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Disruptive Innovation and Incumbent Market Value: The case of Airbnb

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Abstract

The purpose of this article is to analyze the market value impact of actions taken in response to disruptive innovation; specifically, actions that incumbent lodging firms implement to adopt the innovation of peer-to-peer trading-based accommodation rental. As incumbent firms need to device strategies to accommodate the disruption stemming from a new entrant with a disruptive business model, we analyze the differentiated efforts of four incumbent lodging firms to compete with the peer-to-peer lodging firm Airbnb. This study is the first to quantify the effects of innovation on incumbent tourism firms challenged by a disruptive entrant. It finds that adoption speeds, that is first vs. late adoption, make a difference as the former are awarded a significant increase in market value.

Keywords

Innovation adoption, market value, incumbent response, market model, event study.

1. INTRODUCTION

While it is generally understood that disruptive innovation creates new offerings and at times new actors in the marketplace, research in tourism, hospitality and beyond often focuses on the disruptor and pays little attention to already existing firms in the marketplace. These existing firms, generally referred to as incumbents or incumbent firms, survived in the market place by adopting or developing their own innovations to accommodate disruptions stemming from new market entrants, new technologies or changes in consumer behavior. For disruption triggered by information technology and resulting digital innovation, it was found that incumbent firms are best served by redefining their identity to incorporate changing beliefs in the market place and among stakeholders (Tripsas, 2009). Specifically, when faced with a disruptive business model based on a technology innovation, incumbent firms are left with two strategies to ward off the new entrant: strengthening the existing business model or adopting the new business model either exclusively, simultaneously with the existing business model or not at all (Osiyevskyy & Dewald, 2015). The choice among these strategies as a potential response is influenced by organizational and environmental settings and decisions prior to the experienced market disruption. Ultimately incumbent firms adopt these strategies with varying degrees of success: from decline to failure by succumbing to the new technology or business model to survival and even dominance following the disruption (Ahuja & Lampert, 2001; Hill & Rothaermel, 2003).

To measure the success of incumbents' elected strategy past studies assess performance in terms of sales revenue (Kim & Min, 2015) or productivity growth and patent counts (Aghion, Blundell, Griffith, Howitt, & Prantl, 2009). More generally innovation performance can also be measured by a firm's market value (e.g. Blundell, Griffith, & van Reenen, 1999; Sood & Tellis, 2009). For tourism, the measurement of innovation adoption has been challenging at the destination level as performance data is distributed across many destination stakeholders. At the firm level, however, Nicolau and Santa-María (2013) used firm market value to assess the impact of hotel innovation announcements. Assessing market value has the advantage of allowing for daily observations compared to annual or quarterly internal performance data such as sales revenue or productivity

growth. The second advantage is that market value analysis forward looking whereas internal accounting measures look backward. In this study we use timestamped event data of incumbent firms to measure changes to their market value. Specifically, we are analyzing announcements of four incumbent lodging firms in their efforts to adopt the peer-to-peer lodging innovation introduced by Airbnb. Each of the four firms (Accor, Hyatt, Marriott and Wyndham) chose a different strategy at a different point in time. In fact, this study is, to the authors best knowledge, not only the first study to assess the impact of Airbnb on incumbents' market value, but also the first to quantify the effects of incumbents' responses to disruptive innovation.

The purpose of this study is to learn if the stock market rewards incumbent firms in their efforts to adjust their business to "deal with" the increasing popularity of peer-to-peer trading (Volgger, Taplin, & Pforr, 2019). In tourism peer-to-peer trading started as the rental of individual rooms in private residences and is referred to as peer-to-peer lodging. Specifically, the aim of this study is to contribute to innovation and tourism literature by identifying differences among first and late moving incumbents and the effect of these various adoption speeds on firm market value.

2. LITERATURE REVIEW

2.1. Innovation

Broadly defined, innovation is the creation or adoption of marketable new ideas (Daft, 1978; Damanpour & Schneider, 2006; Zaltman, Duncan, & Holbeck, 1973). On a more granular level, Schumpeter (1947) argues that an innovation consists of making use of an invention that is new to the market, while the adoption of of something already existing, but new to an organization is an imitation (Rogers, 2003). Hence, an innovation can be new to the market or new to the adopting entity (Johannessen, Olsen, & Lumpkin, 2001; Mansfield, 1963). This property of innovation "newness", however, depends on the level of analysis: economists considers the industry level, while management scholars are concerned with the organizational level (Gopalakrishnan & Damanpour, 1997). For tourism research Peters and Pikkemaat (2005) argue that complex and networked characteristics of tourism require a clear focus both on the unit of interest and the innovation measurement (for example innovation intensity or success vs. failure). This study adopts the organizational level as it investigates how incumbent firms adopt an idea that is new to them and assesses the introduction or withdrawal of service offers to fend off peer-to-peer lodging competition on incumbent market value.

Newness can also be viewed as a dimension from incremental to radical (Nord & Tucker, 1986). Incremental innovation is a stepwise improvement of products, services and process and can result in efficiency improvements and error reductions (Clark & Fujimoto, 1991). Creating new knowledge, novel ideas and products, often through technological advancements, and commercializing them is referred to as radical innovation (Tushman & Anderson, 1986). Radical innovations, thus can result in starkly different new ways to produce or deliver products and services and alter the relationship between a firm and its customers. Christensen (1997) argues that while radical innovations can disrupt the market place, incremental innovations have the capacity for massive disruptions. This is attributed to incumbents overlooking small changes, especially when they appeal to a market segment currently not served while radical changes and their impact on current market segments are easier spotted. Disruptive innovations, thus, create new markets and challenge incumbents and disrupt the status quo of existing markets (Nagy, Schuessler, & Dubinsky, 2016).

A radical technology policy, as pursued by technology startups or startups relying heavily on technology, has a direct impact on the development of radical innovation (Ettlie, Bridges, & O'Keefe, 1984). Indeed, strategic orientation of the organization and fit with existing strategies, markets and resources are predictors of innovation output and success (de Brentani, 2001; Hitt, Hoskisson, & Hicheon, 1997). Organizations seeking diversification often end up with incremental innovations to expand their current markets while not alienating existing customers (Ettlie et al., 1984). Hence, in the case of peer-to-peer lodging it is thus not surprising that a technology-driven startup like Airbnb developed a disruptive innovation to provide lodging services not only differently than incumbent firms, but also catered to a market overlooked by existing lodging firms.

The disruptive force of peer-to-peer lodging is also reflected in Hjalager's (2002) tourism interpretation of the creative destruction of innovation model developed by Abernathy and Clark (1985). Peer-to-peer lodging in the United States is an architectural innovation as it, by definition disrupts existing production competences and creates new linkages in the market place: first, it produces overnight stays in private rooms or homes rather than in properties originally intended for lodging, and second, Tussyadiah (2016) found that it attracted individuals to the travel market that did not travel previously. Incumbent firms were innovators before the emergence of peer-to-peer accommodation. They developed niche and regular innovations; for example, new brands that combine or split existing services to cater to new customer segments (niche) or development of properties in geographic regions previously untapped. In either case, incumbents did not deviate from the traditional lodging model of allocating many guest rooms within branded properties, whereas peer-to-peer lodging is the opposite: one to few rooms in many residential properties.

Hence, while there is an important argument to understand peer-to-peer lodging through an innovation lens, tourism and hospitality research on peer-to-peer lodging and innovation to date is siloed. Studies on peer-to-peer lodging thus far mostly focus on understanding consumer choice or peer-to-peer properties (e.g. Prayag & Ozanne, 2018; Tussyadiah, 2016; Tussyadiah & Zach, 2017) or host decisions to accept guests (Karlsson, Kemperman, & Dolnicar, 2017). On the other hand, innovation studies help us understand three aspects of innovation: first, drivers of innovation such as human capital (Nieves, Quintana, & Osorio, 2014), and customer orientation and collaborative competence in hospitality (Ordanini & Parasuraman, 2011) and at destination marketing organizations (F. J. Zach, 2016). Second, the management of innovation processes at hospitality firms (Jones, 1996; Ottenbacher, 2007), the incorporation of partners (Cabiddu, Lui, & Piccoli, 2013; F. J. Zach & Hill, 2017), the use of policies to spur innovation (Rodríguez, Williams, & Hall, 2014) and the successful innovation development at hotels (Ordanini & Maglio, 2009) and at destination marketing organizations (F. Zach, 2012). Third, the effects of innovation and innovation behavior on hotel performance (Mattsson & Orfila-Sintes, 2014; Ordanini & Maglio, 2009) and on small and medium sized tourism businesses in general (Martínez-Román, Tamayo, Gamero, & Romero, 2015). For publicly traded hospitality firms several studies measured the impact of innovation behavior on market value of select firms; for example, the effect of innovation announcements (F. J. Zach, Krizaj, & McTier, 2018) and innovation awards (Nicolau & Santa-María, 2013) for hospitality firms and the effect of localized innovations on tourism firms in general (Napierała & Szutowski, 2018).

2.2. Innovation adoption

Innovation adoption literature typically focuses on either the full adoption or the rejection of an innovation (Frambach & Schillewaert, 2002), as in the case of information technology adoption (Carlo, Lyytinen, & Rose, 2012), and assumes that the adopters make full use of the innovation (Rogers, 2003) and commit to using it in perpetuity (Bhattacherjee, 1998). However, this dichotomous point of view ignores that firms might adopt an innovation with less intensity, for example that not all practices of total quality management are adopted (Ravichandran, 2000) or that a disruptive business model by a new entrant cannot be easily and fully replicated by the incumbent (Chesbrough, 2010). However, firm adoption of innovation, which is the decision to implement an innovation, is a process with sequential stages starting with the identification of an innovation. In its entirety it is "the process through which an individual or other decision-making unit passes from first knowledge of an innovation, to forming an attitude toward the innovation, to a decision to adopt or reject, to implementation of the new idea, and to confirmation of this decision" (Rogers, 2003, p. 20). Frambach and Schillewaert (2002) argue that the decision to adopt happens between becoming aware and forming an understanding of the innovation and the decision to purchase and make use of the innovation. The three main steps of pre-adoption, adoption decision and post-adoption (Damanpour & Schneider, 2006) are commonly known as initiation, adoption decision and implementation (Frambach & Schillewaert, 2002; Pierce & Delbecq, 1977; Rogers, 2003).

2.3. Innovation and business models

The adoption of new technologies goes beyond a simple purchasing and staff training process. The new technology itself has no value until it is realized in a commercial setting (Chesbrough, 2010) whereby each approach returns different results. In other words, the value of technology depends up on the business model employed by an incumbent firm to market it. Zott and Amit (2010) and Amit and Zott (2012) define a business model as interdependent system of activities that explains how to create and capture value from technology and other key resources. Business models are often defined for a specific entity, but can also extend to individuals and collective actors (Reinhold, Zach, & Krizaj, 2017), enabling service firms incorporate consumers and other stakeholders relevant to co-create their offerings (Beritelli, Reinhold, Laesser, & Bieger, 2015). As incumbent firms already employ a business model the injection of a new technology or equipment requires them to reassess their current business model to generate a new value proposition for their customers and stakeholders (Souto, 2015). To do so incumbent firms require both knowledge and capabilities to seize opportunities from an innovation (Teece, 2007).

Incumbent lodging firms employ a variety of business models, from operating hotels in leased or owned properties to franchising their brand names to third party operators. Individuals renting their properties as part of peer-to-peer trading can be the property owners or a professional management firm that leases such properties (Reinhold & Dolnicar, 2017a). A firm such as Airbnb, on the other hand, operates a multi-sided platform business model requiring multiple actors on either side (consumer or provider) and connects them (Reinhold & Dolnicar, 2017b); this is similar to hotel booking platforms such as Expedia. Hence, entering the peer-to-peer lodging market is a challenging proposition for incumbent lodging firms, as it is capitalizing on different value propositions and capabilities.

2.4. Innovation diffusion: first and second mover advantages

Innovation adoption does not take place at once, but is diffused over time (Reinganum, 1989; Rogers, 2003). Peer-to-peer lodging at individual rooms in private residences has been available in Europe for a long time; for example, "Private Zimmervermietung" (rental of private rooms) in Austria and Germany lacks a separation of private household and rental unit and were mostly rented based on word of mouth and often to repeat guests. Airbnb combined this type of rental of individual rooms and even pull-out sofas in living rooms with a large-scale internet-based distribution system. Although offline channels such as classifieds in print and unpaid channel such as Couchsurfing might also appear to be relevant, they have not had the same disruptive effect, and in addition, comprise platforms that are distinct from the paid and online Airbnb model (Dolnicar, 2019). This makes Airbnb the inventor of a distribution system for private rooms, which was its first type of offering at its conception in 2008. Incumbent lodging firms, thus, are potential adopters of this innovation.

The internet platforms required to enable peer-to-peer lodging at large scale require substantial resource investments and have uncertain benefits. As for many uncertain investments first movers bear these investment costs and risk to develop a sustained leadership in technology as costs fall with cumulative output (Lieberman & Montgomery, 1988). However, until the entrance of a second mover the first mover has a monopoly and an uncluttered marketspace (Kerin, Varadarajan, & Peterson, 1992). Business models that, such as peer-to-peer lodging, are built on network effects thus have an opportunity to develop a winner-takes-all situation to dominate the marketplace as each additional user makes the network more valuable and useful to all. While first movers might have high rewards, second movers and late adopters can reduce risk by assessing first mover's innovation adoption in the marketplace. Second movers can benefit from several advantages: first, innovations lacking protection in the form of patents and copyright regulation can be freely copied (Dos Santos & Peffers, 1995). This applies to service innovations, especially in tourism where competitors often replicate market leaders. Second, through adoption the first mover reveals the value of the innovation due to the irreversibility of investment and thus informs competitors' adoption decision (Hoppe, 2000). In other words, competitors can choose to adopt after the first movers educated potential customers of the service need, delivered a proof of concept of the innovation or, in the best case, demonstrated the viability of the innovation in the marketplace. This creates a free-rider problem where competitors, even those that did not adopt, can wait to observe market demand after the first mover adopted (Jensen, 2003). Third, by catching up in big steps second movers can leapfrog the first mover without related sunk costs and risks (Fudenberg, Gilbert, Stiglitz, & Tirole, 1983). This suggests, that incumbent lodging firms adopting the peer-to-peer lodging innovation early can reap benefits in the market place whereby those that adopt later can learn not only from innovator Airbnb, but also from the early adopting incumbents.

Incumbent firms respond to disruptive innovations that threaten the firms' existence in three different ways: carry on as usual, adopt the innovation quickly or adopt it later. Regardless of the decision, incumbents will either suffer from the disruption of the status quo of their market, in the worst case to the point that they falter, or they survive with or without adjustments and remain in the market (Ansari & Krop, 2012). Among incumbents the speed of adoption varies; however, so does research on the benefits of fast or slow adoption. In response to a technological innovation second movers can often develop from niche to mass market while the first mover is still occupied

with learning both the technology and the field (Markides & Geroski, 2005). On the other hand, and more generally as a response to radical innovation, Hopkins (2003) found that incumbents with a slow aggressive response were better off than those that responded quickly. Hence, both speed and type of adoption response matter.

3. METHODOLOGY

We are employing an event study to measure the effect of relevant news items on the market value (defined as number of shares times the share price) of incumbent lodging firms. By relying on market value this methodology is a forward-looking performance metric that avoids the disadvantages of backward-looking accounting firm measures. Under the efficient hypothesis assumption, share prices show the actual value of future cash flows, which represents a good metric to gage the effect of innovation adoption actions on firm performance. Assuming this hypothesis, the portfolio theory postulates, for the case of this empirical application, that the impact of incumbent response on performance is estimated in an unbiased way. The impact is assessed on three different window lengths: one, two and three contiguous days before and after the event. Each window assesses all included days as an aggregate. We refrain from using longer windows as they may introduce the possibility of contamination. The relatively short windows we use for the present study allow us to be more confident that any effects we detect result from events of interest, and not from other, non-innovation related developments that affect firm performance over longer time horizons.
Accordingly, we start with the market model

$$R_{it} = \alpha_i + \beta_{1i} R_{mt} + \beta_{2i} R_{ht} + \varepsilon_{it} \quad (1)$$

where R_{it} is the return to shareholders from changes in market value for each firm *i* on day *t*, R_{mt} is the return for the market portfolio on day *t*, and R_{ht} is the return for the hotel industrial index on day *t*. The market portfolio used is the Standard & Poor's index of the 500 largest companies in the US (SP500). As for the industrial index, we use the Dow Jones Hotel and Lodging REITs Index for the US market (Hyatt, Marriott and Wyndham) and, because we are not aware of any similar hotel index specific to France (Accor), we create an index for the French market by factoring in the returns of all the hotels trading on Euronext Paris..

Note that in the literature of event studies, no control groups are used; rather, the general news items that occur in the market are controlled through the market portfolio. Controlling for events that happen to the industry the firm belongs to will certainly refine the analysis. Therefore, we are controlling for general factors and industry-specific factors. The fact that we find some significant and positive parameters related to the innovation news examined in the manuscript means that those firms beat both the market and the industry; in other words, no matter what types of news announcements are made on specific days (market-wise or industry-wise), those firms react more positively to innovation-related announcements than to other general and industry-specific announcements. Obviously, the reverse applies when the parameters are significant and negative.

We estimate a market model for each firm and apply Karafiath's (1988) methodology, so that a dummy variable x_t is introduced that takes value 1 on the day *t* the news item is released for the news type *j*: Note that Karafiath's (1988) method captures the excess returns (abnormal returns) by adding dummy variables to the right-hand side of the market model. The resulting parameter estimate capture those excess returns derived from shock that happen on the day the announcement is made. To be more

specific, this author literally defines the parameter that accompanies the dummy variable as the "estimated coefficient on the dummy variable, or excess return to security *j* on observation *t*" (page 352).

$$R_{it} = \alpha_i + \beta_i R_{mt} + \beta_{2i} R_{ht} + \sum_{j=1}^{J} \gamma_j x_{jt} + \varepsilon_{it} \qquad (2)$$

where γ_j reflects the effect of the news item *j* on the returns; accordingly, any potential abnormal returns will be captured by this coefficient. As the error term might be affected by kurtosis and heteroskedasticity, GARCH-family models are estimated. In particular, we use the symmetric models ARCH (Engle, 1982) and GARCH (Bollerslev, 1986), and the asymmetric models EGARCH (Nelson, 1991) and TGARCH (Glosten, Jagannathan, & Runkle, 1993; Zakoian, 1994). For the symmetric models, the impact of new information on the variance does not depend on its sign. Thus, the ARCH(*p*) model brings about the following returns:

$$\varepsilon_{it} = h_{it}^{1/2} \eta_{it} \text{ and } \varepsilon_{it}/\varepsilon_{it-1}, \varepsilon_{it-2}, \ldots \sim N(0, h_{it})$$

being

$$\eta_{it} \text{ i.i.d. with } E(\eta_{it})=0 \text{ and } E(\eta^2_{it})=1$$

The conditional variance h_{it} is as follows:

$$h_{it} = c_i + \sum_{j=1}^{p} \lambda_{ij} \varepsilon_{it-j}^2 \qquad (3)$$

where c_i and λ_{ij} are parameters to be estimated and *p* are the number of lags. A generalization of this model is obtained by the GARCH(*p,q*) models, where *q* is the number of lags of the autoregressive part, and the conditional variance is

$$h_{it} = c_i + \sum_{j=1}^{p} \lambda_{ij} \varepsilon_{it-j}^2 + \sum_{k=1}^{q} \gamma_{ik} h_{it-k} \qquad (4)$$

Given that positive and negative news might affect differently the returns, other models exist to consider this potential asymmetry: the EGARCH(*p,q*) model. In this model, the conditional variance is defined as

$$h_{it} = \exp\left\{ c_i + \sum_{j=1}^{p} \left(\lambda_{ij} \left| \frac{\varepsilon_{t-j}}{h_{it-j}^{1/2}} \right| + \delta_{ij} \frac{\varepsilon_{t-j}}{h_{it-j}^{1/2}} \right) + \sum_{k=1}^{q} \gamma_{ik} \ln(h_{it-k}) \right\} \qquad (5)$$

And the TGARCH(*p,q*) model, whose conditional variance is defined as follows:

$$h_{it} = c_i + \sum_{j=1}^{p} \lambda_{ij} \varepsilon_{it-j}^2 + \phi_i \varepsilon_{it-1}^2 D_{it-1} + \sum_{k=1}^{q} \gamma_{ik} h_{it-k} \qquad (6)$$

where $D_{it-1} = 1$ if $\varepsilon_{it-1} < 0$ and $D_{it-1} = 0$ otherwise. Akaike's and Schwarz's Information Criteria are used to find the best model, which are defined as AIC=-2log(L_{ML})/M +2k/M and SIC=-2log(L_{ML})/M +$k$log(M)/M, respectively, in which L_{ML} is the likelihood function, M is the sample size and k the number of coefficients estimated in the model. An Ordinary Least Squares model serves as the base line model to with the ARCH class models are compared to. These measures are based on the likelihood functions and use the number of parameters as a penalty, so that the best parsimonious model can be detected. The best goodness of fit is indicated by the lowest value.

4. DATA

To observe the effects of incumbents' response to disruptive innovation on their market value we seized on the opportunity presented by the market entrance of Airbnb as a leading peer-to-peer

lodging firm. Hence, Airbnb's approach to delivering lodging experiences is an external impetus for change. Specifically, we treat Airbnb's entrance into the lodging market as a disruptive innovation that forces existing firms to adapt not only to Airbnb and similar competitors, but also to consumer demands for personalized experiences (Tussyadiah, 2016), hybrid experiences that combine a home feeling with expectations of professional hospitality (Zhu, Cheng, Wang, Ma, & Jiang, 2019), and staying in a local home rather than a hotel (Karlsson et al., 2017).

The incumbent firms we analyzed were four lodging firms that since the entrance of Airbnb adopted the peer-to-peer lodging innovation by developing their own response to Airbnb or by partially or fully acquiring a peer-to-peer lodging startup: Accor, Hyatt, Marriott and Wyndham. For each firm we searched press releases and public disclosure forms for planned or implemented innovation adoptions of peer-to-peer lodging solutions from 2008 until including December 31st, 2018 (specifically, the common time frame of identified items for the sampled firms is January 1st, 2013 to December 31st, 2018). As incumbent firms pursue different announcement strategies it was not possible to exclusively use announcements of either planned or implemented innovations. The effect of each innovation adoption on return was measured with the first announcement towards the innovation and follow-up announcements towards the performance of that response. Table 1 shows the responses put in place by these four firms and the types of news these responses have been classified into. Most interestingly Accor and Hyatt initially invested into the same two startups Oasis and OneFineStay, but later on sold shared in one to settled on just one. Below is a brief description of events in alphabetical order of incumbent firms.

>>> INSERT TABLE 1 ABOUT HERE <<<

In 2016 **Accor** invested heavily in peer-to-peer lodging startups. First, it purchased 30% and 49% stakes in the Oasis and Squarebreak , respectively, fully acquired OneFineStay. Still in 2016 Accor launched the Jo & Joe hotel brand that promised to deliver an experience similar to Airbnb. With the acquisition of Travel Keys in 2017 Accor expanded its peer-to-peer lodging offers. All four external investments and acquisitions were in the upper class and luxury segment. Still in 2017 Accor first sold its stake in Oasis after it received a strategic investment from Hyatt, expanded OneFineStay across the US and Europe and consolidated its three remaining peer-to-peer investments under OneFineStay. In 2018 Accor announced major additions to OneFineStay, but also a write-off of US$228 million.

Hyatt, in 2015, publicized an initial investment into OneFineStay dating back to 2014. When OneFineStay was fully purchased by Accor in 2016 Hyatt sold its shares and a year later made a strategic investment in Oasis, resulting in the divestment of Accor as mentioned above. In 2018 Hyatt added Oasis to its loyalty program, but was sold the same year to home rental firm Vacasa after announcing Oasis underperformance and a US$ 22 million write-off.

Among the studied firms **Marriott** was the last one to go head-to-head with peer-to-peer lodging services. As Airbnb evolved over time from the rental of individual rooms to full homes Marriott launched its own full home offerings as a pilot in London, United Kingdom in 2018. Later that same year Marriott announced an expansion of the pilot to Paris, France, Rome, Italy and Lisbon, Portugal.

Finally, **Wyndham** first used the home rental platform HomeAway for bookings from 2014 to 2015 and tested Airbnb in 2016 with little success. In 2017 it acquired peer-to-peer startup LoveHomeSwap.

5. RESULTS

Table 2 shows the optimum model, that is the most parsimonious model, for each incumbent firm, where the numbers in bold represent the best fitting model. Accordingly, for Accor the TGARCH (1,1) is best, for Hyatt and Marriott EGARCH(1,1) and for Wyndham the ARCH(1) is optimum.

>>> INSERT TABLE 2 ABOUT HERE <<<

Table 3 presents the results derived from the effect of investing in peer-to-peer lodging-related responses on the market value of each of the incumbent firms analyzed. All six models show acceptable R-squared and adjusted R-squared measures, between 0.43 and 0.51.

For Accor only news related to the announcement to finish consolidating Travel Keys, Squarebreak and OneFineStay under OneFineStay by end of the year has significant results (TN_{ACCOR4}). However, the parameter is negative which means that shareholders perceived this news as not beneficial to the firm. All three different window lengths present robust results. For the type of news TN_{ACCOR1} we analyze the type itself (one parameter for all seven announcements) and each announcement (one parameter for each announcement), and find no significant reaction in any case.

The results for Hyatt show that positive and significant parameters for news related to the investing in peer-to-lodging (TN_{HYATT1}). All three different window lengths present robust results. As before, we analyze the individual effect of each announcement contained in the type TN_{HYATT1}, and obtain that the particular announcements bring out positive returns are "Oasis strategic minority investment" and "Oasis – only brief mentioning".

For Marriott both types of news ($TN_{MARRIOTT1}$ and $TN_{MARRIOTT2}$) related to the launch and expansion of its own version of peer-to-peer lodging, respectively, have negative and significant parameters. As before seen with Accor, this innovation is not perceived as adequate by the firm's shareholders. All three different window lengths present robust results. Regarding the individual effects of the announcement type $TN_{MARRIOTT1}$, we find that the last two "London pilot positive CEO comments" cause the impact.

Wyndham, as in the previous case, has a negative and significant parameter for the announcement of its innovation adoption ($TN_{WYNDHAM1}$). All three different window lengths present robust results. Concerning the individual impacts, we see that the reaction is derived from the announcements "HomeAway - used as a distribution channel" and "HomeAway - global agreement and talks with others".

Among the incumbent lodging firms responding to industry disruption led by Airbnb, the analysis suggests that the strongest rewards are available to Hyatt, the earliest of adopters among incumbents. Hyatt's foray into the domain of peer-to-peer lodging, marked by its investment into luxury home rental enterprise OneFineStay in May 2015, followed by its continued peer-to-peer lodging related announcements, resulted in a significant increase in market value of Hyatt.

>>> INSERT TABLE 3 ABOUT HERE <<<

6. DISCUSSION

Our analysis shows that incumbent firms, despite their familiarity with online booking platforms and rental of dedicated units, did not seize quickly on the peer-to-peer lodging market segment. Airbnb introduced the rental of full homes, an activity like vacation rentals, in 2009 when Hilton, Marriott and others managed or had investments in vacation rental businesses. However, the peer-to-peer approach of full rental units distributed across many properties rather than in purpose-built properties might have been a major hurdle for adoption. Nevertheless, the asset-light strategies pursued by incumbent lodging firms, that is the separation of property management and property ownership to forgo investment into real estate. This would have suggested that a peer-to-peer lodging approach with no ownership beyond an online booking platform would have been desirable by incumbent lodging firms. Indeed, Marriott and Wyndham split of their timeshare vacation business into publicly traded companies in 2011 and 2017, respectively. Hilton pursued the asset-light strategy even more aggressively with its 2017 split into three separate publicly traded companies: property management Hilton Worldwide, asset ownership Park Hotels & Resorts and timeshare business Hilton Grand Vacations. Nevertheless, Hilton today is the only large US lodging firm that has not entered the peer-to-peer-like lodging market. It did, however, create TrueHotel as a new hotel brand to capture travelers attracted to peer-to-peer experiences. The divestment from vacation rentals can also explain why incumbent lodging firms did not engage the peer-to-peer lodging market from its 2008 start to 2014. In line with Christensen (1997) it appears the initial low-cost single room or pull-out sofa rental offerings catered to a market segment not appealing to incumbent lodging firms. However, from our data we cannot discern if the lack of appeal stems from timeshare divestment or the initial low-price market segment. Nevertheless, the product evolution and the increased appeal of peer-to-peer lodging eventually did catch the attention of incumbent firms.

Our results show that innovation adoption responses by incumbent lodging firms, except for Hyatt, were not rewarded by shareholders. While Wyndham was the first incumbent to jump on the peer-to-peer bandwagon by utilizing the Home Away platform to sell its inventory, Hyatt was the first to invest into peer-to-peer lodging. Hence, Wyndham's first move was to adding Home Away as another distribution channel and is thus not an innovation adoption. Hyatt, on the other hand, can be seen as the first second mover among incumbent lodging firm following the inventor and first mover Airbnb. Hyatt's investments into OneFineStay and Oasis were exposed to greater risk than later movers, but the positive effect on market value can be explained as a reward by shareholders for the anticipated return stemming from this investment as suggested by Hoppe (2000). On the other hand, Hyatt's integration of Oasis into its loyalty program was neither rewarded nor punished by the market. A possible explanation would be that this move was an effort to save the Oasis investment as it took place with a two year delay after the acquisition, but just months before devaluation and sale.

Theory suggests that later adopters such as Accor, Marriott and Wyndham would be rewarded for their investments (Fudenberg et al., 1983; Jensen, 2003) as they had the opportunity to observe and learn from Hyatt's integration of a peer-to-peer-like lodging producing into a traditional lodging firm. Our results, however, found the opposite. That is, all incumbents that invested into peer-to-peer lodging offerings after Hyatt were punished by the stock market for these investments. As market value is nothing else than the value an investor puts on all future cash flows it appears that

investors in all studied firms except Hyatt did not believe that these investments aid in the future success of the firm. Indeed, despite investments similar to Hyatt both Accor and Wyndham saw negative returns. It is even more striking that their investments were not rewarded even before Hyatt reported a poor performance on its investments. Since we analyzed market portfolios, we have to assume that the Hyatt firm structure and strategies were more appealing to investors. It is also possible that investors believed that due network effects only one incumbent firm can successfully compete with dominant Airbnb. Unfortunately, our data does not reveal these details. Similarly, this lack of reward was found for Marriott's approach to partnership versus acquisition, thus reducing its investment and pursuing an asset-light approach before write-offs and underperformance were reported by Accor and Hyatt. However, timing might be an issue as although the stock market reflects investor assessment of future cash flows, investors at times may adopt a wait and see approach in which abnormal returns may not be generated in the investigated window. These results are intriguing as past research suggests rewards for these later adopters given that first movers and other early adopters took the risk and investment to test for market viability (Hoppe, 2000; Lieberman & Montgomery, 1988).

There are several potential explanations for this lack of reward. New technologies challenge existing processes, resources and assets and can make them obsolete. Hobijn and Jovanovic (2001) argue that capital disappears from the stock market and incumbent firms to be reallocated to new, private firms until they enter the stock market at a later point. Second, contextual explanations are that Accor's investments in and acquisitions of multiple startups while simultaneously launching a new hotel brand aimed at peer-to-peer customers might have raised concerns of a lack of focus to respond to the peer-to-peer market. Indeed, even the consolidation of acquired startups yielded a statistically significant negative effect on market value. As hotel firms engage in many avenues to secure future success there might be an overlap of firm actions beyond the innovation adoption that affect market value. Marriott, on the other hand, might have been punished for being the first client of its partner firm Hostmaker and for locating its investment into the European markets where peer-to-peer products at the time of the Marriott launch already faced stronger legislative and political opposition compared to the United States. It is important to note, that the controversy created by peer-to-peer trading has been responded differently through distinct regulations across countries (Grimmer, Vorobjovas-Pinta, & Massey, 2019).

Innovation announcements or the announcement of innovation adoption are connected with portraying a firm as a pioneer in the field while simultaneously positioning the new product for the most profitable clientele (Urban, Carter, Gaskin, & Mucha, 1986). Hence, such announcements are a positive message for investors (Chaney, Devinney, & Winer, 1991). For our data this holds only for Hyatt as the first adopter among incumbents in 2015 while similar investments by Accor in 2016, Marriott in 2018 and Wyndham in 2017 were too late with their investments potentially being seen as "me too" innovation adoptions. Indeed, a negative effect of innovation announcements on market value, especially for announcements related to marketing innovations as well as opening of new properties and entering new geographic markets has been found by F. J. Zach et al. (2018). While our study differs from Zach et al. (2018) it provides further evidence of a lack of appreciation of innovation adoptions in tourism and hospitality. Furthermore, Subramani and Walden (2001) found that announcements of introducing e-commerce solutions benefitted providers of tangible goods more than providers of digital goods whereby the latter had mostly positive effects. The

mostly negative effects of intangible goods, such as lodging services, thus are a category. Finally, the stock market respond promptly to innovation announcements as for all statistically significant types of announcements the +/- 1 day window lengths was always significant, thus supporting prior findings on the effect of innovations on market value (Sood & Tellis, 2009).

7. CONCLUSION

The goal of our study was to extend research on the effects of incumbent firms' innovation adoption actions in response to disruptive innovation to tourism research. The market entrance of Airbnb and the subsequent responses by incumbent lodging firms provided a unique opportunity to better understand disruption in the tourism marketplace. The findings of our research confirm expectations only for the first incumbent entering the newly created market, whereas later adopters saw negative effects of their responses on market value. All responses by incumbents after the first one resulted in negative impacts on market value. Investors and other shareholders, thus, do not reward efforts by these later adopting incumbent lodging providers. This contradiction to findings from studies on other industries and the confirmation of similar findings from other tourism and hospitality studies suggests that lodging providers are treated differently. Our study adds to a better understanding of market value effects of different categories of businesses, that is tangible, intangible and digital goods. As such, our study contributes to innovation and tourism literature, specifically on the issue of speed of second movers to reap a positive impact on market value.

7.1. Implications

Our findings provide strong evidence that lodging firms need to act fast in their efforts to adopt disruptive tourism innovations. The lack of reward for later movers suggests that the stock market did not value incumbents' investments at the time of investment, possibly due to concerns about returns on that investment or regulatory issues, while Airbnb as a startup funded with venture capital has the benefit to try and test its products despite headwinds from local governments and citizens. Incumbent actions avoided breaking or disregarding rules and regulations, which suggests that their diligence added to their response time. This again suggests, that incumbent lodging firms need to allocate more resources to act faster.

7.2. Limitations and future research:

The dataset of publicly traded lodging firms engaging in the peer-to-peer market is very limited. Future studies should investigate other innovations and triggered innovation adoption decisions that apply to many, if not all, publicly traded tourism and hospitality firms. Next, incumbent investments are at the longest 4 years old, which at this point do not warrant a long-term analysis of their innovation adoption decision. Indeed, innovative late adopters can outperform pioneers and non-innovative late adopters (Shankar, Carpenter, & Krishnamurthi, 1998). Thus, of particular interest is Marriott actions to develop its own peer-to-peer solution with a partner compared to the acquisition of existing startups. Also, in this study we have drawn conclusions at the parent-company level. A parent company like Hyatt or Marriott consists of several diversified brands of hotels. Hajibaba and Dolnicar (2017) suggest that specific characteristics, such as whether the hotel is high-end or not influences the extent to which a hotel is affected by the growth of peer-to-peer accommodation networks, and therefore determines the hotel's response. Additional research using alternative methodologies that can detect property or brand level impacts of peer-to-peer trading-related innovation is therefore needed. Also, our analysis of incumbent market value does not provide

insights into how into the internal processes of incumbents to develop their responses. Additional research on firm and specifically leadership rationale of the adoption of disruptive innovation is needed to understand firm motives related to adoption and adoption speed.

Finally, it is important to note that the news items about peer-to-peer innovation adoption mostly depict business expansions which very often lead to positive momentum in market value. Deriving the innovation adoption component in those announcements is not always feasible. To ascertain whether "innovation adoption" or "expansion" is the cause of the reactions found would imply using a sample of "pure" innovation adoption-related news and a sample of "pure" expansion non-innovation adoption-related news. The literature has proven that both types of announcements have an effect on the market value (for the former see Nicolau and Santa-María (2013) who find positive effects, and for the former see (Nicolau, 2002)) who also finds positive impacts). What we can say is that, regardless of whether the peer-to-peer announcements are innovation adoption- or expansion-related news, the methodology seems to capture potential reactions. What is more, the fact that some announcements do not bring about any reaction and some even cause negative reactions, means that innovation adoption (or expansion) in the context of peer-to-peer economy do not necessarily follow the patterns of the positive impacts found in the literature.

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Table 1. Description of the news items.

Incumbent	Type of news	News item
ACCOR		
2/18/2016	TN_{ACCOR1}	30% stake in Oasis
2/18/2016	TN_{ACCOR1}	49% stake in Squarebreak
4/5/2016	TN_{ACCOR1}	OneFineStay acquisition
9/27/2016	TN_{ACCOR1}	Jo & Joe brand launch - similar to Airbnb
2/5/2017	TN_{ACCOR1}	Negotiations start to acquire Travel Keys
2/9/2017	TN_{ACCOR1}	Travel Keys acqusition announced
9/5/2018	TN_{ACCOR1}	OneFineStay major additions
9/12/2016	TN_{ACCOR2}	OneFineStay new CEO
2/15/2017	TN_{ACCOR3}	OneFineStay expanding to US and across Europe
7/26/2017	TN_{ACCOR4}	Announcement to finish consolidating Travel Keys, Squarebreak and OneFineStay under OneFineStay by end of year
7/26/2018	TN_{ACCOR5}	OneFineStay write-off $228 million
HYATT		
5/21/2015	TN_{HYatt1}	Publicized investment into OneFineStay
11/3/2015	TN_{HYatt1}	OneFineStay is investment to learn
4/5/2016	TN_{HYatt1}	OneFineStay acquisition by Accor - Hyatt sells its shares
8/3/2017	TN_{HYatt1}	Oasis strategic minority investment
11/2/2017	TN_{HYatt1}	Oasis - only brief mentioning
2/15/2018	TN_{HYatt1}	Oasis - small investment to explore match with Hyatt portfolio
3/1/2018	TN_{Hyatt2}	Add Oasis to Hyatt loyalty program
8/1/2018	TN_{HYatt3}	Oasis underperforming and 22m write-off
10/2/2018	TN_{HYatt4}	Sale of Oasis to Vacasa
MARRIOTT		
4/23/2018	$TN_{MARRIOTT1}$	London pilot launch
5/9/2018	$TN_{MARRIOTT1}$	London pilot positive CEO comments
8/7/2018	$TN_{MARRIOTT1}$	London pilot positive CEO comments
11/6/2018	$TN_{MARRIOTT1}$	London pilot positive CEO comments
10/2/2018	$TN_{MARRIOTT2}$	London pilot expansion to Paris, Lisbon and Rome
WYNDHAM		
2/7/2014	$TN_{WYNDHAM1}$	HomeAway - used as a distribution channel
4/28/2015	$TN_{WYNDHAM1}$	HomeAway - global agreement and talks with others
7/31/2017	$TN_{WYNDHAM1}$	Love Home Swap acquisition

Table 2. Selection of the model specification

	ACCOR		HYATT	
	AIC	**SIC**	**AIC**	**SIC**
OLS	-6.0167	-6.0097	-6.0952	-6.0996
ARCH(1)	-6.0214	-6.0075	-6.1541	-6.1402
ARCH(1,1)	-6.0555	-6.0381	-6.1722	-6.1548
TGARCH(1.1)	**-6.0642**	**-6.0433**	-6.1752	-6.1544
EGARCH(1,1)	-6.0583	-6.0409	**-6.1799**	**-6.1626**
	MARRIOTT		**WYNDHAM**	
	AIC	**SIC**	**AIC**	**SIC**
OLS	-6.2791	-6.2722	-6.1784	-6.1833
ARCH(1)	-6.2963	-6.2824	**-6.1961**	**-6.1805**
ARCH(1,1)	-6.3227	-6.3053	-6.1952	-6.1756
TGARCH(1.1)	-6.3214	-6.3006	-6.1945	-6.1711
EGARCH(1,1)	**-6.3320**	**-6.3146**	-6.1798	-6.1602

Table 3. Effect of sharing economy-related news on the hotel market value

	Model 1A Window (-1,+1)		Model 1B Window (-1,+1)		Model 2A Window (-2,+2)		Model 2B Window (-2,+2)		Model 3A Window (-3,+3)		Model 3B Window (-3,+3)	
	Parameter	SD	Parameter	SD	Parameter	SD	Parameter	SD	Parameter	SD	Parameter	SD
ACCOR												
Constant	-2E-05	2E-04	-2E-05	2E-04	-4E-05	2E-04	-4E-05	2E-04	-1E-05	3E-04	-4E-05	2E-04
CAC40 Index	0.723[a]	0.027	0.724[a]	0.027	0.723[a]	0.027	0.724[a]	0.027	0.719[a]	0.027	0.719[a]	0.027
Hotel industrial index	0.377[a]	0.021	0.377[a]	0.021	0.378[a]	0.021	0.376[a]	0.021	0.379[a]	0.021	0.377[a]	0.021
TN_{ACCOR1}	0.002	0.002			0.003	0.002			0.001	0.002		
$TN_{ACCOR1.1}$			0.018	0.016			0.016	0.011			0.012	0.006
$TN_{ACCOR1.2}$			-0.0002	0.004			0.001	0.004			0.003	0.004
$TN_{ACCOR1.3}$			-0.003	0.008			0.001	0.004			-0.0001	0.004
$TN_{ACCOR1.4}$			0.004	0.005			0.003	0.004			0.005	0.005
$TN_{ACCOR1.5}$			-0.003	0.008			-0.004	0.008			-0.009	0.010
$TN_{ACCOR1.6}$			0.004	0.003			0.003	0.003			-0.002	0.003
$TN_{ACCOR1.7}$			-0.001	0.006			0.001	0.005			0.002	0.005
TN_{ACCOR2}	-0.001	0.006	-0.005	0.015	0.001	0.005	-0.003	0.009	0.002	0.005	0.003	0.009
TN_{ACCOR3}	-0.005	0.015	-0.009	0.003	-0.004	0.009	-0.007	0.003	-0.001	0.006	-0.006	0.003
TN_{ACCOR4}	-0.009[b]	0.003	-0.008[b]	0.005	-0.007[c]	0.003	-0.005[c]	0.004	-0.006[d]	0.003	-0.004	0.003
TN_{ACCOR5}	-0.008	0.005	0.018	0.016	-0.005	0.004	0.016	0.011	-0.004	0.003	0.012	0.006
R-squared	0.476		0.478		0.476		0.478		0.475		0.477	
Adjusted R-squared	0.473		0.474		0.473		0.474		0.472		0.473	
HYATT												
Constant	7E-07	2E-04	-4E-06	2E-04	5E-01	2E-04	-1E-05	2E-04	6E-07	2E-04	-8E-6	2E-04
SP500 Index	0.649[a]	0.035	0.645[a]	0.034	0.643[a]	0.034	0.650[a]	0.034	0.6393[a]	0.035	0.651[a]	0.034
Hotel industrial index	0.405[a]	0.020	0.407[a]	0.020	0.406[a]	0.020	0.400[a]	0.020	0.4076[a]	0.020	0.401[a]	0.020
TN_{HYatt1}	0.016[a]	0.0009			0.012[a]	0.0006			0.0124[a]	0.0006		
$TN_{HYatt1.1}$			-0.002	0.009			-0.002	0.006			-0.002	0.006
$TN_{HYatt1.2}$			-0.004	0.004			0.004	0.004			0.003	0.004
$TN_{HYatt1.3}$			-0.005	0.011			-0.006	0.008			-0.002	0.005
$TN_{HYatt1.4}$			0.027[a]	0.001			0.025[a]	0.001			0.019[a]	0.001
$TN_{HYatt1.5}$			0.023[a]	0.002			0.018[a]	0.002			0.018[a]	0.002
$TN_{HYatt1.6}$			0.0004	0.005			0.002	0.003			0.003	0.003
TN_{Hyatt2}	0.005	0.013	0.005	0.013	-0.0008	0.006	0.005	0.013	-0.002	0.005	0.005	0.013
TN_{HYatt3}	0.002	0.008	0.002	0.008	-0.003	0.006	0.002	0.008	-0.004	0.004	0.002	0.008
TN_{HYatt4}	-0.010	0.022	-0.010	0.021	-0.007	0.006	-0.010	0.022	0.002	0.003	-0.010	0.022
R-squared	0.432		0.449		0.435		0.446		0.432		0.443	
Adjusted R-squared	0.430		0.445		0.433		0.442		0.430		0.439	

a=p<0.001; b=p<0.01; c=p<0.05; d=p<0.10

Table 3. (Cont.)

	Model 1A Window (-1,+1)		Model 1B Window (-1,+1)		Model 2A Window (-2,+2)		Model 2B Window (-2,+2)		Model 3A Window (-3,+3)		Model 3B Window (-3,+3)	
	Parameter	SD	Parameter	SD	Parameter	SD	Parameter	SD	Parameter	SD	Parameter	SD
MARRIOTT												
Constant	5E-04[c]	2E-04	6E-04[c]	2E-04	5E-04[c]	2E-04	5E-04[c]	2E-04	5E-04[c]	2E-04	6E-04[c]	2E-04
SP500 Index	0.754[a]	0.034	0.767[a]	0.030	0.754[a]	0.034	0.766[a]	0.034	0.749[a]	0.035	0.756[a]	0.030
Hotel industrial index	0.368[a]	0.020	0.354[a]	0.017	0.367[a]	0.020	0.359[a]	0.021	0.371[a]	0.020	0.354[a]	0.017
$TN_{MARRIOTT1}$	-0.009[a]	0.001			-0.006[a]	0.001			-0.003[c]	0.001		
$TN_{MARRIOTT1.1}$			0.004	0.019			0.002	0.017			0.002	0.008
$TN_{MARRIOTT1.2}$			-0.006	0.020			-0.001	0.003			-0.001	0.002
$TN_{MARRIOTT1.3}$			-0.015[a]	0.003			-0.012[a]	0.002			-0.008[a]	0.002
$TN_{MARRIOTT1.4}$			-0.027[a]	0.003			-0.011[a]	0.003			0.005[c]	0.002
$TN_{MARRIOTT2}$	-0.020[c]	0.008	-0.018[c]	0.008	-0.017	0.004	-0.020[c]	0.008	-0.007[c]	0.003	-0.018[c]	0.008
R-squared	0.509		0.514		0.507		0.509		0.503		0.504	
Adjusted R-squared	0.508		0.512		0.505		0.507		0.502		0.502	
WYNDHAM												
Constant	2E-04	3E-04	2E-04	3E-04	2E-04	3E-04	2E-04	3E-04	2E-04	3E-04	2E-04	3E-04
SP500 Index	0.767[a]	0.047	0.768[a]	0.047	0.765[a]	0.047	0.768[a]	0.047	0.766[a]	0.047	0.766[a]	0.047
Hotel industrial index	0.337[a]	0.026	0.337[a]	0.026	0.338[a]	0.026	0.337[a]	0.026	0.338[a]	0.0267	0.337[a]	0.026
$TN_{WYNDHAM1}$	-0.007[a]	0.001			-0.006[a]	0.001			-0.0039[c]	0.0018		
$TN_{WYNDHAM1.1}$			-0.006[c]	0.002			-0.009[b]	0.003			-0.003[d]	0.002
$TN_{WYNDHAM1.2}$			-0.018[a]	0.003			-0.009[a]	0.002			-0.006[c]	0.002
$TN_{WYNDHAM1.3}$			0.001	0.010			-0.002	0.005			-0.0025	0.0052
R-squared	0.4364		0.4383		0.4366		0.4368		0.4358		0.4360	
Adjusted R-squared	0.4352		0.4362		0.4353		0.4347		0.4345		0.4338	

a=p<0.001; b=p<0.01; c=p<0.05; d=p<0.10