

Hotel Performance Impact of Socially Engaging with Consumers

Chris Anderson and Saram Han

EXECUTIVE SUMMARY

One way that hoteliers can interact with their guests is virtually—by encouraging their online reviews and responding to them. Using data from the popular TripAdvisor site, this study examines three aspects of such interaction based on customer reviews. First, the study found that simply encouraging reviews (using Revinatate Surveys) was associated with an increase in a hotel’s ratings, as compared to their competitive set. Second, the fact that management responds to reviews leads to improved sales and revenue as measured by consumers clicking through to the hotel’s listing at online travel agents. The study re-confirmed an earlier estimate that an increase in a hotel’s TripAdvisor rating is reflected in an increase in revenue. Most interesting, the study found that revenue improvements based on review responses are limited in two ways. First, revenue levels increase as the number responses increases, but only to a point. After about a 40-percent response rate, hotels seem to reach a point of diminishing returns, and making too many responses is worse than offering no response at all. Second, consumers seem to be most appreciative of responses to negative reviews, rather than positive reviews, as indicated by the fact that ratings improve more substantially in connection with constructive responses to negative reviews than simple acknowledgment of positive comments.

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Chris K. Anderson, Ph.D., is an associate professor at the Cornell School of Hotel Administration. Prior to his appointment in 2006, he was on faculty at the Ivey School of Business in London, Ontario Canada. A regular contributor to the CHR Report series, his main research focus is on revenue management and service pricing. He actively works with industry, across numerous industry types, in the application and development of RM, having worked with a variety of hotels, airlines, rental car, and tour companies, as well as numerous consumer packaged goods and financial services firms. Anderson's research has been funded by numerous governmental agencies and industrial partners. He serves on the editorial board of the *Journal of Revenue and Pricing Management* and is the regional editor for the *International Journal of Revenue Management*. At the School of Hotel Administration, he teaches courses in revenue management and service operations management.



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Performance Impact of Socially Engaging with Consumers

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User reviews have become a critical aspect of the travel research process, as evidenced, for instance, by TripAdvisor having over 350 million unique monthly visitors.¹ One benefit of these posted reviews is that hotels can address issues raised by consumers in an effort to improve consumer satisfaction along with review scores. Given the importance of consumer reviews, one goal for hotels is to find ways to improve their social media performance (with a goal of boosting financial outcomes). In this report we examine the effects of reviews posted on TripAdvisor to look at non-operational and relatively inexpensive ways in which hoteliers can improve their performance, both on the review sites themselves and in terms of actual hotel revenue and sales performance.

¹ Source: TripAdvisor.com, February 16, 2016.

Performance and review impact of review encouragement (indices compared to competitive set)

	TripAdvisor Metrics			Hotel Performance Metrics		
	TA Score	Number of reviews	Percentage of positive reviews	ADR	Occupancy	RevPAR
Before	99.00	86.1	99.9	94.3	103.4	98.6
After	100.80	224.4	102.9	94.3	104.5	98.61
Significance	0.00350	0.00000	0.03190	0.48860	0.18920	0.49690

Note: "Before" refers to a 12-month period before implementation of the Revinate Surveys tool to encourage guest reviews. "After" is the 12 months following implementation.

In a previous *CHR Report*, co-author Chris Anderson illustrates the positive relationship between user-generated content and hotel performance.² He calculates online reputation elasticity (percentage change in hotel performance given a percentage change in online reputation) using data from ReviewPRO and hotel performance data from STR. The study found substantive impacts of online reputation on overall hotel performance as measured by revenue per available room (RevPAR), with individual firms capitalizing on their improved reputation through some combination of higher occupancy and average daily rate. Using a second point-of-purchase or transactional dataset from Travelocity, he shows the positive impact of both online reputation and the number of reviews on the purchase likelihood.

That study indicated that online reputation (review scores) and the number of reviews are positively related to hotel performance as measured by price, occupancy, and total revenue. There's no doubt that service providers will want to address consumer issues and improve the quality and value of their service offering based on consumer reviews. However, what we outline here are other, less capital intensive approaches to improve a property's reputation. In particular, we focus on more direct engagement with consumers by specifically encouraging them to post reviews on TripAdvisor.com, which so far remains the dominant source for hospitality-related reviews. Looking further at reviews, we compare the hotel's financial performance and online reputation in a series of before-and-after tests, in which the after stage occurs once the hotel starts to encourage consumer reviews via post stay surveys. We show that once reviews are actively encouraged not only does the number of reviews posted to TripAdvisor increase, but so does the review score and hotel rank on TripAdvisor.com.

The latter part of this study focuses not just on encouraging reviews but also on engaging with consumers by responding to their posted comments. As a measure of hotel revenue, we use bookings generated at TripAdvisor, as measured by clicks

from TripAdvisor over to online travel agents. These clicks show the positive relationship between revenue and hotelier engagement as measured by the managerial response rate to consumer reviews. We also delineate the effects of managerial responses by type of review (positive or negative), indicating that while responding to reviews is positively related to online reputation, hotels are better off responding to negative reviews than to positive reviews, and further that responding to all positive reviews may become detrimental.

Engagement via TripAdvisor

The earlier Anderson study indicates that an increase in the number of reviews (in addition to the actual review score) appears to have a direct relationship with hotel performance. In an effort to further evaluate this connection, we look at the relationship between hotels encouraging customers to provide reviews at TripAdvisor and the hotels' review volume, review score, and performance. We do this in conjunction with online reputation management firm Revinate, using Revinate Surveys, which allows hotels to simultaneously collect private and public guest feedback. Revinate Surveys enables hotels to send a post-stay, short format survey to guests, which includes an optional TripAdvisor review form.³

Working with Revinate we collected data from 80 hotels operated by five different management firms, including review data from TripAdvisor and hotel performance data as compiled by STR and Fairmas, the Berlin-based market analysis software provider. In addition to the individual hotels' data, we have similar measurements from the property-determined competitive set. In an effort to evaluate the success of efforts to encourage reviews, our review and performance data comprised a period of up to 12 months before and 12 months after each hotel launched Revinate Surveys. This allowed us to compare the average performance in those two time periods. To control for seasonality, all analyses employ indices (i.e., hotel parameter divided by average across competitive set). Exhibit 1 summa-

² C.K. Anderson, "The Impact of Social Media on Lodging Performance," *Cornell Hospitality Report*, Vol. 12, No. 15 (2012), p. 11 (Cornell Center for Hospitality Research).

³ Further information is at Revinate.com

TripAdvisor ranking

	Before	After	Percentage improved
TripAdvisor Rank	46.8	42.0*	72

* Significant at 0.0001 level.

izes average values across a series of metrics for the 80 hotels in these before and after tests. The first column in that table summarizes review scores on the TA Score Index, showing an average index increase from 99 to 100.8. This indicates that encouraging consumers to post reviews is positively related to an increase in the (relative) scores of those reviews (i.e., in comparison to the hotels' competitive sets).

Similarly the number of reviews dramatically increased. The hotels were lagging their competitors considerably before launch (index of 86.1), whereas in the post launch window these properties had more than double the number of reviews of their competitive sets (224.4). Prior to launch they had slightly fewer positive reviews (index of 99.9) increasing by 3 percent (to 102.9) post launch. All three of these TripAdvisor metrics are statistically significant at the 0.05 level, indicating that statistically speaking the indices are different post launch.

The hotel performance metrics are not statistically different, however, although they show slight gains across all three indicators (average daily rate, occupancy, and revenue per available room). As indicated in Chris Anderson's earlier study, hotels may choose different ways to capitalize on improved online reputation. Similarly, hotels may not immediately act nor be able to immediately influence performance owing to the way consumers use review information. The issue is that consumers use reviews during different stages of the travel research process. In a 2011 study, Anderson summarizes the distribution of consumer visitation to TripAdvisor prior to online purchases at a major hotel brand.⁴ That study indicated that while 25 percent of visits are concentrated in the five days prior to a booking, TripAdvisor site visit frequencies are relatively flat in the two months leading up to purchase. As such we might expect a lag between changes in TripAdvisor reviews (and ranking) and the performance outcomes. While not statistically significant, we do see a slight increase in occupancy (with the index increasing from 103.4 to 104.5), while ADR and RevPAR are relatively flat across the two test periods.

Perhaps one of the cleanest measurements of the impact of review encouragement is the change in the hotels' TripAdvisor

⁴ C.K. Anderson, "Search, OTAs, and Online Booking: An Expanded Analysis of the Billboard Effect," Cornell Hospitality Report, Vol. 11, No. 9 (2011), p. 10 (Cornell Center for Hospitality Research).

rankings, a measurement that many operators see as one of the most measurable changes on TripAdvisor. The hotels studied experienced an average ranking increase from 46.8 to 42, with 58 out of the 80 properties maintaining or increasing their ranking. Additionally just over half of the remaining 22 properties still experienced increased TripAdvisor scores relative to their competitive set, even though their ranking didn't rise. One could infer that the ratings for these hotels did not increase as fast as those for some other hotels in the market (but not in their direct competitive set).

One of the common criticisms of posted reviews is that most reviews involve extremes—that is, consumers are most likely to post if their experience measurably differed from their expectation, whether favorably or unfavorably. In an effort to reduce the impact of only hearing from the tails of met or unmet expectations, we demonstrate that facilitating review collection is positively related to the number of reviews posted to TripAdvisor, and that these reviews are generally better than those posted without encouragement.

Hotel Engagement (via TripAdvisor)

One of the increasingly common practices on TripAdvisor is for hotel managers to post responses to guest reviews. In an effort to evaluate the impact of this practice, we look at two data sets. The first data set uses 2015 TripAdvisor data for four major markets: Dubai, France, Italy, and the United Kingdom. Hotels in France and Italy dominate the sample, with over 55,000 hotels in our sample of 65,195 hotels. We focus on non-U.S. markets as these markets tend to have fewer branded hotels and as such more reliance upon OTAs than on U.S. hotel chains' brand.com sites (e.g., Marriott.com or Hilton.com).

Our data include the number of reviews posted to TripAdvisor, the scores of these reviews, the number of managerial responses to these reviews, and the revenue generated when consumers decide to book the hotel in question. We measure this by when they click through from TripAdvisor, which takes them to one of the numerous online travel agents (OTAs) displayed at TripAdvisor (as shown, for example, in Exhibit 3, on the next page). We measure revenue using conversion or sales information relayed back to TripAdvisor from the OTA. Using these data we measure the relationship between responding

EXHIBIT 3

Typical TripAdvisor listing, with prices and referral buttons for OTAs

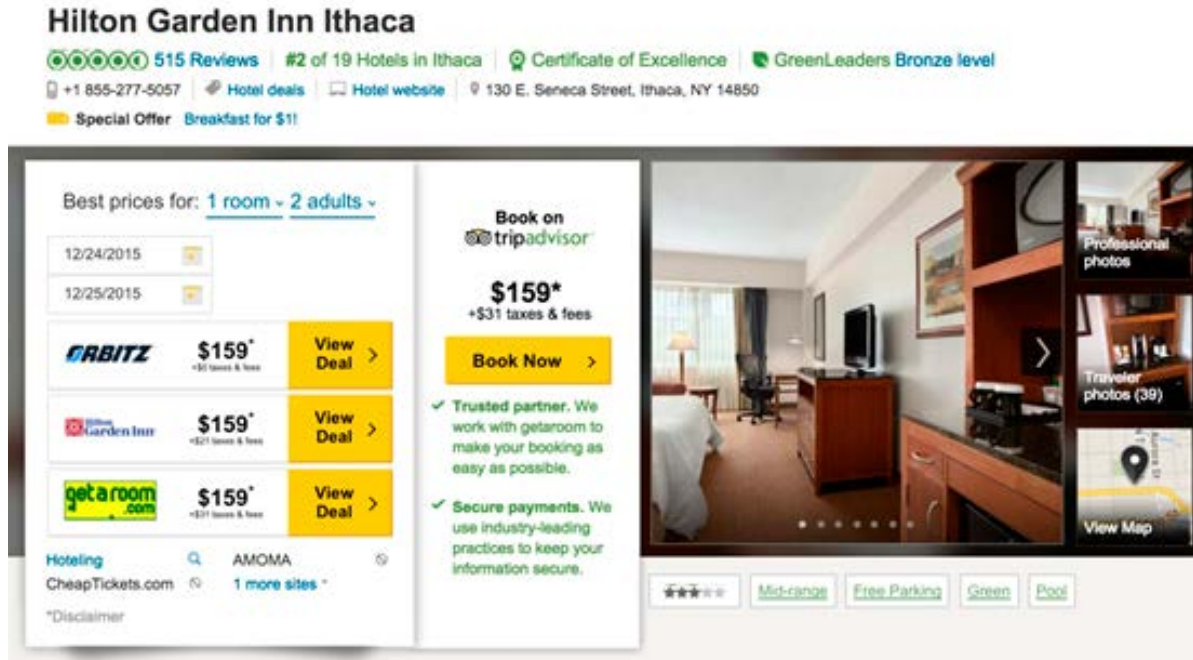


EXHIBIT 4

Revenue and review summary

	Number of Hotels	Percentage of Reviews with Response	Average Review Score	Room-nights	ADR	Number of Reviews
Dubai	477	26%	2.71	205	196	258
France	20,488	12%	3.44	57	118	46
Italy	34,895	9%	3.8	50	120	41
United Kingdom	9,335	16%	3.48	51	132	105

to reviews and hotel performance (based on OTA-generated revenue). Exhibit 4 summarizes revenue and review information for the four markets in our sample. Average review scores are similar in all the markets except Dubai, which has lower scores and a higher managerial response rate. Total revenue is the product of room-nights and ADR.

Similar to Chris Anderson’s 2012 study, we look at performance (revenue) elasticity as a function of the hotel’s average review score at TripAdvisor, the number of reviews, and the percentage of these reviews which have a managerial response.⁵

⁵ See: Anderson, 2012, *op.cit.*

While we don’t have traditional chain scale or hotel classification information we do maintain a control for size of hotel (in rooms) and country of origin. Our analysis applies linear regression with the natural logarithm of revenue as our variable of interest and the other attributes (e.g., review score, number of reviews) as our independent variables.⁶ We anticipate the impact of managerial responses not to be strictly linear, that is, respond-

⁶ As our dependent variable is the natural logarithm of revenue [i.e., $\ln(\text{Revenue})$], we need to transform the parameter estimates in order to interpret the impact on revenues. As e is the opposite of $\ln()$ we need to put the parameter estimates to the power of e to interpret them (i.e., $e^{0.3305} = 2.7182^{0.3305} = 1.39$).

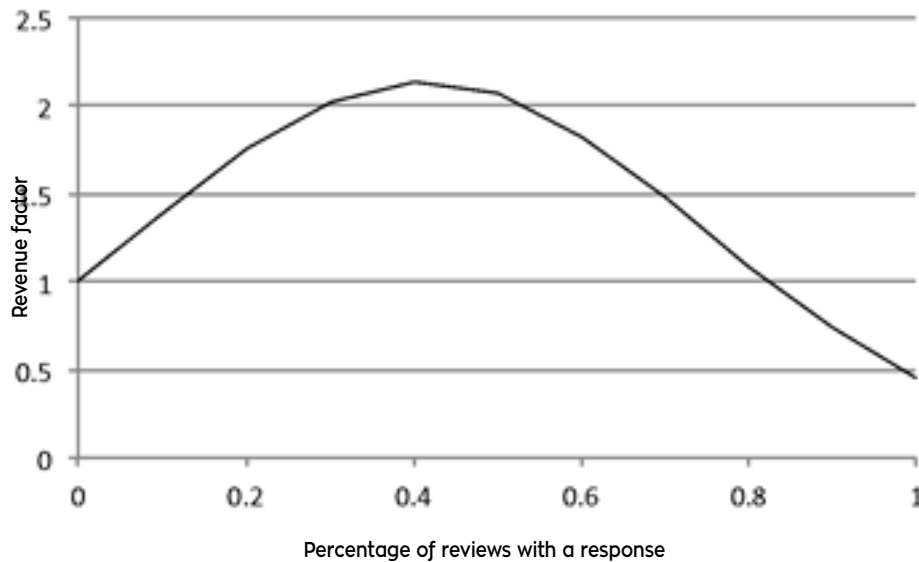
EXHIBIT 5

TripAdvisor review and response impacts on revenue

	Parameter Estimate	Increase unit increase
TripAdvisor Score	0.3305*	1.39
Number of Reviews	0.004889*	1.0049
Percentage of Reviews with Response	3.763*	See Exhibit 6
Percentage of Reviews with Response Squared	-4.588*	See Exhibit 6

EXHIBIT 6

Net revenue effects of responding to reviews on TripAdvisor



ing to some reviews may be beneficial, but perhaps that impact decreases as hotels start to respond to all reviews. Thus, we use both the percentage of review responses and the percentage of review responses squared as variables in our model. Exhibit 5 summarizes the impact of responding to reviews (and of the reviews themselves) on the revenue generated by OTAs referred from TripAdvisor. As a word of caution, these estimates are just approximations since we only have data on OTA revenue created via TripAdvisor but we do not have data on revenue generated by consumers clicking directly through to the hotel or by consumers calling the hotels directly.

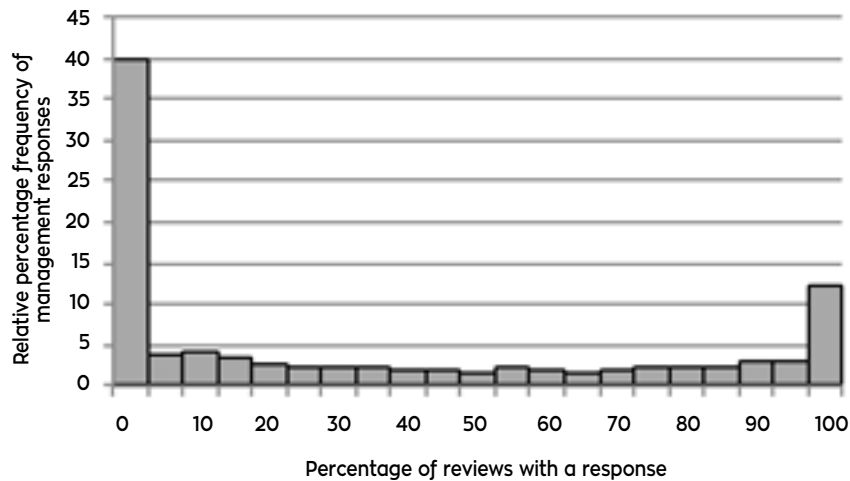
The first row of Exhibit 5 shows that revenue increases by a factor of 1.39 (that is, 39 percent) if a hotel’s review score increases one unit (say, from 3.5 to 4.5 on TripAdvisor’s 5-point scale). Similarly, the second row indicates that each additional review increases revenue by a factor of 1.0049.

The last two rows in Exhibit 5 summarize the impact of managerial responses, combined into a single effect, as illustrated

in Exhibit 6. The two measures of review responses (percentage of responses and percentage of responses squared) are used to assess any non-linearity in the impact of responses on revenues. We found that as the percentage of reviews with responses increases, the percentage with response squared increases faster, and those metrics are combined with the negative parameter (-4.588) for percentage with response squared. The base case is when there are no managerial responses.⁷ As the percentage with responses initially increases, this net effect likewise increases to begin with, but then it starts to decrease as both the percentage of responses and the percentage of responses squared get larger. This calculation suggests that the practical limit for the proportion of review responses seems to be about 40 percent. After this point, incremental increases in review responses become detrimental, and revenue declines. Our data don’t tell us why this is so, but we could infer that

⁷ $(0 * 3.763 + 0^2 * -4.588 = 0, \text{ and } e^0 = 1)$.

Managerial response rate



consumers potentially become annoyed by all the review responses or the responses crowd out the reviews.

In an effort to further refine the impact of responses, we next looked at the actual nature of the managerial response by differentiating responses to negative reviews from responses to positive reviews. For this analysis, we used three years of TripAdvisor review data for two major U.S. destinations, New York and Orlando. We analyzed data for just over 7,400 quarterly hotel observations in NYC and 3,600 in Orlando. We calculated the number of reviews posted in each quarter and the average rating for those reviews. After separating the reviews into positive (4 out of 5 or better) and negative reviews (less than 4), we categorized the managerial responses according to whether they were responding to a positive or negative review.⁸ As responses (in our dataset) are not directly linked to reviews, we can classify responses based on the free form text within the managerial response. For this purpose, we use a Naïve Bayes classifier, which is a commonly used classification model in Natural Language Processing. To build the Naïve Bayes classification model, we consider the responses that included the words “sorry” or “apology” and variants thereof as relating to negative reviews (constituting less than 15 percent of the total hotel responses). In contrast, we identified the responses that included the word “happy” or “glad” (but not “sorry” or “apology”) as those pertaining to positive reviews (again, 15 percent of the total hotel responses). For the rest of the responses, we determine whether each response should be classified as relating to a positive or negative review by

⁸ For more details on this form of classification, see: Jurafsky, D., and Martin, J. H. 2008. *Speech and Language Processing*. Prentice Hall Series in Artificial Intelligence. As a comparison we also classified reviews using 3.5 as the breakpoint with no major differences in results

calculating the sums of conditional probabilities that allow us to identify which words are more likely to be used in conjunction with responses to positive or negative reviews.⁹ Finally, we apply bootstrapping to our model to achieve a better prediction derived from multiple subsample distributions rather than one single overall distribution. Throughout the process of building the training set, we excluded responses written in languages other than English or the words that are not meaningful or representative for our categorization (e.g., “I,” “the,” or a person’s name, such as Michael).

We then calculate the percentage of positive reviews that have responses and the percentage of negative reviews with responses. Exhibit 7 shows a histogram of the overall response rates. The figure indicates that almost 40 percent of hotels never respond to a review, whereas about 12.5 percent respond to all reviews. Then we perform a regression for NYC and one for Orlando, which have similar results, as summarized in Exhibit 8.¹⁰ Here, our variable of interest is quarterly average TripAdvisor score by hotel.

⁹ Jiang, J. and C. Zhai. 2008. “Domain adaptation in natural language processing.” Working paper. University of Illinois at Urbana-Champaign, Champaign, IL

¹⁰ For analysis we take the natural logarithm of the review score as scores are bounded (1–5) and tend to be skewed. Our measures of interest are yes/no did management respond to any reviews that quarter, the number of reviews, and the percentages of positive and negative reviews with responses. Given the panel nature of our data with up to 36 quarterly observations per hotel we test for these impacts upon review scores using a mixed model with a first-order autoregressive covariance structure. Correcting for potential autocorrelation in errors ensures we have unbiased parameter estimates, we use the MIXED PROC in SAS to perform this repeated measures regression. Similar to our Revenue regression, as we take the natural logarithm of reviews, in order to interpret the regression results we need to put each parameter estimate to the power of e .

Impacts of managerial responses on TripAdvisor

	NYC		Orlando	
	Estimate	Change in score	Estimate	Change in score
Intercept	1.40077*		1.32279*	
No response	-0.1135*	0.8927	-0.06841*	0.9339
Number of reviews	0.00009*	1.0001	0.00024*	1.0002
Percentage of negative reviews with a response	0.00009*	1.0165	0.01778*	1.0179
Percentage positive reviews with a response	0.01638*	0.9754	-0.01885*	0.9813

Note: * Significant at 0.0001 level

Failure to respond at all to reviews is costly, as shown in Exhibit 8. For hotels that do not respond to reviews, the average TripAdvisor scores are 89.27 percent in NYC and 93.39 percent in Orlando, compared to those that do respond. But this does not mean that responding to all reviews is generally effective. Instead, it is more critical to respond to negative reviews because they are directly related to review scores. Contrary to this effect relating to negative reviews, responding to positive reviews may in fact diminish a hotel's average score (shown in the last two rows in the table). For example, if a NYC hotel went from responding to almost no negative reviews to responding to all of their negative reviews their review score would increase by 1.65 percent, but if they also then started responding to all positive reviews their score would drop by 2.46 percent (i.e., 1-.9754).

At this point we must inject a note of caution. One should be careful in interpreting these results, because regression analysis simply measures correlations and not causation. Thus, we are relating review responses and scores, and not conducting detailed experiments. Nonetheless, it appears that responding to reviews may benefit the operator in the form of improved review scores. Furthermore, while responding to negative reviews is critical, perhaps repeating simple thank yous for positive reviews might be detrimental.

The Value of Customer Engagement

This study extends earlier research by co-author Chris Anderson that illustrated the relationship between reviews, online reputation, and hotel performance. That earlier study indicated that improved online reputation is positively related to hotel performance as measured by RevPAR. In this study, we use multiple data sources to further refine how hotels can engage with consumers by encouraging reviews on TripAdvisor, and thereby improve performance.

First, we show via a simple series of before-and-after tests with Revinate that simply encouraging reviews via post stay surveys not only increases the number of reviews posted to

TripAdvisor, but also boosts the hotel's actual review scores (relative to their competitive set). Along with an increase in review volume and review scores, hotels also experience an increase in their TripAdvisor ranking and, more important, moderate improvements in ADR, occupancy, and RevPAR.

Taking another step, again using data from TripAdvisor, we measure the impact of responding to posted consumer reviews. Looking at the relationship between responding to reviews and revenue generated at OTAs, we found that revenue increases as management responds to reviews, provided they limit the number of responses. Our calculation here estimates that revenue starts to decrease once hoteliers start responding to more than 40 percent of consumer reviews. In fact, revenues are lower when managers respond to more than 85 percent of reviews than if they don't respond at all.

Perhaps most interesting, our further analysis found that responding to negative reviews boosted hotel's TripAdvisor score more than when management responded to favorable comments. Responding to reviews, particularly negative reviews, appears positively related to the consumer's view of the hotel (measured by increases in the TripAdvisor score). Consistent with other findings, replying to all positive reviews may become detrimental.

Posted reviews constitute a great source of information for prospective customers looking to remove uncertainty around the quality of their stay, and also for hoteliers looking to improve their product and service. Here we illustrate the impact of engaging with consumers on TripAdvisor. We show that letting consumers know you *want their opinion* (through encouraging reviews via post stay surveys) improves the volume and quality of reviews, and additionally showing them that *you are listening* by responding to reviews (particularly negative reviews) has a favorable effect on review scores and revenue. That said, however, we caution hoteliers regarding how they respond, as our analysis indicates that responding to all reviews is unnecessary and potentially detrimental on both review scores and revenues. ■

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