Online Review Response Strategy and Its Effects on Competitive Performance.

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Highlights

- The quantity of managerial responses positively impacts hotels performance.
- Managerial responses have a stronger positive impact on negative reviews.
- Having a certain level of responses is more effective than not responding.
- A selective response strategy is more effective than responding to all reviews.

1   Online Review Response Strategy and Its Effects on Competitive Performance.

2

3   Abstract

4   Online reviews have transformed consumer behavior in information searching and

5   sharing. Their growing popularity has enabled new differentiation strategies for lodging

6   operators. More subtly, online review systems have forced hotel managers to compete

7   through the effective use of information systems that they have not created or purchased.

8   Therefore, managers in the tourism industry must adapt to the widespread use of external

9   systems, incorporate them in their strategy and evaluate their effects.

10   This study focuses on the impact of managements' quantity and quality of usage of online

11   review systems. Our findings show that managerial response quantity positively impacts

12   hotels' competitive performance. Moreover, responses have a stronger positive impact

13   when they address extreme reviews. We evaluate four response strategies and find

14   significant performance differences among them. Our finding demonstrates the

15   importance of proficiency in external information systems use because performance

16   differs by "how" the system is used – not only "how much."

17

18   Keywords: online review; managerial response; quantity of response; quality of response;
19   response strategy

20

1. Introduction

Travel is one of the most expensive items purchased regularly by households, and it represents a significant proportion of individual's annual budget. Travel budgets also represent a significant expense for many corporations. Tourism and travel products (e.g., hotel rooms) are experience goods (Nelson 1970) where customers must purchase and utilize the service to ascertain its quality. That is, unlike search goods which the customers have an opportunity to evaluate before purchasing, hotel accommodation has always been impossible to "test" a priori. Experience goods are therefore characterized by a disproportionate importance of reputation which is used as a proxy for gauging quality prior to consumption (Nelson 1970). The importance of reputation, as conveyed for example by brands, is widely recognized in the hotel industry and it has been one of the historic drivers of industry consolidation (Prasad and Dev 2000).

While the nature of travel services as experience goods has not changed, the continuing evolution of Information Technology (IT), and the widespread adoption of the Internet, contributed to virtualizing the information gathering process (Overby 2008). For example, the Internet has enabled the virtualization of tourism information search with dramatic changes in consumers' behavior (Buhalis and Law 2008) and the strategic balance of power between operators and intermediaries. The success of alternative accommodation arrangements, such as AirBnB, is arguably enabled by the digitalization of trust and reputation enabled by the IT. Social media and opinion platforms today are mainstream communications media in the tourism industry (Schmidt et al. 2008). Having virtualized the information search process, IT shifted the source of hotel information from traditional intermediaries and operators, to two categories of internet-based entities: (1) online travel agencies (e.g., Expedia) and, (2) online review specialists (e.g., TripAdvisor, Oyster). Online reviews are evaluative statements, written by actual or potential customers, available to end user and institutions via the Internet (Stauss 2000). They represent a critical information resource enabling prospective hotel guests to leverage the experience of other travelers in their selection process (Levy et al. 2013).

Recent industry data indicates that about 53% of travelers would not make a reservation until they read hotel online reviews and 77% of prospective guests report reading reviews

before they choose a hotel either "always" or "usually" (TripAdvisor 2014). The academic literature shows that positive online hotel reviews enhance customers' trust in the hotel (Sparks and Browning 2011) resulting in improved financial performance (Öğüt and Onur Taş 2012).

One critical, yet understudied, characteristic of modern online review systems is the ability of operators to respond to guest reviews. This feature of online review platforms enables managers to resolve customers' complaints. More importantly, it allows hotel operators to join the conversation and engage potential customers in a long-term discussion about their products or services by responding publicly to online comments (Park and Allen 2013). Thus, online review systems are socio-technical artefacts (Silver and Markus 2013) that mediate the interaction between the firm and its customers. The ability to respond affords the hotel managers an opportunity to further enhance the hotel performance by better utilizing this online communication channel. Yet, despite the potential value offered by response features, there is little research focusing on response management strategies in the hotel industry (Abramova et al. 2015). In this paper, we focus on the question of how profit-maximizing hotel operators should respond to online reviews.

Practicing managers have long intuited that partaking in the conversation is important. An early industry study by TripAdvisor shows that responding to online reviews improves customers' likelihood of recommending a hotel by more than 20% (Barsky and Frame 2009). However, the number and the context of a response may increase or decrease hotels' performance thus, hotel managers need a well-defined strategy on when and how to respond. Surprisingly, there is a lack of research that rigorously and empirically classifies and evaluates response management strategies (Liu et al. 2015). We pursue the question by conceptualizing online reviews platforms as socio-technical artefacts that virtualize the communication process between the customers and the hotels. We categorize and analyze firms' online review response strategies in terms of the quantity and quality of online review system use. Our results extend previous work on the effect of review valence and review quantity on hotel performance. More importantly, ours is the first study to measure the competitive performance effect of managerial

responses to online reviews. Our contribution is in the empirical demonstration that hotels benefit from both the quantity and quality of online review systems use. Specifically, we find that those hotels that embrace externally developed online review systems to respond to customer comments perform better than their competitors, and this effect is stronger when the hotel uses the system to address negative comments. Finally, we also demonstrate the competitive effect of four different classes of response strategies and their implications for hotel managers.

The paper is organized as follows. In the next section, we introduce our theoretical framework and discuss previous literature on online reviews and management responsiveness. We then introduce the context, methods and data used in our work. We conclude by reporting and discussing our findings.

2. Theoretical Framework

2.1. Online Reviews

The context of this study is the lodging industry, in which travelers make decisions based on their own past experience with the hotel or the brand. Increasingly, over the last decade, travelers leverage online reviews and experiences shared by other travelers over the Internet. The literature shows that online consumer reviews have a significant influence on travel information search and product sales (Duan et al. 2008; Xiang and Gretzel 2010; Mauri and Minazzi 2013). For example, online hotel reviews increase customers' awareness of the hotels and enhance their consideration in the customers' mind (Vermeulen and Seegers 2009). Further, positive online hotel reviews can enhance customers' trust (Sparks and Browning 2011) and, as a consequence, increase the hotel's financial performance (Öğüt and Onur Taş 2012). High review scores convey: both product quality and social validation (Cialdini 2000). The literature has reached consensus on the finding that higher review scores positively affect demand for hotel and, consequently, increase sales and revenue (e.g., Chevalier and Mayzlin 2006; Phillips et al. 2017; Sparks and Browning 2011), while negative reviews are known to impact customers' attitudes negatively (e.g. Lee et al. 2008). As customers become more

discerning, they use online reviews to better specify their service requirements and uncover the best value propositions in the market. As a result, it is common for people to read comments about other's experiences to reduce uncertainly before they make a purchase (Zheng et al. 2011; Archak et al. 2011). Prior research has also established that the total number of reviews a product or service receives leads to higher sales and improved brand reputation (e.g., Amblee and Bui 2011). While not the focus of our work, we seek to establish that the same relationships hold in our context. Thus, we hypothesize:

H1a: Cumulative review scores are positively related to the firm's competitive performance.

H1b: The total number of the online reviews positively impacts the firm's competitive performance.

2.2. Firm Responsiveness

An online review system is an IT-enabled customer service system (Lui and Piccoli, 2016) that, because of the reach capability of information technology (Overby 2008), has the characteristics of a broadcast communication medium. The firm can utilize such a communication channel to collect intelligence and to respond to consumers' comments. Managerial response is one of the functionalities of the online review systems used for the support of customer relationship, reputation and brand management (Van Noort and Willemsen 2012; Baka 2016). We define managerial response as an answer posted on behalf of a tourism operator by its employees, addressing a specific review contributed by a guest. Traditionally, customers interact with a few frontline employees during the service encounter, and typically develop an overall image of the emotions that members of a given organization will display (Sutton and Rafaeli 1988). Given that managerial response is publicly available online and will be viewed by potential customers, readers of online reviews can now form a similar perception of the firm's customer orientation strategies without physically interacting with employees. They do so by reading management responses rather than interacting first hand with the staff. In other words, while hotel services remain largely an experience product, prospective guests can

vicariously "test it" by reading other guest comments and managerial responses. A positive link exists between a service-oriented business strategy and company performance. For example, managers respond to negative reviews, in some situations, to reassure customers that the experience described in the negative reviews is unlikely to be repeated (Chevalier et al. 2016). Another notable study shows that managerial response to negative reviews is more profitable for hotels than answering to positive reviews (Anderson and Han 2016). In the absence of much academic literature there is some evidence of the importance of managerial responses from consulting firms. For example, analyzing a survey with 12,225 global consumers, PhoCusWright (2013) reported that over half of the respondents are more likely to book a hotel that displays managerial response compared to a hotel that does not. However, these works do not explain how or why managerial responses produce their effects or how hotel operators can maximize their positive influence on performance.

Early academic research in this area suggests that managerial responses positively impact subsequent review rating and review volume, especially in the case of unsatisfied customers (Gu and Ye 2014). More importantly, archival research using TripAdvisor data shows that providing timely and lengthy responses to reviews enhances the hotels' future financial performance (Xie et al. 2017) but there is an inverted U relationship between response percentage and revenue (Anderson and Han 2016). From this work, it follows that hotels should devise explicit strategies for managerial response to customer reviews.

We adopt the concept of usage quality from the information systems literature. Quality of system usage (i.e., effective use of the system) is crucial to obtain maximum benefits from information systems implementations (Burton-Jones and Grange 2012). Conversely, ineffective usage leads to resources waste and a decrease chance of reaching the objectives associated with the system's introduction (Bevan 1995). We thus theorize that, at the firm-level, managerial responses to online reviews reflect the firm's underlying capability in using online review systems. In other words, the emergence of social media and user generated content has forced hotel operators to develop the ability to manage the hotel's reputation online, engage customers, address customers' concerns, and restore customer satisfaction (Xie et al. 2016). The hotels that are able to develop such

capabilities, send a credible signal to potential guests, that the management team is reading and responding to the suggestions and comments of their customers. It is such a signal that stimulates future reviewing activities and fosters communications between the customers and the hotels (Chevalier et al. 2016; Wang and Chaudhry 2017). In summary, managerial responses are the manifestation of the operator's capability to utilize an online review system to implement their service-oriented business strategy.

2.2.1. Quantity of Responses

Previous research has established a direct link between systems usage and firm performance (Devaraj and Kholi 2003). With the emergence of online review systems and their opening of a managerial response channel, firms have the opportunity to use the system to contribute new information about their product or service. Customers perceive managerial responses as an indicator of the fact that the firm cares about customer service (Lee and Hu 2005). Thus, the presence of a managerial response conveys an important message of the firm's customer-orientation strategy and is correlated with greater sales and improved satisfaction of complaining customers (Gu and Ye 2014). Those organizations that recognized the nature of online review systems as broadcast channels and their role in customer decision-making devote organizational resources to its use. As a consequence, managerial response correlates with increased hotel ratings and review volume on TripAdvisor (Xie et al. 2016). We propose that there is a direct link between online review systems use and competitive financial performance.[1]

H2: The cumulative percentage of managerial response to online reviews is positively related to the firm's competitive performance

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[1] As explained in the methodology section, we use RevPAR Index to measure performance. Since RevPAR Index is a financial measure of competitive performance, we use the terms "financial performance" and "competitive performance" as interchangeable in this study.

2.2.2. Quality of Responses

While recent academic research has begun to investigate the relationship between managerial response and hotel financial performance, no work to date has investigated the relative effect of different response strategies. In other words, while managerial response in online review systems is a type of digital firm competence, there is no work to date mapping the impact of this competency on hotels' competitive performance. We argue that different response strategies are indicative of different degrees of competence by the hotel in adapting to the emergence of online review systems. Thus, they result in different competitive performance outcomes. Information systems scholars have empirically investigated the link between quantity of system usage and firm performance. Conversely, the role of quality of system usage has proven elusive (Sabherwal and Jeyaraj 2015). Burton-Jones and Grange (2012) defined effective use as "using a system in a way that helps attain the goals for using the system" (p.2). This characterization provides a general definition, which can be applied to any context and level of analysis. However, it lacks specificity. In the context of online review systems, the quality of use relies on the firms' capability to utilize the information in the system effectively and produce responses to help attract more customers. Effective information use is defined as "the extent to which information provided by the organization's information systems is successfully utilized to enable and support its business strategies and value-chain activities" (Kettinger et al. 2013, p. 846). Building on these definitions, we describe the quality of review system usage as the extent to which the firm employs the online review system to enable its customer orientation strategy. Quality of usage stems from the firms' ability to optimize its resource allocation to the managerial response activity.

The online review literature has demonstrated the disproportionate impact that negative reviews have on user decision-making. Specifically, there is an inverse relationship between review rating and review diagnosticity, with negative reviews perceived as significantly more helpful by readers (Archak et al. 2011). Moreover, negative reviews have a greater effect on customers due to the "negativity bias." The bias leads customers to pay more attention to negative information than positive inputs (Vaish et al. 2008). Because they counterbalance the negativity bias, specific management responses to

negative online reviews engender more trust and deliver higher perceived communication quality than generic responses (Wei et al. 2013). It follows that managerial response should have the greatest impact when it addresses negative online reviews. In other words, on average, the positive impact of managerial response on competitive performance is stronger when the review rating is lower. Formally:

H3a: The cumulative review scores moderates the relationship between cumulative percentage of managerial response to online reviews and firm's competitive performance

2.2.3. Response strategies

One aspect of quality of usage is captured by the prioritization of resource allocation toward negative reviews. However, such conceptualization does not capture the variety of response strategies the firm may enact. We posit that the quantity of managerial response impact firm performance (H2), and responses will have the greatest impact when addressing negative responses (H3a). However, there is no one well-defined response strategy and a firm can enact a range of response strategies since: "hotels within the same brand can have completely different response rates and patterns" (Park and Allen 2013, p. 72). Most research in the field has analyzed guests' perceptions of the response strategies hotels use to address negative reviews (e.g., Lee and Song 2010; Lee and Cranage 2012; van Noort and Willemsen 2012; Treviño and Castaño 2013; Abramova et al. 2015). These works address the effects of a combination of the following strategies:

- Confession/Apology strategies: The managers politely recognize and apologize for the situation but do not offer compensation or follow up actions (Treviño and Castaño 2013, Abramova et al. 2015).

- Changing/Accommodative strategies: The managers politely recognize the situation and explain how they will redress the situation for future occasions. These strategies encompass any form of apology, compensation, and/or corrective action (Lee and Song 2010, Treviño and Castaño 2013).

- Denial/Defensive strategies: The managers deny the existence of the negative experience mentioned in the review, deny responsibility for the negative events, and, sometimes attack the customers who leave the negative reviews. The managers

disagree with the negative statements either directly by saying "I do not agree", "It is not true" or indirectly by providing counterarguments to show that the truth is different from the events described in the negative reviews (Lee and Song 2010, Treviño and Castaño 2013, Abramova et al. 2015).

- Excuse strategies: The managers introduce uncontrollable causes of the negative event as an explanation to distance themselves from the responsibility for the incident or to shift the blame to a third party (Weiner 2000, Abramova et al. 2015).

- No Response strategies: The managers offer no response to the negative comments or take no overt action with the purpose of separating themselves from the negative events by remaining silent in the online review platforms (Lee 2004).

The findings of this research in laboratory settings, suggest that managerial responses to negative reviews increase customers' trust toward the firm (Sparks et al. 2016). That an accommodative response strategy to negative reviews has a more positive impact on customers' evaluation of the company, compared to a defensive response strategy or a no response strategy (Lee and Song 2010). That unsatisfied customers expect accommodative response from the hotel, when they strongly perceive that the causes of the negative event are controllable by the hotel (Coombs 1999). This approach can reduce feeling of aggression (Conlon and Murray 1996), which in turn leads to favorable evaluation of product or service providers. More specifically, a recent study of response strategies on Airbnb shows that when customers' complaints are related to a factor controllable by the firm (e.g., cleanliness), a confession/apology strategy results in higher customers' trust toward the firm while an excuse strategy reduces trust (Abramova et al. 2015). On the other hand, when the complaints are beyond the control of the firm, a confession/apology strategy, or an excuse one, positively influences customers' trust, while a denial strategy yields a negative effect (Abramova et al. 2015). Finally, a no response strategy may risk allowing negative information about the company to stand unchallenged, which in turn may damage the company's reputation and cause potential reputation damage and consequent business loss in the future (Chan and Guillet 2011). As these strategies studied in the past mainly concerns negative online reviews, very little research to date examines empirically the managerial response strategies to all of the

reviews present on the online review systems. Moreover, no empirical research to date has formally evaluated the impact of different response strategies on the competitive performance of the hotels adopting them.

Given the paucity of research on this subject we abstract and categorize response strategies empirically. Specifically, we identify the following four managerial response archetypes:

- No response strategy (NRS): the hotel never addresses any of the guests' online concerns. The NRS is the least costly approach to online review systems usage since the hotel devotes zero resources to the effort.

- Strategic customer orientation strategy (SCO): the hotel selectively responds to extreme customers' comments (the online reviews with the lowest and highest evaluations).

- Full response strategy (FRS): the hotel responds indiscriminately to all guest comments in an effort to signal its attention to all customers, regardless of their comments.

- No strategy (NS): the hotel displays no discernible response strategy and managers address customer comments seemingly at random.

When a hotel has a clearly defined managerial response strategy, customers can structure their expectation of accommodation experience based on the customer-orientation strategies the hotel implemented. Without a clearly defined pattern of managerial response, it is difficult for prospective guests to create a perception of the hotel and to vicariously test the quality of an experience good (e.g., hotel rooms) before consumption. Therefore, we propose:

H3b: A defined response strategy (SCO, FRS and NRS) has a stronger positive effect on firm's competitive performance than the no strategy (NS).

The presence of managerial response creates a dynamic and interactive communication between the hotels and the customers. This two-way communication reduces information asymmetry and the problems associated with it for experience goods (Litvin et al. 2008; Xie et al. 2014). Having developed a response strategy, the operator signals its care for guests and service quality. Previous work shows that this signaling effect leads to improved review valence, number of reviews and hotel ratings (Li et al. 2017). As a consequence, we expect this approach to engender superior competitive performance of the hotel as compared to a no response strategy. Therefore, we propose:

H3c: The effect of a strategy with different levels of managerial response (SCO and FRS) on firm's competitive performance is stronger than the effect of a no response strategy (NRS).

Customer reviews display a J-shaped distribution due to purchasing bias (i.e., the prospective customers with lower valuations are less likely to purchase the product) and underreporting bias (i.e., the customers with extreme ratings are more likely to write reviews than the ones with moderate reviews) (Hu et al. 2009). Rational people react to these two biases by paying more attention to extreme reviews compared to moderate reviews and even more attention to extreme negative reviews (Hu et al. 2009). On the other hand, responding to positive reviews publicly recognizes customers' supportive comments and creates a positive emotion in the hotel's online interactions with customers (Dickinger and Lalicic 2014). A template response that simply shows gratitude to customer online compliments when the customers write to express their positive feelings about the experience can enhance future customers' attitudes (Deng and Ravichandran 2016). It signals that the hotel cares about showing appreciation of customers' business and experience more than just fighting the negative reviews. In addition, when management provides a personalized response to altruistic positive reviews, customers perceive higher usefulness of the response and are more likely to agree with the compliment to leave a positive comment. As a result, the managerial response will have a positive influence on future review valence (Deng and Ravichandran 2016). Therefore,

1 focusing on responding to extremes, positive and negative reviews, should yield a higher

2 return. We propose:

3 H3d: The effect of a strategic customer orientation strategy (SCO) on firm's competitive

4 performance is stronger than the effect of a full response strategy (FRS).

5

6 3. Methodology

7 We developed a dataset uniquely suited to test our hypothesis by joining financial data

8 with online reviews and responses for hotels in Taipei, Taiwan listed on TripAdvisor –

9 one of the biggest online hotel reviews providers. In total, there are 588 hotels listed on

10 TripAdvisor in Taipei. However, to avoid confounds and systematic differences between

11 the hotels, we focused the analysis on the 39 properties that met the requirements for

12 international hotels established by the Ministry of Transportation and Communication of

13 Taiwan. For the July 2012 to January 2017 timeframe our dataset includes the hotels'

14 monthly average room rate, monthly average occupancy percentage, and the total number

15 of employees reported during the month. The choice of the Taipei market was dictated by

16 the fact that it is one of the few markets where the government collects and publicizes

17 monthly hotel performance data – thus enabling rigorous competitive performance

18 analyses. To have a complete picture of the effect of past actions on performance, we

19 merged financial performance data with review data from TripAdvisor. We compiled the

20 full set of reviews since hotel responses became possible on the platform until January 31,

21 2017. The first review in one of the hotels in our sample appeared on June 20, 2004.

22 Collecting this data is necessary to accurately compute, for any point in time during the

23 analysis, historical measures such as the total number of reviews (see measures). A total

24 of 27,635 are used in this analysis.

25

26 3.1. Measures

27 Cumulative review scores (Cum_AvgR) is the running average, for each review, of all

28 chronological prior rating for the hotel. This represents the aggregated review score of the

1 hotel on TripAdvisor. We then aggregate the cumulative review scores by averaging by

2 month to match with the monthly performance data. The total number of reviews is the

3 review count for the month (TotR). Managerial response capabilities are not a native

4 feature of the TripAdvisor platform. The first managerial response for our sample of

5 hotels appeared on June 28, 2009. Thus, cumulative response percentage (Cum_RespP) is

6 computed by dividing the monthly running total of response number and the monthly

7 running total of the review posted since July 2009[2].

8 We measure competitive performance using the Revenue per Available Room (RevPAR)

9 Index. RevPAR Index is a standard measure of competitive financial performance in the

10 hotel industry, allowing comparison across hotels with different number of rooms and

11 characteristics. It is computed as the product of the occupancy percentage and the average

12 daily room rate. RevPAR Index compares an individual property's RevPAR to its

13 competitive set, thereby creating a standardized RevPAR measure. We create meaningful

14 competitive sets of international hotels by dividing the 39 hotels into 5 equally distributed

15 groups based on average daily room rate (4 groups of 8 hotels and 1 group of 7 hotels).

16 RevPAR Index is thus computed as the hotel's RevPAR divided by the competitors'

17 average RevPAR times 100. Therefore, a RevPAR Index that is greater than 100

18 indicates that the hotel outperforms its competitive set within the comparable room rate

19 group while numbers below 100 indicate relative underperformance. Using RevPAR

20 Index as a competitive performance measure allows use to control for all exogenous

21 influences on hotel performance (e.g., economic performance of the overall market,

22 travel market cycle in each segment, seasonality). However, there is a time lag from the

23 day when customers start searching for the hotel information and read the reviews to the

24 actual staying date (when the hotel receives financial benefits). This lead time can be

25 divided into two phases (1) from search to booking and (2) from booking to hotel stay.

26 Based on the statistics reported by HEBS Digital (a hotel marketing company), on

27 average a traveler takes 24 days to book, after starting a search (Starkov 2014). We

28 obtained transactional data from July 1, 2012 to August 13, 2015 from one of the 39

29 hotels under study. The data contains 182,322 reservation records, including reservation

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[2] There are only 2 managerial responses between June 28 to June 30, 2009. Using only 2 responses to computing the cumulative response percentage will be misleading so they were ignored in the computation.

1 dates and arrival dates. On average, customers made a reservation 20.53 days before their

2 arrival. Therefore, we assume that the time lag between a customer reading the hotel

3 reviews and the arrival days is within a month and we lag RevPAR Index by 1 months.

4 We merge the monthly hotel competitive performance data with the monthly aggregated

5 cumulative review score and cumulative percentage of managerial response. This results

6 in a panel of 2,076 hotel-month paired observations. Out of the 39 hotels, 35 hotels have

7 55 monthly performance and aggregated review data. The other 4 hotels were established

8 after July 2012; thus, they have less than 55 monthly observations (25, 38, 42 and 46

9 months to be exact). The descriptive Statistics of the variables are presented in Table 1.

10

Variables	Min.	Median	Mean	Max.	S.D.
RevPAR Index	9.809	98.84	100	206.7	24.915
Cumulative Average Review Score (Cum_AvgR)	2.916	4.032	3.994	2	0.366
Cumulative Response Percentage (Cum_RespP)	0	0.164	0.355	1	0.384
Total Number of Reviews (TotR)	0	6	9.916	143	13.306

11 *Table 1. Descriptive Statistics of the Variables*

12

13 We measure response strategy on a monthly basis to capture strategy changes by the

14 firms. We categorize the different strategies based on the pattern of responses exhibited

15 on the online review platforms. A firm that responds to no online reviews falls into the no

16 response strategy (NSR). A firm that selectively responds only positive reviews with a

17 rating of 4 and 5, and/or negative reviews with a rating of 1 and 2, falls into the strategic

18 customer orientation strategy (SCO). A firm that responds to all reviews is assigned to

19 the full response strategy (FRS). The remaining firms, which engage in response activity

20 that does not follow any of the above systematic patterns, represent the no strategy (NS)

21 group.

22

23 ## 3.2. Controls

24 We include average review score (Avg_Review), guest to staff ratio (GuestToStaff),

25 average response window (Avg_Window), TripAdvisor star rating (Tripadvisor), and

1 affiliation (Affiliation) as control variables. Avg_Review is the monthly average of the

2 review score received during each month. It provides a measure of product quality and it

3 is an important control variable to capture the effect of hotel quality on its competitive

4 performance. GuestToStaff is the number of room occupied during the month divided by

5 the total number of staff reporting to work during the month. It is a further measure of

6 product quality. While Avg_Review captures hotels' service quality as perceived by

7 travelers, GuestToStaff is an internal measure of quality, a proxy for the service level

8 offered by the hotel. Avg_Window is the number of days between the review date and the

9 managerial response date. It is a control variable designed to measure the speed with

10 which hotels respond in order to isolate the effect of managerial response beyond the

11 quickness of such action. Finally, TripAdvisor star rating and hotel affiliation

12 (independent, local chain and international chain) are included as controls to capture the

13 hotel's service levels.

14

15 ## 4.   Data Analysis and Results

16 ### 4.1.   Analytical Procedure

17 Due to the panel nature of the data (a panel of hotels by months), we perform the

18 Breusch-Godfrey/Wooldridge test for serial correlation in fixed effect panel models

19 (Equation 1). The result is a small p-value (chi square $= 221.44$, df $= 5$, p-value < 0.000).

20 Therefore, we choose to fit a linear mixed-effects model allowing for nested random

21 effects (Equation 2) to test hypotheses H1a, H1b, H2 and H3a.

22

23 $RevPARIndex_{ij} = \quad \alpha_i \quad + \beta_1 \times (Cum\_AvgR_{ij})$ (Equation 1: n-entity Fixed Effects Model)

24 $+ \beta_2 \times (TotR_{ij})$

25 $+ \beta_3 \times (Cum\_RespP_{ij})$

26 $+ \beta_4 \times (Avg\_Review_{ij})$

27 $+ \beta_5 \times (GuestToStaff_{ij})$

1                          $+ \beta_6 \times (Avg\_Window_{ij})$

2                          $+ \beta_7 \times (Tripadvisor_{ij})$

3                          $+ \beta_8 \times (Affliation_{ij})$

4                          $+ \beta_9 \times (Cum\_AvgR_{ij}) \times (Cum\_RespP_{ij}) + \varepsilon_{ij}$

5 $\alpha_i = \beta_1 + \beta_{10} \times (Hotel_i)$ where $\alpha_1, \dots \alpha_i$ are hotel-specific intercepts to be estimated

6

7 $RevPARIndex_{ij} =$ $\beta_0 + \beta_1 \times (Cum\_AvgR_{ij})$ (Equation 2: Mixed Effects Model)

8                          $+ \beta_2 \times (TotR_{ij})$

9                          $+ \beta_3 \times (Cum\_RespP_{ij})$

10                         $+ \beta_4 \times (Avg\_Review_{ij})$

11                         $+ \beta_5 \times (GuestToStaff_{ij})$

12                         $+ \beta_6 \times (Avg\_Window_{ij})$

13                         $+ \beta_7 \times (Tripadvisor_{ij})$

14                         $+ \beta_8 \times (Affliation_{ij})$

15                         $+ \beta_9 \times (Cum\_AvgR_{ij}) \times (Cum\_RespP_{ij}) + \varepsilon_{ij}$

16                         $+ random = \sim I | Hotel + \varepsilon_{ij}$

17

18 $RevPARIndex_{ij} = 1$ month lag of RevPAR Index of Hotel i (i = 1,…,39) during the j-th

19 month j = 1,…,n_i

20 n_i denotes the number of months for the i-th hotel

21

22 To test hypotheses 3b-3d, we created a dummy variable called *Strategy_d1*, where -1

23 indicates the hotels with no strategy and 1 indicates the others (FRS, SCO and NRS);

24 another dummy variable called *Strategy_d2*, where -1 indicates the hotels with a no

response strategy and 1 indicates the ones with a specific patterns of response (FRS and

SCO); and finally the last dummy variable called *Strategy_d3*, where -1 indicates the

hotels with a strategic customer orientation strategy and 1 indicates the ones with a

reassurance strategy. We then conduct a series of analysis of covariance (ANCOVA)

(Equation 3, 4 and 5) to test hypotheses 3b-3d.

$$RevPARIndex_{ij} = \mu + Strategy\_d1_i \qquad \text{(Equation 3: Hypothesis 3b)}$$
$$+ \beta_1 \times (Avg\_Review_{ij})$$
$$+ \beta_2 \times (Cum\_AvgR_{ij})$$
$$+ \beta_3 \times (Avg\_Window_{ij})$$
$$+ \beta_4 \times (TotR_{ij})$$
$$+ \beta_5 \times (GuestToStaff_{ij})$$
$$+ \beta_6 \times (Tripadvisor_{ij})$$
$$+ \beta_7 \times (Affliation_{ij})$$
$$+ \varepsilon_{ij}$$

where μ is the grand mean of RevPAR Index, Avg_Review_{ij} is the average review score for observation j of strategy level i (i = 1, 2; j = 1, 2, …, n_i and n is the number of observations in i-th strategy). The other covariates are represented in the same manner.

$$RevPARIndex_{ij} = \mu + Strategy\_d2_i \qquad \text{(Equation 4: Hypothesis 3c)}$$
$$+ \beta_1 \times (Avg\_Review_{ij})$$
$$+ \beta_2 \times (Cum\_AvgR_{ij})$$
$$+ \beta_3 \times (Avg\_Window_{ij})$$
$$+ \beta_4 \times (TotR_{ij})$$

1                $+ \beta_5 \times (GuestToStaff_{ij})$

2                $+ \beta_6 \times (Tripadvisor_{ij})$

3                $+ \beta_7 \times (Affliation_{ij})$

4                $+ \varepsilon_{ij}$

5

6   $RevPARIndex_{ij} = \mu + Strategy\_d3_i$ (Equation 5: Hypothesis 3d)

7                $+ \beta_1 \times (Avg\_Review_{ij})$

8                $+ \beta_2 \times (Cum\_AvgR_{ij})$

9                $+ \beta_3 \times (Avg\_Window_{ij})$

10               $+ \beta_4 \times (TotR_{ij})$

11               $+ \beta_5 \times (GuestToStaff_{ij})$

12               $+ \beta_6 \times (Tripadvisor_{ij})$

13               $+ \beta_7 \times (Affliation_{ij})$

14               $+ \varepsilon_{ij}$

15

4.2. Findings

After controlling for hotel specific effects, product quality and managerial response timing, we find that cumulative average review score (Cum_AvgR) and total number of review of the month (TotR) have a significant impact on RevPAR Index. Therefore, hypothesis 1a and 1b are supported. Hypothesis 2 about cumulative response percentage is also supported with a significant positive impact on RevPAR Index with 1-month lag. Finally, the coefficient of the interaction of cumulative response percentage and cumulative average review score is negative and significant (H3a). This result indicates that, as the Cum_AvgR decreases, the positive relationship between Cum_RespP and RevPAR Index strengthens. In other words, the extent to which a hotel responds to online

1 reviews has a stronger positive effect on competitive performance when reviews are

2 negative rather than positive. The results of the fixed effects models are summarized in

3 Table 2. Table 3 reports the correlation matrix of the dependent and control variables.

4

5

Predictor	Coef. β	SE(β)	DF	t-value	p-value
Intercept	-61.978	83.479	803	-0.743	0.458
Cumulative Average Review Score (Cum_AvgR)	58.190	9.994	803	5.823	<0.000
Total Number of Review (TotR)	0.137	0.037	803	3.716	<0.000
Cumulative Response Percentage (Cum_RespP)	152.189	42.083	803	3.616	<0.000
Monthly Average Review Score (Avg_Review)	-2.108	1.360	803	-1.550	0.122
Guest to Staff Ratio (GTS)	-0.032	0.093	803	-0.345	0.730
Average Response Window (Avg_Window)	-0.026	0.020	803	-1.309	0.191
Tripadvisor	-14.988	19.142	23	-0.783	0.442
Affiliation (International Chain)	2.012	13.893	23	0.145	0.886
Affiliation (Local Chain)	0.944	12.400	23	0.076	0.940
Cum_RespP × Cum_AvgR	-38.345	10.302	803	-3.722	<0.000

6 *Table 2. Summary Result of the Fixed Effects*

7

	Intercept	1	2	3	4	5	6	7	8	9
1.Cum_AvgR	-0.287									
2.TotR	0.005	-0.254								
3.Cum_RespP	-0.300	0.724	0.079							
4.Avg_Review	0.025	-0.190	-0.042	-0.048						
5.GTS	-0.101	0.050	0.300	0.051	-0.009					
6.Avg_Window	-0.002	-0.031	0.005	-0.022	-0.087	-0.004				
7.Tripadvisor	-0.878	-0.194	0.116	-0.055	0.002	0.051	0.019			
8.Affiliation_IC	0..032	0.010	0.021	0.028	0.002	0.029	-0.010	-0.080		
9.Affiliation_LC	-0.183	0.031	-0.002	0.033	-0.007	-0.021	-0.015	0.126	0.266	
10.Cum_RespP × Cum_AvgR	0.303	-0.738	-0.085	-0.998	0.045	-0.049	0.030	0.058	-0.031	-0.034

8 *Table 3. Correlation Matrix*

9

10 The results of the three ANCOVA on the difference among the quality of responses

11 (Table 4, 5 and 6), lend support to H3c and H3d, but not to H3b. Thus, we find that while

12 a no strategy condition offers no clear effect on competitive performance, a well-defined

1 response strategy has a significant positive impact on competitive performance as

2 measured by RevPAR Index when compared to a no response strategy. Moreover,

3 deploying a strategic customer orientation strategy yields significantly stronger results

4 than engaging in a full response strategy. Figure 1 shows the number of data points (i.e.,

5 hotel-months) associated with each strategy, the average RevPAR Index and the 95%
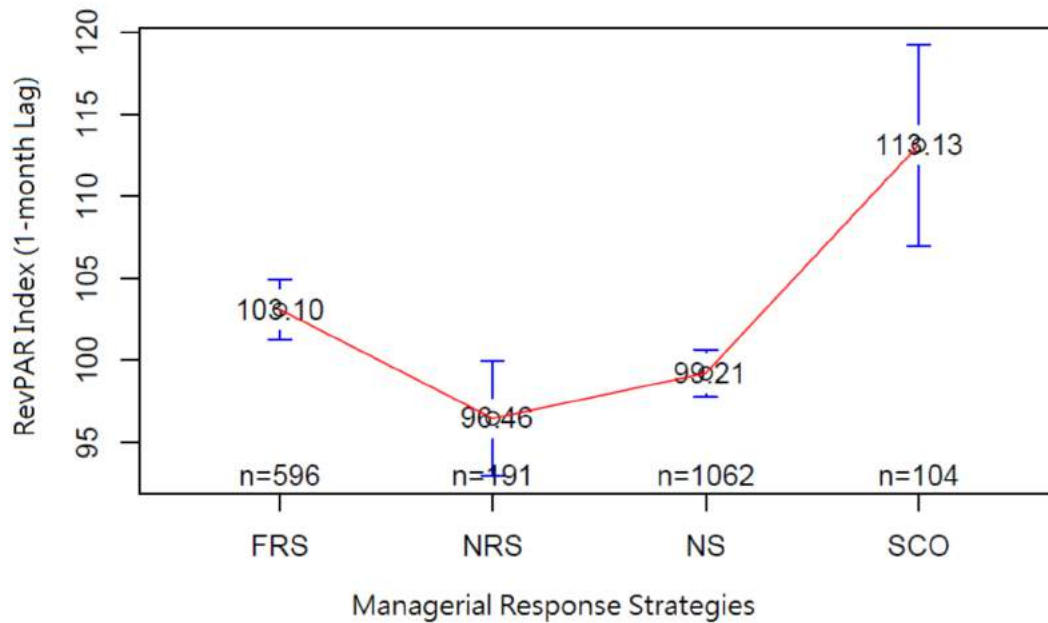
6 confidence interval of the average RevPAR Index (blue lines).

7

8
9

10 *Figure 1. Average RevPAR Index by Strategies*

11

Predictor	DF	Sum Sq	Mean Sq	F value	p-value
Strategy_d1	1	913	913	1.833	0.176
Monthly Average Review Score (Avg_Review)	1	4590	4590	9.216	0.002
Cumulative Average Review Score (Cum_AvgR)	1	10159	10159	20.396	<0.000
Average Response Window (Avg_Window)	1	3602	3602	7.232	0.007
Total Number of Review (TotR)	1	35120	35120	70.507	<0.000
Guest to Staff Ratio (GTS)	1	89936	89936	180.556	<0.000
Tripadvisor	1	224	224	0.450	0.503
Affiliation	2	9101	4551	9.136	<0.000
Residuals	827	411933	498		

12 *Table 4. Analysis of Variance Table for Equation 3*

13

Predictor	DF	Sum Sq	Mean Sq	F value	p-value
Strategy_d2	1	9914	9914	20.818	<0.000
Monthly Average Review Score (Avg_Review)	1	6950	6950	14.594	<0.000
Cumulative Average Review Score (Cum_AvgR)	1	10925	10925	22.941	<0.000
Total Number of Review (TotR)	1	31607	31607	66.367	<0.000
Guest to Staff Ratio (GTS)	1	58956	58956	123.795	<0.000
Tripadvisor	1	3422	3422	7.186	0.007
Affiliation	2	4683	4683	9.834	<0.000
Residuals	882	476	476		

Table 5. Analysis of Variance Table for Equation 4

Predictor	DF	Sum Sq	Mean Sq	F value	p-value
Strategy_d3	1	6726	6726	14.729	<0.000
Monthly Average Review Score (Avg_Review)	1	652	652	1.429	0.232
Cumulative Average Review Score (Cum_AvgR)	1	4477	4477	9.804	0.002
Total Number of Review (TotR)	1	22527	22527	49.332	<0.000
Guest to Staff Ratio (GTS)	1	70773	70773	154.987	<0.000
Average Response Window (Avg_Window)	1	1961	1961	4.295	0.039
Tripadvisor	1	45	45	0.099	0.753
Affiliation	2	8485	4243	9.291	<0.000
Residuals	567	259827	457		

Table 6. Analysis of Variance Table for Equation 5

5. Discussion

The introduction and use of online review systems is an example of digital disruption of traditional business processes. With the advent of user generated content, hospitality operators had to adjust and learn to use externally imposes information systems to establish a communication channel with their guests, current and prospective, in order to broadcast their customer-oriented strategies. Developing an online review response capability forces managers to devote more resources to monitoring online reviews and to respond to the reviews in a timely manner while providing meaningful communication instead of standardized messaging. There is limited research on the optimal response strategies. Thus, we focus on the question of how profit-maximizing operators should respond to online customer comments. We contend that firms must develop a response capability that enables them to leverage the nature of online review systems as broadcast communication channels. In other words, those organizations that are able to implement

22

1 optimal managerial response strategies (i.e., to effectively use the online review system)

2 will, on average, experience superior competitive performance.

3 Our results confirm and extend prior literature on the effect of online reviews and provide

4 managerial implications for lodging operators listed on online reviews platforms. We find

5 support for the hypotheses that cumulative online review scores (H1a) and total number

6 of reviews (H1b) are positively related to competitive firm performance. These results are

7 not surprising and are in line with extant theory suggesting that higher review ratings act

8 as a product quality signal for customers and the number of reviews reinforces the trust

9 those customers have in the implicit recommendations of the online review systems

10 (Duan et al. 2008). Our work extends prior literature by using a direct measure of

11 competitive performance, rather than sales or intention to purchase. However, we treat

12 H1a and H1b as confirmatory and our focus is on controlling for these known effects

13 when focusing the analysis on managerial responses.

14 There is still a paucity of research that rigorously and empirically evaluates response

15 management strategies in online review systems (Abramova et al. 2015; Liu et al. 2015).

16 This is surprising since online review systems are widely used by customers and have the

17 potential to strongly impact firm performance. Thus, the consequences of the quantity

18 and quality of their use by organizations should be a foremost concern for tourism

19 management scholars.

20 With respect to the quantity of system use in terms of managerial response (H2), we

21 report a strong positive effect. There is a direct correlation between the use of the online

22 review systems to respond to customer comments and the competitive performance of the

23 firm. It is important to note that this effect is evident even after we control for measures

24 of hotel service quality, measured as star ratings, guest-to-staff ratios, TripAdvisor ratings

25 and chain affiliation. Thus, this result is not simply a proxy of service quality, but rather

26 an incremental effect of responding to online reviews. The positive relationship between

27 the quantity of managerial responses and competitive performance complements and

28 extends finding from previous research. Specifically, unlike previous empirical work on

29 quantity of usage (Devaraj and Kholi 2003), our study focuses on an outward facing

30 system used by customers, rather than an internal system. We demonstrate the importance

of system use when the business process impacted is customer facing. We therefore lend support to the notion that the system usage by the management impacts competitive performance not only through improved efficiency in communication process, but also through the signaling strategies to broadcast the hotels' service commitment. The managerial implication if this finding is clear: operators must be present online and join the conversation with customers. While online platforms are systems that are not commissioned or developed by hotels, but rather "imposed from the outside," ignoring them is not a viable alternative for hotel managers.

Our contribution extends beyond previous literature as we focus on quality of systems use, a construct that has received surprisingly little attention in the literature (Burton-Jones and Grange 2012). We corroborate the notion that 'not all system use is created equal' by showing that managerial responses to online reviews have disproportionate effects depending on the rating of the review they address. In other words, across the continuum of review ratings, investing resources in responding to reviews produces a stronger impact on competitive performance as the rating of reviews tends toward the negative end of the continuum. Thus, the management of hotels and other lodging facilities should apply well-planned strategies, which focus not only on how much, but also on how and to what kind of online reviews they respond.

The corollary to the above finding is the seemingly obvious realization that under resource constraints a firm should ensure quality as well as quantity of the online review system usage. Online review systems are an example of socio-technical artefacts that the firm is compelled to use by market forces. That is, due to the changing customer information searching behavior, the hotel must devise an online review response strategy to stay competitive in the market. Interestingly, these activities are to be performed using external systems that the firm did not build or purchase. In other words, hotel managers are forced into participation in these channels using systems they did not commission or approve (e.g., TripAdvisor). The functionalities of these applications are limited (e.g., inability to delete reviews even when they are deemed inaccurate or false). To be sure, some operators choose not to develop such competencies and to ignore the systems. However, as our results suggest, this is itself a strategy, and one that leads to negative

results – on average. From an academic standpoint, online reviews systems are an intriguing early example of customer service systems beyond the control of the organizations that the firm must adapt to in order to stay competitive. This is an area ripe for future research. For example, organizations building new information systems typically can act on both the system variables (e.g., IT functionalities) as well as organizational variables (e.g., employees' skills, reward systems). With this new class of external systems, the first set is not available for information systems designers. For example, when it comes to responding to TripAdvisor reviews the system does not allow the ability to offer more than one response to each review. Thus, a hotel that wish to provide a response from the general manager and the head housekeeper could not do so. Moreover, there is no way for the staff to numerically rate the guest review, but only text is enabled as a response vehicle. How should hotel approach the development of digital competences for systems they not control or willingly subscribe to? A firm that chooses to engage with the community of users on an online review platform (i.e., does not adopt the no response strategy) must adapt and use the systems to its advantage. We argue that a hotel must design a socio-technical system usage strategy – a strategy that marshals an understanding of the optimal approach to deploying the socio-technical artefact (e.g., the online review system) given the firm's use objectives (e.g., maximization of revenue per available room). We are not aware of any previous research that investigates this question directly.

While our findings demonstrate the overall value of managerial response (H2), the expectations that a lack of coherent response strategy leads to lower competitive performance (H3b) is not supported. This result may stem from the residual nature on the no strategy group (NS) and the fact that our categorization was very restrictive. We identified as NS any response strategy that fell short of 100% response during the month. Thus, our inability to clearly differentiate the effect of a no strategy approach to managerial response may be a function of our restrictive categorization. Another possible explanation, warranting further research, is that management creates confusion without a clearly defined pattern of managerial response. As a result, the customers could not form an evaluative conclusion of the hotel's service and product quality, and the resources invested in monitoring and responding to online reviews become a waste.

1   Our results show that having a defined managerial response strategy yields better

2   performance than enacting a no response strategy (H3c). It follows that the firm has no

3   choice but to partake in the online review community. As a consequence, it is imperative

4   that the organization uses the systems effectively within the constraints of the

5   functionalities that it exposes and within the scope of accepted usage practices

6   established by the review system owner and the community of users. This is a very

7   different environment as compared to traditional organizational information systems

8   deployment comprising internal management of proprietary or licensed IT that is fully

9   within the control of the firm. We believe that this is an exciting area for future research.

10   Particularly in light of the increasing emergence of such external systems in areas

11   spanning from customer interactions (e.g., social media) to platform participation (e.g.,

12   app ecosystems) and cooperation with supply chain partners. Our work on managerial

13   response strategies in online review systems informs the larger theoretical questions of

14   how the firms improve their system use in the new context.

15   Our results for quality of use show that any patterned response strategy is better than not

16   responding at all and confirms the importance of quality of system usage. Finally, we

17   evaluated the competitive performance of firms adopting the two different approaches to

18   managerial response (H3d). We find that, in spite of a higher requirement of resource

19   investment when using a full response strategy, the firm's RevPAR Index is significantly

20   lower as compared to hotels with a strategic customer orientation strategy.

21   We believe our work can be extended along two dimensions: analytical and theoretical.

22   From an analysis standpoint, we operationalize quality of system usage as response

23   strategy and we measure it by way of the pattern of managerial responses. This is just one

24   dimension of system usage quality in the context of online review systems. While some

25   hospitality literature investigates the text in the managerial responses in an experimental

26   setting (Lee and Song 2010, Treviño and Castaño 2013), it is likely an important factor

27   affecting firm competitive performance as well, and it is certainly a driver of resource

28   allocation. In other words, while it is true that negative reviews are generally few, they

29   are longer and more articulated (Piccoli and Ott 2014). In practice, firms utilize different

30   service recovery responses. Some firms apologize for the issues in the response publicly

but prefer to follow up the service recovery with the customers via a private channel (e.g., phone call, or private message in the review system). Others not only apologize for the issues but also broadcast to all users the corrective actions they have taken. Moreover, some managerial response strategies carefully address the issues raised in the online review, while others provide standard responses drawn from a fixed set of templates. One possible approach to the investigation of the response content is to use text-mining techniques (e.g., topic modelling) to compute a measure of breadth and congruence between the customer review and the managerial response (Piccoli 2016). Such measure would improve the precision of our quality of use measure by augmenting the pattern of response with a measure of the information quality of the individual responses (Kettinger et al. 2013). Another approach is to use algorithms to group responses based on their content (e.g., a trained classifier) instead of rating of the review they reply to.

6. Limitations and Conclusions

As with any study using an archival research methodology, we acknowledge some limitations. While we observe the correlation between quantity and quality of online review system usage and hotel performance, we cannot establish a conclusive causal relationship. We seek to limit the impact of this limitation by controlling for product quality and tease out the effect of managerial response. In addition, due to the exploratory nature of the study, we categorize the quality of system usage (in terms of managerial response) into four different strategies based on the empirical data and previous literature. While our categories are sensible with respect to practice, there is a need for a theoretical framework for guiding future research. Despite the above limitations, we believe our work uncovers an interesting pattern of results that points to the importance of research on quality of online review system use at the property level. Moreover, as one of the first empirical works focused on the competitive effect of managerial response strategies to online reviews, we hope that our effort spurs future research in this important area. As customer service interactions are increasingly mediated by digital technology, the ability to foster high quality system usage by employees will become a critical competitive lever for hospitality operators.

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