side innovations (producer-to-producer and consumer-to-consumer) and cross-side innovation (producer-to-consumer) and finds that producer-to-consumer innovations have greater impact on the market value of OTAs than producer-to-producer and consumer-to-consumer innovations.

Regarding theoretical implications, this study fills a gap in the literature by providing a theoretical understanding of innovations in a two-sided platform setting, in the context of OTAs. While the current literature is mainly focused on the innovation types of the Organization for Economic Co-operation and Development (Hjalager, 2010), our article responds to the literature that calls for studies that estimate the effect of two-sided innovations on performance (McIntyre and Srinivasan, 2017) by connecting two-sided platform innovations to the market value of OTAs. Moreover, as we find that producer-to-consumer innovations have greater impact on the performance of OTAs than producer-to-producer and consumer-to-consumer innovations, this result suggests that OTAs' ability to enhance exchange is a key driver of performance for two-sided platforms.

Derived from this, a critical managerial implication is that OTA managers ought to further emphasize the improvement of producer-to-consumer innovations to develop the fundamental ability to manage exchange. As these innovations are expected to increase user satisfaction via reduction of transactions costs between consumers and producers, innovative actions aiming at facilitating the exchange between consumers and producers should be reinforced. Additionally, producer-to-consumer OTA innovations help enhance trust on the platform, leading to a larger number of interactions and, in turn, getting an increased number of

trades on the platform. Accordingly, actions that can be proposed may consist of offering services that facilitate the identification of ideal rates tailored to a consumer's characteristics, and that automatically identify reductions in prices and cancel previous reservations and rebook at the new rates.

This study examines, for the first time, the effect of OTA innovations on market value by quantifying the impacts of P2C, P2P and C2C innovations. Still, additional work is necessary. Accordingly, further research could look into other platforms so that these results are confirmed. As Airbnb is another platform in the hospitality industry that is based on the two-sided market business model, an interesting approach would be to analyze innovation in this two-sided platform, which could certainly expand our understanding of the effect of innovation on two sided markets. At the same time, it would be worthwhile to look at the impact of the rise of the Airbnb on OTA performance. Many of the papers relating to the effects resulting from emergence the sharing economy have looked at hotels (García and Ruiz, 2022b), but an understanding of how the OTA business model has been altered could help guide OTA strategy in the future. It is also likely that in the upcoming years more OTAs could look to tap into the sharing economy market, by letting private homeowners list directly on OTA portals. In order to succeed in this space, OTAs might look at what makes portals like Airbnb attractive to consumers (see, for example, Qiu et al., 2020; Yao et al., 2019), but also how OTAs might differentiate themselves from firms like Airbnb. Lastly, advances in mobile technology permit more than simply traditional reservation and information search (Lei, Wang and Law, 2021). The degree to which OTAs are able is likely to be a determinant of future OTA success, and presents an exciting avenue for research.

Additionally, in line with the findings of Williams, Rodríguez and Skokic (2021) about the perceptions of risk and uncertainty throughout the innovation process, it would be insightful to use the volatility in the stock market as a proxy of risk and uncertainty to identify how these notions evolve during the introduction of the innovation. In addition, it would be interesting to investigate what kind of innovations OTAs are going to be interested in pursuing in the upcoming years. Social media and analysis of big data are useful to understand tourist preferences (Chen, Beckin and Stantic, 2021), and one certainly expects that part of the value they create will depend on how effectively they are able to harness these innovations.

The analysis of the effect of OTA innovations on their market value in the framework provided by the two-sided market shows that producer-to-consumer innovations have a greater effect on OTA performance than producer-to-producer and consumer-to-consumer innovations. Consequently, a fundamental managerial implication is that exchange management is an area to be enhanced when innovating in two-sided platforms.

While the study is, by design, restricted to those major OTAs that are trading on the stock market, a limitation is that the empirical application only looks into the US stock market. To confirm the results obtained, the effect of the two-sided market specific innovations should be examined in other stock markets. This, however, we leave for future research.

An additional area of future research in this strand of the literature pertains to whether OTA innovations have changed as a result of the Covid-19 pandemic. The Covid-19 crisis had a significant negative impact on the travel industry (Karabulut et al., 2020; Sharma and Nicolau, 2020), and the ensuing situation of crisis will necessarily bring about changes in business operations and management approaches (Gümüş, Geçti and Yılmaz, 2020). Tourism supply chains have also been impacted (Bire and Nugraha, 2022). The crisis was unprecedented, and firms needed to re-evaluate their current practices and come up with innovations to protect their consumers' health and restore their confidence. In this environment, organizations including OTAs had to innovate; innovation that would help them to gain their competitiveness. In this regard, future research would help shed light on the specific innovations that OTAs undertook in the midst of the pandemic, and assess how effective these pandemic specific innovations were.

References

Abdullah, S., Van Cauwenberge, P., Vander Bauwhede, H., & O'Connor, P. (2021). The indirect distribution dilemma: assessing the financial impact of participation in Booking. com for hotels. *Tourism Review*.

Afuah, A. (2013), "Are network effects really all about size? The role of structure and conduct", *Strategic Management Journal*, 4(3), 257-273.

Agag, G., & El-Masry, A. (2016). Understanding consumer intention to participate in online travel community and effects on consumer intention to purchase travel online and WOM: An

integration of innovation diffusion theory and TAM with trust. *Computers in Human Behavior*, 60, 97-11.

Aghaei, H., Naderibeni, N., & Karimi, A. (2021). Designing a tourism business model on block chain platform. *Tourism Management Perspectives*, 39, 100845.

Algesheimer, R., Dholakia, U.M. & Herrmann, A. (2005), "The social influence of brand community: evidence from European car clubs", *Journal of Marketing*, 69, 3, 19-34.

Algesheimer, R., Borle, S., Dholakia, U.M. & Singh, S.S. (2010), "The impact of customer community participation on customer behaviors: an empirical investigation", *Marketing Science*, 29(4), 756-769.

Anagnostopoulou, S. C., Buhalis, D., Kountouri, I. L., Manousakis, E. G., & Tsekrekos, A. E. (2019). The impact of online reputation on hotel profitability. *International Journal of Contemporary Hospitality Management*.

Angeloni, S., & Rossi, C. (2020). Online search engines and online travel agencies: A Comparative Approach. Journal of Hospitality & Tourism Research, 1096348020980101.

Anderson, C. K., & Ming, C. (2017). Multi-click attribution in sponsored search advertising: An empirical study in hospitality industry. *Cornell Hospitality Quarterly*, 58(3), 253–262.

Armstrong, M. & Wright, J. (2007), "Two-sided markets, competitive bottlenecks and exclusive contracts", *Economic Theory*, 32 2, 353-380.

Armstrong, M. (2006), "Competition in two-sided markets", *RAND Journal of Economics*, 37, 3, 668-691.

Bandyopadhyay, S., Barron, J.M., Chaturvedi, A.R. (2005), "Competition among sellers in online exchanges", *Information Systems Research*, 16(1), 47-60.

Bilotkach, V. & Rupp, N.G. (2014). Buyer subsidies in two-sided markets: evidence from online travel agents. *The Economics of International Airline Transport*, 4, 339-374.

Bire, R. B., & Nugraha, Y. E. (2022). A value chain perspective of the new normal travel behaviour: A case study of Indonesian millennials. *Tourism and Hospitality Research*, 14673584211065615.

Bollerslev, T. (1986). Generalized autoregressive conditional heteroskedasticity. *Journal of Econometrics*, 31(3), 307-327.

Bonel, E. & Rocco, E. (2007). Coopeting to Survive; Surviving Coopetition. *International Studies of Management and Organization*, 37(2), 70-96.

Bouncken, R., Clauß, T. & Fredrich, V. (2016). Product innovation through coopetition in alliances: Singular or plural governance? *Industrial Marketing Management*, 53(1), 77-90.

Brolos, A. (2009). Innovative coopetition: The strength of strong ties. *International Journal of Entrepreneurship and Small Business*, 8(1), 110-134.

Buhalis, D., Andreu, L., & Gnoth, J. (2020). The dark side of the sharing economy: balancing value co-creation and value co-destruction. *Psychology & Marketing*, 37(5), 689-704.

Buhalis, D., & Crotts, J. (2000). Global alliances in tourism and hospitality management. Routledge.

Buhalis, D., Harwood, T., Bogicevic, V., Viglia, G., Beldona, S., & Hofacker, C. (2019). Technological disruptions in services: lessons from tourism and hospitality. *Journal of Service Management.*

Buhalis, D., & Kaldis, K. (2008). eEnabled internet distribution for small and medium sized hotels: the case of Athens. *Tourism Recreation Research*, 33(1), 67-81.

Buhalis, D., & Law, R. (2008). Progress in Information Technology and Tourism Management: 20 years on and 10 years after the Internet: The State of the etourism Research. *Tourism Management*, 29(4), 609-623.

Buijtendijk, H., van Heiningen, J., & Duineveld, M. (2021). The productive role of innovation in a large tourism organisation (TUI). *Tourism Management*, 85, 104312.

Busby, G., & Huang, R. (2022). Intermediaries. In D.Buhalis (Ed.), *Encyclopedia of Tourism Management and Marketing*. Edward Elgar Publishing.

Capineri, C., & Romano, A. (2021). The platformization of tourism: from accommodation to Experiences. *Digital Geography and Society*, 2, 100012.

Carayannis, E. & Alexander, J. (1999). The wealth of knowledge: Converting intellectual property to intellectual capital in co-opetitive research and technology management settings. *International Journal of Technology Management*, 18(3), 326-352.

Chakravarty, A., Kumar, A., Grewal, R. (2014), "Customer orientation structure for internet-based business-to-business platform firms", *Journal of Marketing*, 78(5), 1-23.

Chen, J., Becken, S., & Stantic, B. (2021). Harnessing social media to understand tourist mobility: the role of information technology and big data. *Tourism Review*.

Chen, C. F., & Kao, Y. L. (2010). Relationships between process quality, outcome quality, satisfaction, and behavioural intentions for online travel agencies – evidence from Taiwan. *The Service Industries Journal*, 30(12), 2081-2092.

Chesbrough, H. (2020). To recover faster from Covid-19, open up: Managerial implications from an open innovation perspective. *Industrial Marketing Management*, 88(2020), 410-413.

Choudary, S.P. (2015), Platform Scale: How a new Breed of Startups is Building Large Empires with Minimum Investment, Platform Thinking Labs, New York, NY.

Cocola-Gant, A., Jover, J., Carvalho, L., & Chamusca, P. (2021). Corporate hosts: The rise of professional management in the short-term rental industry. *Tourism Management Perspectives*, 40, 100879.

Corbet, S., Efthymiou, M., Lucey, B., & O'Connell, J. F. (2021). When lightning strikes twice: The tragedy-induced demise and attempted corporate resuscitation of Malaysia airlines. *Annals of Tourism Research*, 87, 103109.

Dietl, H.M., Grutter, A., & Lutzenberger, M. (2009). Defensive competitive strategies in two-sided markets: the example of the mail industry. *Competition and Regulation in Network Industries*, 10, 1, 25-43.

Dolnicar, S. (2020). Sharing economy and peer-to-peer accommodation–a perspective paper. *Tourism Review*.

Dyckman, T., Philbrick, D. & Stephan, J. (1984), "A comparison of event study methodologies using daily stock returns: a simulation approach", *Journal of Accounting Research*, 22, 1-29.

Eastes, R. (2010). History of online travel industry. Retrieved from https://blog.vroomvroomvroom.com/2010/10/history-of-online-travel-industry.html

Egger, R., & Buhalis, D. (2011). Case 1 InterContinental Hotel Group: dealing with online intermediaries. In *eTourism case studies* (pp. 52-59). Routledge.

Estrada, I., Faems, D. & De Faria, P. (2016). Coopetition and product innovation performance: The role of internal knowledge sharing mechanisms and formal knowledge protection mechanisms. *Industrial Marketing Management*, 53(1), 56-65.

Evans, D.S. (2003), "Some empirical aspects of multi-sided platform industries", *Review of Network Economics*, 2(3), 191-209.

Falk, M. (2013). A survival analysis of ski lift companies. *Tourism Management*, 36, 377-390.

Fama, E.F., Fisher, L., Jensen, M.C. & Roll, R. (1969), "The adjustment of stock prices to new information", *International Economic Review*, 10 1, 1-21.

Gao, G. X., & Bi, J. W. (2021). Hotel booking through online travel agency: Optimal Stackelberg strategies under customer-centric payment service. *Annals of Tourism Research*, 86, 103074.

García , J. R., & Ruiz, R. P. (2022a). Independent Travel Agency. In D. Buhalis (Ed.), *Encyclopedia of Tourism Management and Marketing*. Edward Elgar Publishing.

García, J. R., & Ruiz, R. P. (2022b). Platform Economy. In D. Buhalis (Ed.), *Encyclopedia of Tourism Management and Marketing*. Edward Elgar Publishing.

Gawer, A. & Cusumano, M.A. (2014), "Industry platforms and ecosystem innovation", *Journal of Product Innovation Management*, 31 3, 417-433.

Gnyawali, D. R. & Park, B. (2011). Co-opetition between giants: Collaboration with competitors for technological innovation. *Research Policy*, 40(5), 650-663.

Grewal, R., Chakravarty, A., & Saini, A. (2010), "Governance mechanisms in business-to-business electronic markets", *Journal of Marketing*, 74(4), 45-62.

Gümüş, N., Geçti, F., & Yılmaz, A. (2020). Marketing strategies with private labels during economic recession. In improving marketing strategies for private label products 110-134.

Hao, J., Yu, Y., Law, R., & Fong, D. (2015). A genetic algorithm-based learning approach to understand customer satisfaction with OTA websites. *Tourism Management*, 48, 231-241.

Hayes, D.K., Miller, A.A. (2011). Revenue Management for the Hospitality Industry. John Wiley and Sons, Hoboken, NJ.

Hjalager A.M. (2010) A review of innovation research in tourism. *Tourism Management*, 31(1): 1-12.

Hjalager, A.M. (2002). Repairing innovation defectiveness in tourism. *Tourism Management*, 23, 465-474.

Jørgensen, M.T. (2022). Intermediary (Online). In D.Buhalis (Ed.), *Encyclopedia of Tourism Management and Marketing*. Edward Elgar Publishing.

Karabulut, G., Bilgin, M. H., Demir, E., & Doker, A. C. (2020). How pandemics affect tourism: International evidence. *Annals of Tourism Research*, 84, 102991.

Kim, D. J., Kim, W. G., & Han, J. S., (2007). A perceptual mapping of online travel agencies and preference attributes. *Tourism management*, 28(2), 591-603.

Kim, J., Franklin, D., Phillips, M., & Hwang, E. (2020). Online travel agency price presentation: examining the influence of price dispersion on travelers' hotel preference. *Journal of Travel Research*, *59*(4), 704-721.

La, L, Xu, F, Hu, M, & Xiao, C (2021). Location of Airbnb and hotels: the spatial distribution and relationships. *Tourism Review*, emerald.com, https://doi.org/10.1108/TR-10-2020-0476

Lamoureux, C.G., & Lastrapes, W.D., (1990). Heteroskedasticity in stock return data: volume versus GARCH effects. *The Journal of Finance*, 45, 221-229.

Landsman, V. & Stremersch, S. (2011), Multihoming in two-sided markets: an empirical inquiry in the video game console industry", *Journal of Marketing*, 75 6, 39-54.

Law, R., Buhalis, D. & Cobanoglu, C. (2014). Progress on information and communication technologies in hospitality and tourism. *International Journal of Contemporary Hospitality Management*, Vol. 26 Iss 5 pp. 727 - 750

Leung, R., Au, N., Liu, J., & Law, R. (2018). Do customers share the same perspective? A study on online OTAs ratings versus user ratings of Hong Kong hotels. Journal of Vacation Marketing, 24(2), 103–117.

Lei, SI, Wang, D, & Law, R (2021). Mobile-based value co-creation: Contextual factors towards customer experiences. *Tourism Review*, emerald.com, https://doi.org/10.1108/TR-10-2020-0504

Liu, J., & Zhang, E. (2014). An investigation of factors affecting customer selection of online hotel booking channels. *International Journal of Hospitality Management*, 39, 71-83.

Love, J.H., Roper, S., & Bryson, J.R., (2011). Openness, knowledge, innovation and growth in UK business services. *Research Policy*, 40 (10), 1438–1452.

MacKinlay, A., (1997). Event studies in economics and finance. J. Econ. Lit. 35 (1), 13–39.

Masiero, L., Viglia, G., & Nieto-Garcia, M. (2020). Strategic consumer behavior in online hotel booking. *Annals of Tourism Research*, 83, 102947.

Mastrogiacomo, M. (2020). COVID-19 Hotel Recovery Strategy: Top 10 Ways to Prepare your Hotel for the Rebound in Travel Demand, https://www.hospitalitynet.org/opinion/4098228.html

McIntyre, D. P., & Srinivasan, A. (2017). Networks, platforms, and strategy: Emerging views and next steps. *Strategic management journal*, *38*(1), 141-160.

McWilliams A, & Siegel D. 2000. Corporate social responsibility and financial performance: correlation or misspecification? *Strategic Management Journal*, 21(5): 603–609.

McWilliams, A., & Siegel, D., (1997). Event studies in management research: theoretical and empirical issues. *Academy of Management Journal*, 40 (3), 626–657.

Medrano, N., Cornejo Canamres, M., & Olarte-Pascual, C (2020). The impact of marketing innovation on companies' environmental orientation. *Journal of Business & Industrial Marketing*, 35(1), 1-12.

Mensah, C., Sakyi, R., & Forson, M. A. (2022). Destination Distribution Systems and Travel Disintermediation in Emerging Economies. In Marketing Tourist Destinations in Emerging Economies (pp. 149-166). Palgrave Macmillan, Cham.

Muzellec, L., Ronteau, S., & Lambkin, M. (2015), "Two-sided Internet platforms: a business model lifecycle perspective", *Industrial Marketing Management*, 45(1), 139-150.

Nicolau, J. L., & Santa-María, M. J. (2013). The effect of innovation on hotel market value. *International Journal of Hospitality Management*, 32, 71-79.

Nicolau, J. L., & Santa-María, M. J. (2012). Gauging innovation worth for airlines. *Journal of Air Transport Management*, 20, 9-11.

No, E., & Kim, J.K., (2015). Comparing the attributes of online tourism information sources. *Comput. Hum. Behav*. 50, 564–575.

Ozturk, A.B., & Medeiros, M. (2022). eCommerce. In D.Buhalis (Ed.), *Encyclopedia of Tourism Management and Marketing*. Edward Elgar Publishing.

Parker, G.G., Van Alstyne, M.W., & Choudary, S.P. (2016), Platform Revolution: How Networked Markets are Transforming the Economy And How To Make Them Work For You, WW Norton & Company, New York, NY.

Perren, R. & Kozinets, R.V. (2018), "Lateral exchange markets: how social platforms operate in a networked economy", *Journal of Marketing*, 82(1), 20-36.

Qiu, D, Lin, PMC, Feng, SY, Peng, KL, & Fan, D (2020). The future of Airbnb in China: industry perspective from hospitality leaders. *Tourism Review*, emerald.com, https://doi.org/10.1108/TR-02-2019-0064

Quaglione, D., Crociata, A., Agovino, M., & Iaia, L. (2020). Cultural capital and online purchase of tourism services. *Annals of Tourism Research*, 80, 102797.

Ritala, P., Golnam, A. & Wegmann, A. (2014). Coopetition-based business models: The case of Amazon.com. *Industrial Marketing Management*, 43(2), 236-249.

Rochet J. (2006) "Two-Sided Markets: A Progress Report", *RAND Journal of Economics*, 37(3), 645–667.

Rochet, J., & Tirole, J. (2003). *Platform competition in two-sided markets*. *Journal of the European Economic Association*, 1(4), 990-1029.

Rodriguez, I., Williams, A. M., & Hall, C. M. (2014). Tourism innovation policy: Implementation and outcomes. *Annals of Tourism Research*, 49, 76-93.

Ruiz, R. P., & García, J. R. (2022). Travel Agent, Encyclopedia of Tourism Management and Marketing (pp. 1-3). Edward Elgar Publishing. Salem, I.B. (2014) Toward better understanding of knowledge management: Correlation to hotel performance and innovation in five-star chain hotels in Egypt. *Tourism and Hospitality Research*, 14(4): 176–196.

Scuttari, A., Pechlaner, H., & Erschbamer, G. (2021). Destination Design: A heuristic case study approach to sustainability-oriented innovation. *Annals of Tourism Research*, 86, 103068.

Sharma, A., & Nicolau, J. L. (2020). An open market valuation of the effects of COVID-19 on the travel and tourism industry. *Annals of tourism research*.

Sharpe, W. (1963) "A Simplified Model for Portfolio Analysis", *Management Science*, 9(2), 277-293

Stangl, B., Inversini, A., & Schegg, R. (2016). Hotels' dependency on online intermediaries and their chosen distribution channel portfolios: Three country insights. *International Journal of Hospitality Management*, 52, 87-96.

Su, C. H. J., & Chen, C. D. (2020). Does sustainability index matter to the hospitality industry?. *Tourism Management*, 81, 104158.

Tanford, S., Choi, C., & Joe, S. J. (2019). The influence of pricing strategies on willingness to pay for accommodations: Anchoring, framing, and metric compatibility. *Journal of Travel Research*, *58*(6), 932-944.

Tseng, T. H., Wang, Y. S., & Tsai, Y. C. (2021). Applying an AHP Technique for Developing A Website Model of Third-Party Booking System. Journal of Hospitality & Tourism Research, 1096348020986986.

Williams, A. M., Rodriguez, I., & Makkonen, T. (2020). Innovation and smart destinations: Critical insights. *Annals of Tourism Research*, 83, 102930.

Williams, A. M., Rodríguez Sánchez, I., & Škokić, V. (2021). Innovation, risk, and uncertainty: A study of tourism entrepreneurs. *Journal of Travel Research*, *60*(2), 293-311.

Williams, A. M., & Shaw, G. (2011). Internationalization and innovation in tourism. *Annals of tourism research*, 38(1), 27-51.

Yao, B., Qiu, R. T., Fan, D. X., Liu, A., & Buhalis, D. (2019). Standing out from the crowd–an exploration of signal attributes of Airbnb listings. *International Journal of Contemporary Hospitality Management.*

Zach, F. J., Nicolau, J. L., & Sharma, A. (2020). Disruptive innovation, innovation adoption and incumbent market value: The case of Airbnb. *Annals of Tourism Research*, 80, 102818.

Zentner, H., & Spremić, M. (2021). Typology of digital business models in tourism. International *Journal of E-Services and Mobile Applications*, 13(2), 21-42.

Zhang, S. & Tang, T. (2019). Managing same-side and cross-side innovations in two-sided platforms. *Marketing Intelligence and Planning*. 37(7), 770-790.