ONLINE REVIEW RESPONSE STRATEGY AND ITS EF-FECTS ON FIRM COMPETITIVE PERFORMANCE

Research paper

Abstract

Online reviews have transformed consumer behaviour in product information searching and sharing. While some literature frames online reviews as "electronic word of mouth," we posit that an online review system is an IT-enabled customer service system and that online reviews are not an electronic version of a traditional face-to-face phenomenon. Their growing popularity engenders new phenomena for which information systems scholars are best positioned to understand the full complement of consequences. One such consequence, at the firm level of analysis, is the impact of online reviews on the firm's success. More specifically, we focus on the question of how profit-maximizing firms should respond to online customer comments.

Our findings show that system usage quantity positively impacts the firm's competitive performance, and that responses have a stronger positive impact when they address negative reviews. We investigate four approaches to managerial response and find significant performance differences between the strategies. This finding proves that not only "how much" the system is used, but also "how" the system is used, affects firm performance – an effect long theorized by information systems researchers that has eluded empirical demonstration.

Keywords: Online review, Managerial response, Quantity of usage, Quality of usage.

1   Introduction

The development of information technology has virtualized the information gathering process in product searching by removing the physical interactions between employees and consumers in a wide range of industries (Overby 2008). In the hospitality industry for example the Internet has enabled the virtualization of the information searching process with dramatic changes in consumers' behaviour (Buhalis and Law 2008) and changes in the strategic balance of power between hotel operators and intermediaries. One of the foremost manifestations of process virtualization is the rise to prominence of online review platforms.

Online reviews are evaluative statements, written by actual or potential customers, available to end-user and institutions via the Internet (Stauss 2000). Modern online review systems enable firms to join the conversation about their products or services by responding publicly to online comments. Thus, online review systems are socio-technical artefacts (Silver and Markus 2013) that mediate the interaction between the firm and its customers.

Much academic literature presents online reviews as "electronic form of word of mouth" (eWOM). Yet, this label and the hinted similarity to "physical" word of mouth (WOM) is conceptually questionable (Sparks and Browning 2011). WOM is transmitted directly from a source to a receiver, often among small groups of friends or family members. Moreover, the receiver typically knows the sender personally and has therefore a lot of contextual information to draw upon when interpreting the opinion. Conversely, online reviews are broadcasted to all Internet users, with the overwhelming majority of readers being strangers (Cheung and Thadani 2012). Thus, online reviews are more akin to a broadcast medium than a bilateral computer-mediated conversation. Moreover, they lack one of the key characteristics of WOM communications – social ties. Finally, they are written and permanent, unlike WOM that is a volatile for of information exchange (Bartosiak and Piccoli 2016).

In short, online reviews are not an electronic version of a traditional face-to-face phenomenon. Rather, the introduction and use of online review systems engenders new phenomena for which information systems scholars are best positioned to understand the full complement of consequences (Silver and Markus 2013). In this paper we focus on question that has received limited research attention, despite its theoretical and practical importance: how should profit-maximizing firms respond to online reviews. 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 channel that a firm must learn to use to collect intelligence and to respond to consumers' comments. Practicing managers have long intuited that partaking in the conversation is important. An industry study by TripAdvisor for example, shows that responding to online reviews improves customers' likelihood of recommending a hotel by more than 20% (Barsky and Frame 2009). However, there is a lack of research that rigorously and empirically evaluates response management strategies (Liu et al. 2015).

We frame our work in the context of sociotechnical systems use. We categorize and analyse 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 firm performance. Our novel contribution is in the empirical demonstration that firm benefits form both the quantity and quality of online review systems use. Specifically, those organizations that engage with online review system to respond to customer comments display superior competitive performance, and this effect is stronger when the firm uses the system to address negative comments.

The paper is organized as follows. In the next section we introduce our theoretical framework and discuss previous literature on online reviews and firm 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 literature shows that online consumer review ratings have a significant influence on product sales (Duan et al. 2008; Mauri and Minazzi 2013). In the hotel industry, for example, online hotel reviews increase customers' awareness of the hotel and enhance hotel consideration in customers' mind (Vermeulen and Seegers 2009). High review scores convey: (1) product quality and (2) social validation (Cialdini 2000). The research has reached consensus on the finding that higher review scores increase sales (e.g., Chevalier and Mayzlin 2006). 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 central aspect of our work, we seek to establish that the same relationships hold.

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

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

2.2   Firm Responsiveness

A positive link exists between a service-oriented business strategy and company performance. Customers generally interact with a few front-line employees during a service encounter, and typically develop an overall image of the emotions that members of a given organization will display (Sutton and Rafaeli 1988). Readers of online reviews can now form a similar perception of the firm's customer orientation without physically interacting with employees, but by viewing management responses. We define managerial response as an answer posted on behalf of a firm by a firm's employee answering to a specific comment posted by a customer or user. Recent work suggests that managerial responses positively impact subsequent review rating and review volume, especially in the case of unsatisfied customers (Gu and Ye 2014).

At the firm level managerial responses to online reviews reflect the firm's underlying capability in using online review systems to improve their competitiveness. That is, managerial responses manifest the firm's ability to utilize an online review system to implement their service-oriented business strategy. Despite the significant attention garnered by online review systems and their use by customers, very few studies focus on managerial response strategies. A notable exception (Treviño and Castaño 2013) classified managerial response strategies into three types: denying response (in which the managers take a defensive stance and disagree with the customer's review); accepting response (in which managers politely recognize the situation, but offer no further actions); and changing response (in which managers politely recognize the situation and explain how they will redress the situation for future occasions). The results of this perceptual study indicate that, in the subjective evaluation of the 12 respondents, the changing response to negative reviews is superior and leads to a more positive view of the firm.

2.2.1   Quantity of Responses

Information systems theory predicts that the benefits of new sociotechnical systems adoption accrues to those organizations that utilize it (Silver et al 1995). 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. Customer perceives 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. We propose that there is a direct link between online review systems use and performance.

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

2.2.2   Quality of Responses

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 attain the business goal (i.e., 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). 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 managerial response.

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). 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 low. Formally:

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

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, a firm can enact a range of response strategies, and no research to date has empirically evaluated the relative effect of each one on firm competitive performance. We identify a "no response strategy" (NRS) as the benchmark. The NRS is the least costly approach to online review systems usage since the firm devotes zero resources to the effort. We propose that any response strategy, which involves an allocation of human resource, should be justified as an improvement over the NSR. We therefore test how different response strategies compare to the NRS. Given the paucity of research on this subject we abstract and categorize response strategies empirically. Specifically, we identify the following four types:

• Positive reinforcement strategy (PRS): the firm responds only to positive comments in order to highlight for future online review readers the positive aspects of its product or service

- Reassurance strategy (RS): the firm responds only to negative comments in order to broadcast to signal to future online review readers its concern for customers' wellbeing and to clarify any misunderstandings that lead to a negative customer comment.

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

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

Customer reviews often manifest 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 to avoid making mistakes on product choice (Hu et al. 2009). We are not aware of any previous work that has theorized the effects of the response strategies we identified. We therefore take an exploratory stance based on the notion that any systematic approach should be superior to the NRS. Formally:

H3b: The effect of a positive reinforcement strategy on hotel performance is stronger than the effect of a no response strategy.

H3c: The effect of a reassurance strategy on hotel performance is stronger than the effect of a no response strategy.

H3d: The effect of a full response strategy on hotel performance is stronger than the effect of a no response strategy.

While systematic approaches to managerial response should prove superior to a strategy of no response, we expect that when the response strategy is haphazard it will not result in improved competitive performance for the firm. We hypothesize:

H3e: The effect no strategy on hotel performance is no different than the effect of a deliberate no response strategy.

3   Methodology

The context of this study is the lodging industry, a context that is well suited to the study of managerial responses to online reviews. Travel and holidays are one of the most expensive items purchased regularly by households around the world, and it represents a significant proportion of individual's annual budget. However, tourism products (e.g., hotel rooms) are generally considered to be "confidence goods" where customers have to make purchase decisions before testing the products. That is, unlike physical goods, which which customers have an opportunity to test before purchasing, hotel accommodation cannot be "tested" a priori. Therefore, travellers make decisions based on their own past experience with the hotel or the brand; and/or others' experiences shared over the Internet. Therefore, positive online hotel reviews can enhance customers' trust in a hotel (Sparks and Browning 2011) and, as a consequence, increase the hotel's financial performance (Öğüt and Onur Taş 2012). Moreover, 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).

We obtained archival data from 39 international hotels in Taipei, Taiwan from January 2007 to August 2016, including the hotels' monthly average room rate, monthly average occupancy percentage, and the total number of employees of the month. The choice of the Taipei market was dictated by the fact that it is one of the few markets where the government collects and publicises monthly hotel performance data. We complemented performance data with review data from Tripadvisor from June 20, 2004, the date when the first review appeared in one of the 39 hotels, to August 31, 2016. The total sample comprises 24,351 unique individual reviews.

3.1   Measures

Cumulative review scores (Cum_AvgR) is the running average, for each review, of all chronological prior rating for the hotel. This represents the aggregated review score of the hotel on Tripadvisor. We then aggregate the cumulative review scores by averaging by month to match with the monthly performance data. Total number of reviews (TotR) represents the review count for the month. Managerial response capabilities are not a native feature of the Tripadvisor platform. The first managerial response for our sample of hotels appeared on June 28, 2009. Thus, cumulative response percentage (Cum_RespP) is computed by dividing the monthly running total of response number and the monthly running total of the review posted since July 2009.

We measure competitive performance through the Revenue per Available Room (RevPAR) Index. The RevPAR is a standard measure of financial performance in the hotel industry, allowing comparison across hotels with different number of rooms and characteristics. It is computed as the product of the occupancy percentage and the average daily room rate. The RevPAR Index compares an individual property's RevPAR to its competitive set, thereby creating a standardized RevPAR measure. We divide the 39 hotels into 5 equally distributed groups based on average daily room rate (4 groups of 8 hotels and 1 group of 7 hotels). The hotels within each group are the competitors. The RevPAR Index is computed as the hotel's RevPAR divided by the competitors' average RevPAR times 100. Therefore, a RevPAR Index that is greater than 100 indicates that the hotel outperforms its competitive set while numbers below 100 indicate relative underperformance. Using RevPAR Index as a competitive performance measure allows use to control for all exogenous influences on hotel performance (e.g., economic performance of the overall market, travel market cycle in each segment, seasonality).

We merge the monthly hotel competitive performance data with the monthly aggregated cumulative review score and cumulative percentage of managerial response. This results in a panel data of 1,891 observations. Out of the 39 hotels, 35 hotels have 50 monthly performance and aggregated review data. The other 4 hotels were established after January 2007; thus have less than 50 monthly observations (20, 33, 42 and 46 months to be exact). The descriptive Statistics of the variables are presented in Table 1.

Variables	Min.	Median	Mean	Max.	S.D.
RevPAR Index	8.84	52.20	60.61	215.10	32.79
Cumulative Average Review Score (Cum_AvgR)	2.95	4.03	3.99	5.00	0.36
Cumulative Response Percentage (Cum_RespP)	0	0.06	0.22	0.85	0.27
Total Number of Review (TotR)	0	6	9.32	143	12.44

Table 1. Descriptive Statistics of the Variables

We measure response strategy on a monthly basis to capture strategy changes by the firms. We categorize the different strategies based on the pattern of responses exhibited on the online review platforms.

A firm that responds to no online reviews falls into the no response strategy (NSR). A firm that selectively responds only to reviews with a rating of 4 and 5, or 1 and 2, falls into the positive reinforcement strategy (PRS) or the reassurance strategy (RS) respectively. A firm that responds to all reviews is assigned to the full response strategy (FRS). The remaining firms, which engage in response activity that does not follow any of the above systematic patterns, represent the no strategy (NS) group.

3.2   Controls

We include average review score (Avg_Review), guest to staff ratio (GuestToStaff), average response window (Avg_Window) as control variables. Avg_Review is the monthly average of the review score received during each month. It provides a measure of product quality and it is an important control variable to capture the effect of hotel quality on its competitive performance. GuestToStaff is the number of room occupied during the month divided by the total number of staff reporting to work during the month. It is a further measure of product quality. While Avg_Review captures hotel's service quality as perceived by travellers, GuestToStaff is an internal measure of quality, a proxy for the service level offered by the hotel. Avg_Window is the number of days between the review date and the managerial response date. It is a control variable designed to measure the speed with which hotels respond in order to isolate the effect of managerial response beyond the quickness of such action.

4   Data Analysis and Results

4.1   Analytical Procedure

To test hypotheses 1, 2 and 3a we constructed a panel of hotels by months and we fit a linear mixed-effects model allowing for nested random effects. The specification is as follows:

$RevPARIndex_{ij} = \beta_0 + \beta_1 \times (Cum\_AvgR_{ij})$

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

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

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

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

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

$$+ \beta_7 \times (Cum\_AvgR_{ij}) \times (Cum\_RespP_{ij})$$

$$+ random = \sim 1 | Hotel$$

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

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

To test hypotheses 3b-3e we conduct a two-way analysis of variance (ANOVA) and measure whether the average RevPAR Index of hotels implementing the five different strategies are significantly different, controlling for hotels' variability. We use a post-hoc Tukey HSD Test for pairwise comparisons.

$RevPARIndex_{ij} = \mu + Strategy_i + Hotel_j + \gamma_{ij}$, where μ is the grand mean of RevPAR Index, and is the non-additive interaction effect of i-th strategy (i = 1,…,5) and j-th hotel (j = 1,…,39).

4.2   Findings

After controlling for hotel specific effects, product quality (Avg_Review, GuestToStaff) and managerial response timing (Avg_Window), we find that cumulative average review score (Cum_AvgR) and total number of review (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. Finally, the coefficient of the interaction of cumulative response percentage and cumulative average review score is negative and significant (H3a). This finding shows 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 reviews has a stronger positive effect on competitive performance when reviews are negative rather than positive. The results of the fixed effects are summarized in Table 2. Table 3 reports the correlation matrix of the dependent and control variables.

Predictor	Coef. β	SE(β)	DF	t-value	p-value
Intercept	-138.048	42.055	718	-3.282	0.001
Cumulative Average Review Score (Cum_AvgR)	55.556	10.402	718	5.341	< 0.000
Total Number of Review (TotR)	0.137	0.041	718	3.318	0.001
Cumulative Response Percentage (Cum_RespP)	270.464	50.549	718	5.350	< 0.000
Monthly Average Review Score (Avg_Review)	-4.872	1.511	718	-3.225	0.001
Guest to Staff Ratio (GTS)	0.278	0.102	718	2.726	0.007
Average Response Window (Avg_Window)	-0.042	0.025	718	-1.665	0.096
Cum_RespP × Cum_AvgR	-70.584	12.280	718	-5.748	< 0.000

Table 2. Summary Result of the Fixed Effects

	Intercept	Cum_AvgR	TotR	Cum_RespP	Avg_Review	GTS	Avg_Window
Cum_AvgR	-0.978						
TotR	0.194	-0.202					
Cum_RespP	-0.635	0.632	0.093				
Avg_Review	0.075	-0.219	-0.043	-0.053			
GTS	-0.135	0.077	0.263	0.050	-0.017		
Avg_Window	-0.054	0.059	0.016	0.081	-0.090	-0.014	
Cum_RespP × Cum_AvgR	0.650	-0.648	-0.110	-0.998	0.051	-0.046	-0.079

Table 3. Correlation Matrix

The results of the two-way ANOVA to test the difference among the quality of responses (*Table 4*), lend support to our general claim that there are systematic differences in RevPAR Index between the managerial response strategies we have identified. More specifically the results of a post-hoc Tukey HSD Test (*Table 5*) points to the hypothesized differences between strategies. We find support for the superiority of reassurance (H3c), full response (H3d) and positive reinforcement strategy (H3b) as compared to the benchmark no response strategy. We also find that the no strategy approach is superior to the benchmark no response strategy – a result counter to our expectation (H3e). Thus, we claim support for H3b, H3c and H3d, but not for H3e. *Figure 1* shows the number of data points (i.e., hotel-months) associated with each strategy, the average RevPAR Index and the 95% confidence interval of

the average RevPAR Index (blue lines). We also report non-hypothesized pairwise differences between strategies that are significant (*Table 6*). We comment on these extra results in the discussion.
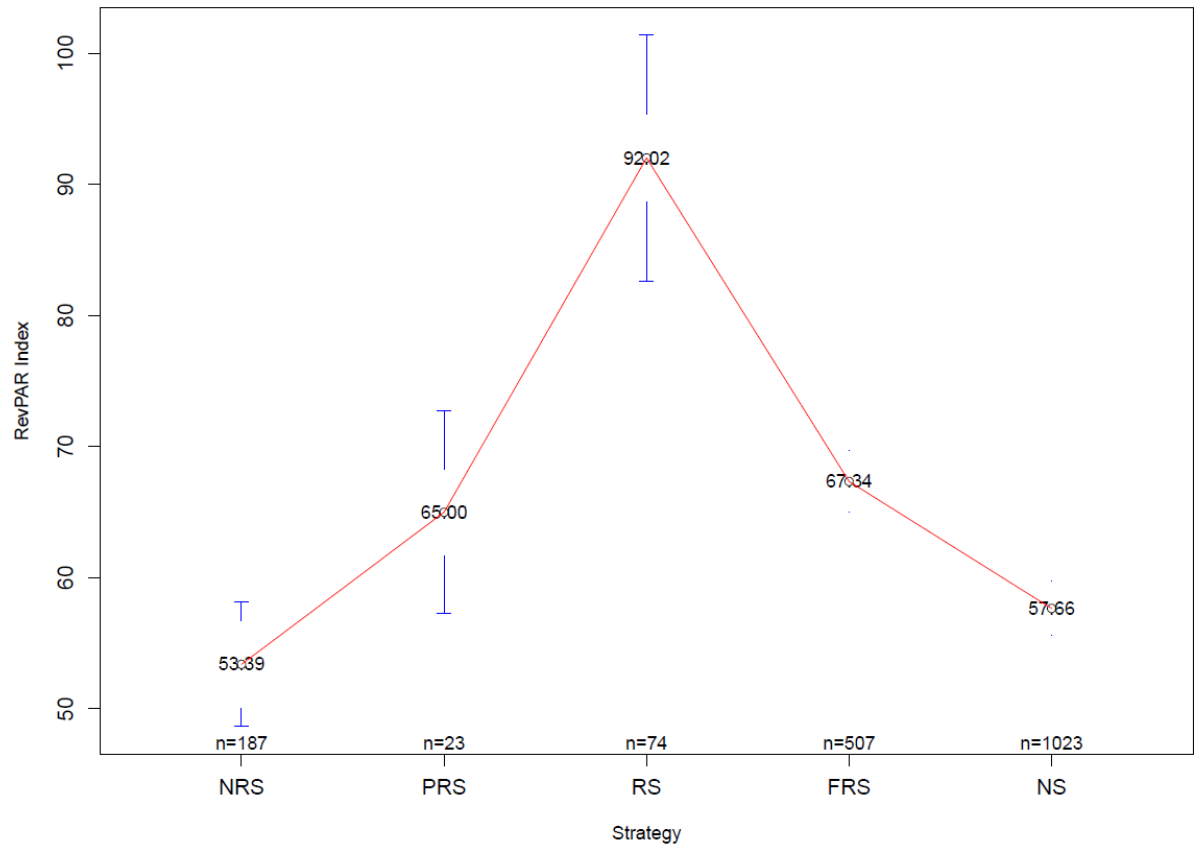

Figure 1. Average RevPAR Index by Strategies

Predictor	DF	Sum Sq	Mean Sq	F value	p-value
Strategy	4	113878	28470	194.0	< 0.001
Hotel	38	1590852	41865	285.3	< 0.001
Residual	1771	259859	147		

Table 4. ANOVA Table

	Predictor	Difference	Lower CI	Upper CI	Adjusted p-value	
H3b	PRS – NRS	11.603	4.294	18.912	< 0.001	Supported
H3c	RS – NRS	38.625	34.082	43.165	< 0.001	Supported
H3d	FRS – NRS	13.952	11.122	16.782	< 0.001	Supported
H3e	NS – NRS	4.268	1.638	6.899	< 0.001	Not Supported

Table 5. Post-hoc difference test for hypothesized differences

Predictor	Difference	Lower CI	Upper CI	Adjusted p-value
PRS – NS	7.335	0.360	14.309	0.034
RS – PRS	27.022	19.126	34.918	< 0.001
RS – FRS	24.673	20.557	28.789	< 0.001
RS – NS	34.357	30.375	38.339	< 0.001
FRS – NS	9.684	7.888	11.480	< 0.001

Table 6. Post-hoc difference test for non-hypothesized differences

5 Discussion

The point of departure for our theorizing is the notion that online reviews are not an electronic version of a traditional face-to-face phenomenon. Rather, the introduction and use of online review systems engenders new phenomena for which information systems scholars are best positioned to understand the full complement of consequences (Silver and Markus 2013). One such consequence, at the firm level of analysis, is the impact of online reviews on the firm's success. More specifically, we focus on the question of how profit-maximizing firms 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 a broadcast communication channel. In other words, those organizations that are able to implement optimal managerial response strategies (i.e., to effectively use the online review system) will, on average, experience superior competitive performance.

Our results confirm and extend prior literature on the effect of online reviews. We find support for the hypotheses that cumulative online review scores (H1a) and total number of reviews (H1b) are positively related to competitive firm performance. These results are not surprising and are in line with extant theory suggesting that higher review ratings act as a product quality signal for customers and the number of reviews reinforces the trust those customers have in the implicit recommendations of the online review systems (Duan et al 2008). Our work extends prior literature by using a direct measure of competitive performance, rather than sales (Archak et al 2011; Dellarocas et al 2010) or intention to purchase (Cheung et al 2009). However, we treat H1a and H1b as confirmatory and our focus is on controlling for these known effects when focusing the analysis on managerial responses.

There is a paucity of research that rigorously and empirically evaluates response management strategies in online review systems (Liu et al. 2015). This is surprising since online review systems are widely used by customers and have the potential to strongly impact firm performance. Thus, the consequences of the quantity and quality of their use by organizations should be a foremost concern for information systems scholars.

With respect to the quantity of system use (H2) we report a strong positive effect of managerial response. In others words, there is a direct correlation between the use of the systems to respond to customer comments and the competitive performance of the firm. It is important to note that this effect is evident even after we control for measures of product quality. The positive relationship between system usage quantity and competitive performance complements and extends finding from previous research. Specifically, unlike previous empirical work on quantity of usage (Devaraj and Kholi, 2003), our study focuses on an outward facing 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 system usage impacts competitive performance not only through efficiency and business process improvement, but also through effectiveness improvements.

We are not aware of any work that has empirically demonstrated the link between quantity of systems use and firm performance in this context.

Our contribution extends beyond previous literature as we focus on quality of systems use, a construct that has received surprisingly little attention in the information systems 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.

The corollary to the above finding is the seemingly obvious realization that under resource constraints a firm should ensure quality of use as well as quantity. While most organizations recognize the importance of IT training, and information systems research has investigated IT training for decades (Lee et al. 1995, Mehra et al. 2014), individual user training may improve how effective a manager is in navigating the online review system. Our work however focuses on the firm level, not the individual level of analysis. In other words, while IT training is the process used to increase effective IT use by individuals, it will not inform the quality of system use of the firm. We argue that a firm must design a sociotechnical system usage strategy – a strategy that marshals an understanding of the optimal approach to deploying the sociotechnical 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. Strategic alignment research addresses some of the same concerns about effective deployment of IS resources, but the focus of the analysis is on the fit between strategy and technology resources as well as the governance processes (Henderson and Venkatraman, 1993; Gerow at al. 2015) not the quality of use of specific systems.

Another novel aspect of our work is the class of systems we are investigating. Online review systems are an example of sociotechnical artefacts that the firm often is compelled to use by market forces. Yet, the firms had no input in the development of the system and it did not willingly purchase or otherwise commission it. In other words, 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. Our findings show that a no response strategy is ineffectual. It follows that the firm has no choice but to partake in the online review community. As a consequence it is imperative that it uses the systems effectively within the constraints of the functionalities the system exposes and within the scope of accepted usage practices established by the review system owner and the community of users. This is a very different environment as compared to traditional organizational information systems deployment comprising internal management of proprietary or licensed IT that is fully within the control of the firm. We believe that this is an exciting area for future research. Particularly in light of the increasing emergence of such external systems in areas spanning from customer interactions (e.g., social media) to platform participation (e.g., app ecosystems) and cooperation with supply chain partners. Our work on managerial response strategies in online review systems informs the larger theoretical questions of how the firms improve its system use in the new context.

Our results for quality of use show that any response strategy is better than not responding at all. The significant difference between No Strategy and the three deliberate approaches to managerial response we identify (i.e., Full Response, Positive Reinforcement and Reassurance) confirms the importance for the firm to ensure quality of system usage. However, contrary to our expectation, having no discernible strategy (i.e., responding seemingly at randomly to customer comments) is also superior to not responding to any online review. This result may be a function of our residual approach to classification in the no strategy category, which may have failed to identify a deliberate strategy that does not fit in any of the Full Response, Positive Reinforcement and Reassurance categories. Barring a methodological explanation, the result suggests that a poor quality of usage without any directions is still better than no action at all. A possible explanation, warranting further research, is that even a haphazard re-

sponse strategy may convey a degree of customer orientation by the firm. Thus, outperforming, at least marginally, the No Response Strategy.

In a follow up analysis we evaluated the comparative performance of firms adopting the different approaches to managerial response, even those for which we had no explicit hypothesis. The Reassurance strategy emerges as distinctly superior not only to the No Response Strategy benchmark, but also to all other deliberate approaches to managerial response in online platforms. Note that, because of the J-shaped distribution that characterizes online reviews, the number of negative reviews for a typical product or firm is low relative to the total. Therefore, Reassurance is not only the approach with the greatest positive impact, but it is also the most efficient from a resource allocation standpoint.

We believe our work can be extended along two dimensions: analytical and theoretical. From an analysis standpoint we operationalize quality of system usage as response strategy and we measure it by way of the pattern of managerial responses. This is just one dimension of system usage quality in the context of online review systems. While the information systems literature has yet to investigate it, the text in the managerial responses is likely an important factor affecting firm competitive performance, and it is certainly a driver of resource allocation. In other words, while it is true that negative reviews are generally few, they are longer and more articulated (Piccoli and Ott, 2014). In practice, firms utilize different 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.

With respect to the theoretical development future research should improve our collective understanding of quality of usage at the firm level of analysis. Specifically, while we demonstrate the importance of quality of use and its impact on a firm's competitive performance, our work is silent on the question of how a firm can foster quality of usage. Moreover, our work is contextual to online review systems and needs to be generalized. The ultimate objective of this work would be to produce a general theory that can provide theoretical and practical guidance for broad classes of sociotechnical systems that are beyond the scope of firm's control.

6 Conclusions and Implications for Practice

As with any study using an archival research methodology, we acknowledge some limitations. While we observe the correlation between system usage and firm 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 categorise the system usage quality into four different strategies based on the empirical data without a strong theoretical ground. 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 system use at the firm level.

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