

## Implications of Electronic Word-of-Mouth on Hotel Profitability: An Investigation beyond Room Revenue

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### Abstract

Interest has been growing in the financial impact of online reviews, an important form of electronic word-of-mouth (eWOM), on hotel performance. Existing research in this area is overwhelmingly focused on the relationship between online reviews and room-related revenue. For a more comprehensive understanding of online reviews' financial impacts, this study investigates the value of these reviews relative to hotels' non-room revenue, total revenue and gross operating profit (GOP). To the authors' best knowledge, this study is the first to link hotels' online reviews or any form of eWOM to GOP, a firm-level outcome. A panel dataset comprising the annual operating performance of 104 hotels in Asia was assembled and matched with 50,732 TripAdvisor reviews. Analyses indicated that review valence, variance and volume correlated to varying degrees with hotels' GOP but demonstrated limited association with non-room revenue. Our findings also indicated that online reviews more strongly influenced room revenue and total revenue than non-room revenue and GOP. Overall, the positive effects associated with room revenue demonstrated selective generalizability to GOP. This in turn reflects the insufficiency of relying solely on room revenue indicators (i.e. average daily rate, occupancy and revenue per available room) to fully understand the impact of online reviews.

**Keywords:** Electronic word-of-mouth, Online reviews, Room revenue, Total revenue, Operating expenses, Gross operating profit.

## Introduction

Online review (OR) sites are by far the single most important information source used by travelers worldwide to plan their holidays (STR Inc., 2019). Opinions disseminated through such sites can influence different aspects of tourist behavior, such as trust in the service provider (Sparks and Browning, 2011) and purchase intention (Akhtar et al., 2019b). Many hotel managers therefore engage in OR management because they believe doing so reinforces customer relationship, brand perception and financial performance (Perez-Aranda et al., 2019).

Despite such perceptions, scholarly attempts to empirically quantify the financial benefits of online reviews (ORs) to firms are limited. Moreover, when analyzed, these efforts primarily involve revenue indicators of hotels' average daily rate (ADR), occupancy and revenue per available room (RevPAR; e.g. Xie et al., 2014, Kim et al., 2015). As these three performance indicators are based solely on room revenue, two important electronic word-of-mouth (eWOM) outcomes have been overlooked.

Firstly, other revenue streams, e.g. food and beverage sales, are excluded even though they could represent as much as 50% of a hotel's total revenue (Horwath HTL, 2016). Secondly, profitability is also neglected. As profitability considers revenue generated and expenses incurred, it effectively conveys a firm's operating financial viability. Hence, profitability is arguably a more important indicator of business success than revenue. However, to the best of our knowledge, publicly available research has not yet evaluated the relationships between ORs or other forms of eWOM and operating profits, whether in tourism and hospitality or other industries. The dearth of research quantifying the financial benefits of eWOM is presumably because firm-level performance details, particularly profits, are not readily accessible to researchers. Also, the challenges involved in obtaining a sufficient volume of eWOM data matched with hotel profits to ensure generalizability of findings could have exacerbated this problem.

Against this backdrop, our study seeks to investigate the financial impacts of ORs, a form of eWOM, on firm-level profitability. We referred to the financial data of 104 hotels in Asia that were matched with corresponding ORs from each property's first full year of opening until the end of 2015. Our study contributes to eWOM and hotel performance literature by: (i) assessing the effects of ORs on each hotel's total revenue and non-room revenue (vs. room price or room sales volume) and (ii) evaluating hotels' operating profits, thus providing a more complete understanding of the financial consequences of ORs.

## Literature Review

### Electronic Word-of-Mouth

ORs are a prominent form of eWOM in hospitality. EWOM refers to "consumer-generated, consumption-related communication that employs digital tools and is directed primarily to other consumers" (Rosario et al., 2020). Compared to traditional word-of-mouth (WOM), eWOM is more persistent, accessible and measurable while possessing unprecedented scalability and diffusion speed (Cheung and Thadani, 2012). Moreover, unlike traditional WOM, eWOM often occurs between anonymous strangers and tends to be more easily observed and measured (Lee et al., 2008).

Notably, while substantial research exists to investigate the relationship between WOM/eWOM on behavioral outcomes of hotel guests, comparatively little publicly available research has examined WOM/eWOM associations with a hotel's operating profits. This could be because firm-level profitability data are generally difficult to access, irrespective of industry type (e.g. Wang and Kim, 2021).

### **Research Model and Hypotheses**

Scholarly research on ORs of tourism and hospitality services has investigated different content features. For brevity, a selection of such research in recent years is presented in Appendix 1. We adopted the following four dominant textual features, which are widely considered as fundamental to consumer reviews (Kwok et al., 2017), as indicators of hotels' ORs:

(a) *Valence*. Whether a review is positive, negative, or neutral is heuristically communicated through consumer-generated numerical ratings (Sparks and Browning, 2011), also known as valence. Studies have shown that review valence is positively related to purchase intention (Mauri and Minazzi, 2013) and hotel performance (Xie et al., 2014).

(b) *Volume*. The number of reviews is important as this metric could impact hotel prices and sales volume (Schuckert et al., 2015). As review volume is often an indicator of the number of eWOM interactions (Melián-González et al., 2013), it could signal hotels' sales performance, popularity and/or lower buying risk.

(c) *Variance*. This factor captures the extent of disagreement among reviewers (Godes and Mayzlin, 2004); however, findings on the influence of review variance have been mixed. While Ye et al. (2009) unveiled that OR variation negatively influenced sales, Xie et al. (2014) discovered that review variance can positively predict hotels' revenue performance.

(d) *Length*. Lengthier textual reviews are perceived as more useful, as they typically include more information (Liu and Park, 2015, Park and Nicolau, 2015), thus increasing prospective consumers' intentions to book a given hotel (Zhao et al., 2015). Review length is commonly evaluated based on word count (Kwok et al., 2017).

As hospitality consumers increasingly seek out ORs, these trends in consumer behavior are expected to have cascading impacts on firm performance. Firm-level outcomes, e.g. product sales, revenue levels and stock prices, can be affected (King et al., 2014). In assessing firm-level consequences of ORs for hotels, popular metrics include the room-revenue indicators of ADR, occupancy and RevPAR (Appendix 1). More recently, Anagnostopoulou et al. (2019) investigated the relationship between OR themes and hotel profitability by using pre-tax profits, which accounted for firms' overall operating and financing expenses (e.g. debt servicing). However, financing expenses are beyond the control of a hotel's operations team. Accordingly, our study aims to address this gap by focusing on a hotel's operating profit in relation to ORs.

Moreover, none of the aforementioned measures considered non-room revenue despite many hotels amassing considerable revenue from non-room demand (Dunn and Brooks, 1990). Total revenue (e.g. sales from rooms, spa and food and beverage) is expected to

provide a more thorough understanding of all revenue streams associated with ORs, as ORs comprise eWOM beyond the hotel's room facilities (Kim et al., 2016, Anagnostopoulou et al., 2019). With existing research on review valence, variance, volume and length predominantly support behavioral outcomes that are favorable to the hotel, we hypothesize that ORs are positively associated with a hotel's multiple revenue streams.

**H1** Online review (a) valence, (b) variance, (c) volume, and (d) length are positively related to a hotel's operating performance in terms of non-room revenue.

**H2** Online review (a) valence, (b) variance, (c) volume, and (d) length are positively related to a hotel's operating performance in terms of total revenue.

ORs may also influence a hotel's operating profitability. By driving all revenue streams as hypothesized in H1 and H2, higher operating profitability could result from higher revenue levels. Simultaneously, operating profitability is potentially increased through lower expenses associated with digital marketing strategies (Litvin et al., 2018), such as ORs. Research that empirically quantifies the financial impact of digital marketing is scant. Nevertheless, a digital marketplace is theorized to benefit firms by slashing marketing costs, eliminating intermediaries and redefining marketing relationships (Fesenmaier et al., 2004). Hence, ORs are envisioned to be positively associated with higher profitability and negatively associated with expenses.

**H3** Online review (a) valence, (b) variance, (c) volume, and (d) length are positively related to a hotel's operating performance in terms of operating profits.

**H4** Online review (a) valence, (b) variance, (c) volume, and (d) length are negatively related to a hotel's operating expenses.

By focusing on operating profitability, we consider only revenue and expenses related to day-to-day hotel operations. ORs are conceptualized herein as a form of eWOM whereby consumers provide direct feedback about a hotel's operations. Financing expenses (e.g. debt servicing) that are not directly determined by or related to day-to-day operations, along with externally imposed expenses (e.g. income tax), are beyond firms' control and, hence, are not considered part of operating expenses.

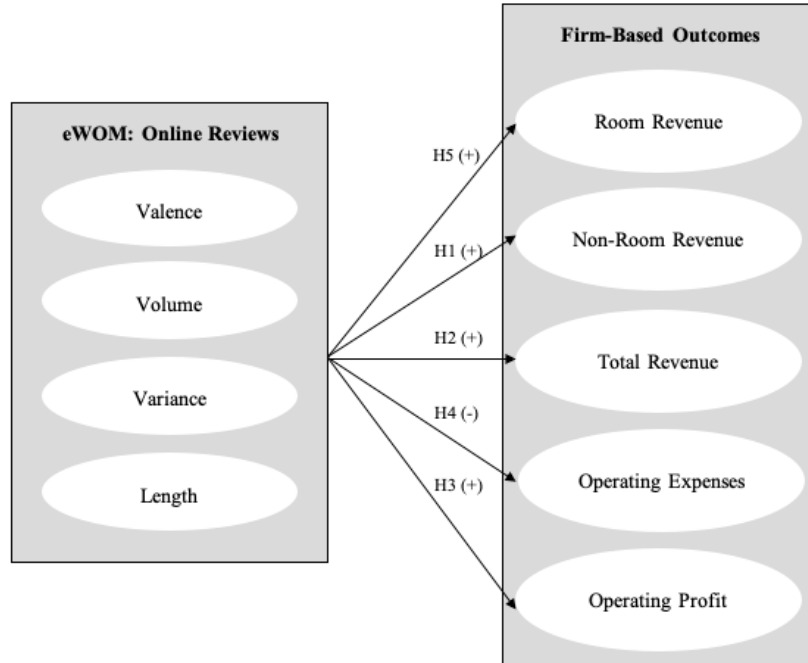
Hypotheses 1 to 4 in turn raise the question on appropriateness of indicators used to measure firm-level performance. Existing literature focuses predominantly on ADR, occupancy and RevPAR (Appendix 1), all of which are room revenue indicators. We propose the following hypotheses to compare the effects of ORs on different performance indicators:

**H5** Online review (a) valence, (b) volume, (c) variance, and (d) length are positively related to a hotel's room revenue.

Figure 1 presents the research model guiding this study. Although substantial evidence exists to support the relationship between ORs and room-revenue based indicators, much less is known about how ORs are associated with a hotel's non-room revenue,

total revenue and profitability. This study seeks to bridge these gaps in existing literature through an empirical investigation using actual OR data matched with objective firm performance measures.

**Figure 1: Research Model of Online Hotel Reviews and Firm Performance**



## Methodology

### Data and Sample

Our sample consisted of 104 hotels in five Asian countries (Table 1). This sample was selected based on hotels' available financial data as collected through industry contacts. It would have been ideal to include data on more Asian or other non-Asian markets. However, property-specific data involving profitability measures tend to be confidential and rarely accessible for academic research. Many hotels in the sample were upscale or above based on STR's hotel class standard, with a median age of 6.1 years. Most were considered medium to large-scale hotels with an average of 294 rooms each.

Annual performance records obtained for each hotel, included total hotel revenue, room revenue indicators (i.e. ADR, occupancy and RevPAR), non-room revenue and gross operating profit (GOP; Table 2). Unlike prior work that mostly focused on room revenue indicators, this study included hotels' non-room revenue, total revenue and profit indicators. Thus, findings extend research regarding the relationship between ORs and hotel performance by providing more holistic and relevant insights.

**Table 1: Dataset Descriptive**

Category	Frequency	Mean	Std. Dev.
<b>Hotel Class (STR Standard)<sup>a</sup></b>			
Luxury	38 (36%)		
Upper Upscale	26 (25%)		
Upscale	29 (28%)		
Upper Midscale	11 (11%)		
<b>Room Count</b>		294.2	144.1
0-99	10 (10%)		
100-199	16 (15%)		
200-299	30 (29%)		
300-399	29 (28%)		
400 or more	19 (18%)		
<b>Hotel Age</b>		6.1	2.2
1-2 years	3 (3%)		
3 years	6 (6%)		
4 years	20 (19%)		
5 years	14 (13%)		
6 years	13 (12%)		
7 years	26 (25%)		
8 years	9 (9%)		
9 years	8 (8%)		
10 years or older	5 (5%)		
<b>Hotel Country</b>			
China	54 (52%)		
Thailand	24 (23%)		
Indonesia	14 (13%)		
Singapore	11 (11%)		
Japan	1 (1%)		

<sup>a</sup>Dataset encompassed four out of six standard STR hotel classifications.

Each hotel's performance records covered a period beginning from its first full year of operations until 2015 (the latest data available). In our dataset, the hotel with the longest operating history opened in 2002. To control for size effects, performance data were scaled by the number of available rooms (e.g. gross operating profit per available room – *GOPPAR*) and converted to a percentage of total revenue (e.g. gross operating profit as a percentage of total revenue – *GOP%*), an approach that parallels existing literature (e.g. Tan et al., 2021). All financial data were converted into constant 2015 U.S. dollars and adjusted for inflation and currency fluctuations.

**Table 2: Definition and Descriptive Statistics of Variables**

Variable	Label	Description	Mean	Std. Dev.	Min.	Max.
<b><i>Dependent Variables – Operating Profit Indicators</i></b>						
GOP <sup>a</sup> per available room	<i>GOPPAR</i>	Annual gross operating profit ÷ No. of available rooms	84.48	88.28	-100.63	584.54
GOP <sup>a</sup> as a percentage of total revenue	<i>GOP%</i>	Annual gross operating profit ÷ Total annual revenue	0.35	0.21	-1.88	0.75
<b><i>Dependent Variables – Operating Expenses Indicators</i></b>						
Operating expenses per available room	<i>OperExpPAR</i>	(Annual departmental expenses + undistributed operating expenses) ÷ No. of available rooms	142.17	117.9	8.08	797.75
Operating expenses as a percentage of total revenue	<i>OperExp%</i>	(Annual departmental expenses + undistributed operating expenses) ÷ Total annual revenue	0.65	0.21	0.25	2.88
<b><i>Dependent Variables – Total Revenue Indicator</i></b>						
Total revenue per available room	<i>TotalRevPAR</i>	Total annual revenue ÷ No. of available rooms	226.65	196.4	6.87	1166.6
<b><i>Dependent Variables – Non-Room Revenue Indicators</i></b>						
Non-room revenue per available room	<i>NonroomRevPAR</i>	Annual non-room revenue ÷ No. of available rooms	99.97	112.1	0	842.2
Non-room revenue as a percentage of total revenue	<i>NonroomRev%</i>	Annual non-room revenue ÷ Total annual revenue	0.4	0.14	0	0.97
<b><i>Dependent Variables – Room Revenue Indicators</i></b>						
Average daily rate (ADR)	<i>ADR</i>	Annual room revenue ÷ Room nights sold in a year	198	167	11	1682
Occupancy	<i>Occ</i>	Room nights sold in a year ÷ Room nights available in a year	0.66	0.15	0.1	0.95
Revenue per available room	<i>RevPAR</i>	Annual room revenue ÷ No. of available room nights in a year	126	97	2	741

Variable	Label	Description	Mean	Std. Dev.	Min.	Max.
<b>Independent Variables</b>						
Review valence	<i>ReviewValence</i>	Consumer-generated overall rating on 5-point scale (1 = terrible, 5 = excellent) for a hotel	4.3	0.51	1	5
Review variance	<i>ReviewVariance</i>	Standard deviation of overall ratings for a hotel per year	0.83	0.29	0	2.83
Review volume	<i>ReviewVolume</i>	Total number of reviews for a hotel per year	84	123	1	922
Review length	<i>ReviewLength</i>	Average length of reviews for a hotel per year	175	69	13	728
Variable	Label	Description	Mean	Std. Dev.	Min.	Max.
<b>Control Variables</b>						
Room count	<i>RmCount</i>	Hotel scale as measured by room count	- <sup>c</sup>	- <sup>c</sup>	-	-
Market positioning	<i>PosMkt</i>	Positioning categories of luxury, upper upscale, upscale and upper midscale, per STR classification scheme <sup>b</sup>	-	-	-	-
Hotel age	<i>Age</i>	Hotel's age as of the year of 2015	- <sup>c</sup>	- <sup>c</sup>	-	-
Country of the hotel	<i>Country</i>	Country where hotel is located, namely, China, Indonesia, Thailand, Singapore and Japan	-	-	-	-

<sup>a</sup> Gross operating profit = Total departmental profit - Total undistributed expenses (Hotel Association of New York City Inc., 2014).

<sup>b</sup> Economy category was merged to the upper midscale category due to its small sample size.



ORs corresponding to the timeframe of revenue and profitability indicators for each hotel were obtained from TripAdvisor, the most popular and widely used hotel review website in the world (Elliott, 2018). Our sample contained 50,732 ORs. To maintain consistent observation levels between hotel performance data and OR data, daily-level customer reviews were aggregated to annual data and matched with performance data at the individual hotel level. Thus, the primary target unit of analysis in the merged panel dataset was *Hotel* × *Year*, with a total of 574 observations. Table 2 presents definitions and descriptive statistics of variables used.

Four control variables were included to account for the potential effects of hotel attributes and environmental factors (e.g. Zhang et al., 2020). Room count (*RmCount*), which proxies the scale of a hotel, tends to be positively correlated with hotel performance (Claver-Cortés et al., 2009) as conferred by economies of scale (Pan, 2007). Likewise, hotel class (*PosMkt*) is positively correlated with pricing levels (Xu, 2019) as the extent and quality of services and amenities provided by a hotel arguably increases with higher positioning. However, hotel age (*Age*) is negatively related to hotel performance (Hung et al., 2010), particularly if older properties do not renovate or update their hardware (Madanoglu and Ozdemir, 2016). Additionally, the country where the hotel was located (*Country*) was included as a control. No two countries are alike and the operating environment of hotels could vary across countries. Most correlation coefficients between the independent and control variables were relatively small (Table 3), indicating that multicollinearity was not a major concern.

**Table 3: Correlation Matrix of Variables**

	1	2	3	4	5	6	7	8
1. <i>ReviewValence</i>	1.000							
2. <i>ReviewVariance</i>	-.560	1.000						
3. <i>ReviewVolume</i>	.092	-.052	1.000					
4. <i>ReviewLength</i>	.072	.136	-.186	1.000				
5. <i>RmCount</i>	-.094	.089	.076	-.204	1.000			
6. <i>PosMkt</i>	-.101	-.008	.089	-.189	.227	1.000		
7. <i>Age</i>	-.096	-.034	-.160	.068	.083	-.097	1.000	
8. <i>Country</i>	.072	.030	.503	.193	-.250	.022	-.190	1.000

## Model Estimation

This study used panel data with *Hotel* × *Year* as the unit of analysis. Longitudinal panel data are helpful for understanding the relationship between ORs and hotel performance (Yang et al., 2018), as these data allow for examination of the effect of customer reviews on hotel performance over time (Xie et al., 2017). With an average of 5.5 years of reviews per hotel, the number of time periods of the panel data is limited and the coefficients of fixed-effects models can be seriously biased (Nickell, 1981). Consequently, a linear regression model was applied to evaluate the association between ORs and hotel performance. Dependent variables included hotel performance indicators, namely, revenue, expenses and GOP. Meanwhile, independent variables comprised review characteristics including *ReviewValence*, *ReviewVariance*, *ReviewVolume* and *ReviewLength*. The regression model also included the four control variables of *RmCount*, *PosMkt*, *Age* and *Country*. Thus, the performance for hotel *i* in year *t* can be estimated using the following equation:

$$\begin{aligned}
 HotelPerf_{it} = & \beta_0 + \beta_1 ReviewValence_{it-1} + \beta_2 ReviewVariance_{it-1} \\
 & + \beta_3 ReviewVolume_{it-1} + \beta_4 ReviewLength_{it-1} + \beta_5 RmCount_i \\
 & + \beta_6 PosMkt_i + \beta_7 Age_i + \beta_8 Country_i + \varepsilon_{it}
 \end{aligned}$$

where  $HotelPerf_{it}$  denotes the performance indicators (e.g. *ADR*, *Occ*, *RevPAR*, *OperExpPAR* and *GOPPAR*) for hotel  $i$  in year  $t$ . As suggested by existing literature, it takes time for ORs to affect hotel performance (Xie et al., 2017). Therefore, following Xie et al. (2017) and Zhang et al. (2020), this model addresses the lagged effect of OR variables on hotel performance. Specifically, the regression model predicts the impact of ORs in year  $t-1$  on hotel performance indicators in year  $t$ . To further test for multicollinearity, variance inflation factors (VIFs) were calculated. These ranged between 1.14 and 2.27, which were smaller than the recommended threshold of 10 (Hair et al., 1992), thus indicating that multicollinearity was not a major concern.

## Results

Table 4 presents the regression results of the relationships between ORs on hotel performance. Models 1 and 2 were first estimated to examine the effects of ORs on hotels' non-room revenue. Model 3 estimated the effects on hotels' total revenue. Next, the results of Models 4 and 5 were reported to investigate OR effects on operating profits. Models 6 and 7 focused on operating expenses. We then compared the impacts of ORs on room revenue indicators in Models 8–10 with the impacts on total revenue and operating profits.

### Relationships Between Online Reviews and Operating Performance

Models 1 and 2 estimated the effects of ORs on *Non-roomRevPAR* and *Nonroom%*, respectively. The models fit the data well with an adjusted  $R^2$  of 0.607 and 0.432, respectively accounting for 60.7% of the variance in non-room revenue and 43.2% of the variance in non-room revenue percentage. *ReviewValence* ( $b=.076$ ,  $p=.028$ ) and *ReviewVariance* ( $b=.102$ ,  $p=.038$ ) were significantly and positively related to *Non-roomRevPAR*, suggesting that higher review ratings and higher review variance were linked to more non-room revenue. The coefficients of *ReviewVolume* and *ReviewLength* were not significant. Model 2 displayed a different pattern – no significant coefficients were found for *ReviewValence* and *ReviewVariance*. However, *ReviewVolume* ( $b=-.0002$ ,  $p<.001$ ) and *ReviewLength* ( $b=-.0002$ ,  $p=.061$ ) were negatively related to *NonroomRev%*; thus, higher hotel popularity on an OR platform and longer reviews would presumably result in a lower proportion of non-room revenue to total revenue. As such, H1a and H1b were supported in PAR terms but H1c and H1d were not supported.

Model 3 reflected the effects of ORs on *TotalRevPAR*. The model explained 65% of the variance in total revenue. In Model 3, all four review features, *ReviewValence* ( $b=.073$ ,  $p=.004$ ), *ReviewVariance* ( $b=.083$ ,  $p=.021$ ), *ReviewVolume* ( $b=.0003$ ,  $p<.001$ ) and *ReviewLength* ( $b=.0003$ ,  $p=.095$ ), were significantly and positively associated with *TotalRevPAR*, supporting H2a, H2b, H2c and H2d. In other words, a better hotel reputation, a higher level of variance and popularity in review rating and longer reviews were correlated with higher total revenue. The findings from Models 1, 2 and 3 imply that ORs exerted more influence on total revenue than non-room revenue of sampled hotels.

Table 4: Hotel Performance Effects of Online Reviews<sup>a</sup>

	Model 1 <sup>b, c</sup>	Model 2	Model 3 <sup>b</sup>	Model 4 <sup>b, d</sup>	Model 5 <sup>b, e</sup>	Model 6	Model 7	Model 8 <sup>b</sup>	Model 9	Model 10 <sup>b</sup>
	<i>log(1+NonroomRevPAR)</i>	<i>NonroomRev %</i>	<i>log(TotalRev PAR)</i>	<i>log(36732+G OPPAR)</i>	<i>log(1.75-GOP%)</i>	<i>log(OperExp PAR)</i>	<i>log(OperExp %)</i>	<i>log(ADR)</i>	<i>Occupancy</i>	<i>log(RevPAR)</i>
Type of dependent variable used	Non-room Revenue		Total Revenue	Operating Profit		Operating Expenses		Room Revenue		
<i>ReviewValence</i>	.076* (.035)	.009 (.013)	.073*** (.025)	.033* (.017)	.001 (.005)	.074*** (.021)	.002 (.011)	.067*** (.022)	-.009 (.015)	.064** (.027)
<i>ReviewVariance</i>	.102** (.049)	-.008 (.019)	.083** (.036)	.056** (.025)	-.017** (.008)	.052* (.03)	-.031** (.016)	.084*** (.031)	.035* (.021)	.109*** (.038)
<i>ReviewVolume</i>	.0001 (.0001)	-.0002*** (<.0001)	.0003*** (.0001)	.0002** (.0001)	-.0001*** (<.0001)	.0002** (.0001)	-.0001*** (<.0001)	.0003*** (.0001)	.0003*** (.0001)	.0005*** (.0001)
<i>ReviewLength</i>	.0002 (.0002)	-.0002* (.0001)	.0003* (.0002)	-.0001 (.0001)	.0001*** (<.0001)	.0005*** (.0001)	.0002*** (.0001)	.001*** (.0001)	-.001*** (.0001)	.0003* (.0002)
<i>RmCount</i>	-.001*** (.0001)	.0001* (<.0001)	-.001*** (.0001)	-.0003*** (.0004)	<.0001 (<.0001)	-.001*** (.0001)	.00001 (<.0001)	-.001*** (.0001)	-.0001** (<.0001)	-.001*** (.0001)
<i>PosMkt<sup>f</sup></i>										
Upper upscale	-.31*** (.028)	-.066*** (.011)	-.261*** (.021)	-.113*** (.014)	-.008* (.004)	-.276*** (.018)	-.015 (.009)	-.206*** (.018)	.019 (.012)	-.19*** (.022)
Upscale	-.461*** (.031)	-.093*** (.012)	-.362*** (.022)	-.139*** (.015)	-.012** (.005)	-.386*** (.019)	-.024** (.01)	-.318*** (.02)	.053*** (.013)	-.28*** (.024)
Upper midscale	-.738*** (.05)	-.134*** (.019)	-.563*** (.037)	-.221*** (.025)	-.01 (.008)	-.587*** (.031)	-.025 (.016)	-.515*** (.032)	.132*** (.021)	-.409*** (.042)
<i>Age</i>	.042*** (.006)	.006*** (.002)	.031*** (.004)	.018*** (.003)	-.004*** (.001)	.023*** (.004)	-.0008*** (.002)	.022*** (.004)	-.086*** (.022)	-.027*** (.005)
<i>Country<sup>g</sup></i>										
Indonesia	-.136*** (.038)	-.075*** (.015)	-.07** (.028)	.06*** (.019)	-.04*** (.006)	-.157*** (.024)	-.087*** (.012)	-.019 (.025)	.021 (.017)	-.004 (.03)
Singapore	-.024 (.052)	-.098*** (.02)	.13*** (.038)	.084*** (.026)	-.027*** (.008)	.068** (.032)	-.061*** (.017)	.129*** (.033)	.115*** (.022)	.204*** (.04)
Thailand	-.324***	-.076***	-.238***	-.065***	-.003	-.245***	-.007	-.199***	.033*	-.173***

	<b>Model 1<sup>b, c</sup></b> <i>log(1+NonroomRevPAR)</i>	<b>Model 2</b> <i>NonroomRev %</i>	<b>Model 3<sup>b</sup></b> <i>log(TotalRev PAR)</i>	<b>Model 4<sup>b, d</sup></b> <i>log(36732+GOPPAR)</i>	<b>Model 5<sup>b, e</sup></b> <i>log(1.75-GOP%)</i>	<b>Model 6</b> <i>log(OperExp PAR)</i>	<b>Model 7</b> <i>log(OperExp %)</i>	<b>Model 8<sup>b</sup></b> <i>log(ADR)</i>	<b>Model 9</b> <i>Occupancy</i>	<b>Model 10<sup>b</sup></b> <i>log(RevPAR)</i>
<b>Type of dependent variable used</b>	<b>Non-room Revenue</b>		<b>Total Revenue</b>	<b>Operating Profit</b>		<b>Operating Expenses</b>		<b>Room Revenue</b>		
	(.037)	(.014)	(.027)	(.019)	(.006)	(.023)	(.012)	(.024)	(.016)	(.029)
Constant	1.668*** (.192)	.453*** (.074)	2.068*** (.14)	2.109*** (.097)	.179*** (.03)	1.949*** (.119)	-.119* (.062)	1.933*** (.122)	.701*** (.083)	1.788*** (.147)
Adjusted R-squared	0.607	0.432	0.65	0.42	0.23	0.733	0.252	0.685	0.375	0.567
Observations	574	574	574	574	574	574	574	574	574	574

<sup>a</sup> Standard error in parentheses.

<sup>b</sup> Log transformation performed due to skewness.

<sup>c</sup> *Non-roomRevPAR* contained zero values. Thus, a constant value of 1 was added.

<sup>d</sup> *GOPPAR* contained negative values. Thus, a constant value of M+1 was added where M = lowest *GOPPAR* value.

<sup>e</sup> *GOP%* contained negative values. Thus, a transformation of  $\log(K-GOP\%)$  was done where K = highest *GOP%* value +1.

<sup>f</sup> Reference level = luxury.

<sup>g</sup> Reference level = China.

\* p < 0.1, \*\* p < 0.05, \*\*\* p < 0.01.

Models 4 and 5 returned estimation results regarding the effects of ORs on *GOPPAR* and *GOP%*. Model 4 explained 42% of the variance in *GOPPAR* and Model 5 explained 23% of the variance in *GOP%*. Model 4 revealed that increases in *ReviewValence* ( $b=.033$ ,  $p=.062$ ), *ReviewVariance* ( $b=.056$ ,  $p=.024$ ) and *ReviewVolume* ( $b=.0002$ ,  $p=.013$ ) were significantly associated with growth in *GOPPAR*. However, no significant effect of *ReviewLength* on *GOPPAR* was observed. Thus, when profitability was measured in PAR, H3a, H3b and H3c were supported but H3d was not supported.

For *GOP%* in Model 5, aside from *ReviewValence*, all review features were significantly related to hotels' *GOP%*. Specifically, *ReviewVariance* ( $b=.017$ ,  $p=.028$ ) and *ReviewVolume* ( $b=.0001$ ,  $p=.005$ ) were each significant and positive predictors of *GOP%*. Unlike Model 4, *ReviewLength* ( $b=-.0001$ ,  $p=.002$ ) had a significant but negative effect in Model 5. Overall, *ReviewVariance* and *ReviewVolume* showed similar significant positive effects on *GOPPAR* and *GOP%*. This finding indicates that a large quantity of reviews and high variance in review ratings were correlated with high hotel profitability. Even so, *ReviewLength* had no impact on *GOPPAR* but negatively affected *GOP%*, suggesting declining efficiency in operating cost management with each additional word posted by guests in ORs. Interestingly, *ReviewValence* had an effect on *GOPPAR* but not on *GOP%*.

Models 6 and 7 used operating expenses as the dependent variable, yielding an adjusted  $R^2$  of 0.733 and 0.252 respectively. Model 6 revealed that *ReviewValence* ( $b=.074$ ,  $p<.001$ ), *ReviewVariance* ( $b=.052$ ,  $p=.089$ ), *ReviewVolume* ( $b=.0002$ ,  $p=.012$ ) and *ReviewLength* ( $b=.0005$ ,  $p<.001$ ) were significantly and positively related to *OperExpPAR*; that is, a higher hotel reputation, high variance in review ratings, higher popularity and longer reviews were associated with higher hotel operating costs. However, the results of *OperExp%* displayed a different pattern: both *ReviewVariance* ( $b=-.031$ ,  $p=.048$ ) and *ReviewVolume* ( $b=-.0001$ ,  $p=.005$ ) significantly influenced *OperExp%* in a negative direction, implying that higher variance in review ratings and higher popularity were related to a lower ratio of operating expenses to total revenue. This finding suggests that although OR volume was associated with increased operating expenses (Model 6) and total revenue (Model 3), ORs' positive influence on total revenue may outweigh its effects on operating expenses. The negative coefficient of *ReviewVariance* in Model 7 was consistent with Models 3 and 6 as review variance was positively associated with total revenue but did not have an effect on operating expenses, resulting in a negative relationship between *ReviewVariance* and *OperExp%*. The relationship between *ReviewLength* ( $b=.0002$ ,  $p=.003$ ) and *OperExp%* was statistically significant but assumed a positive direction. Ultimately, H4a and H4d were not supported and H4b and H4c were supported when operating expense was expressed in percentage terms.

### Comparison of Hotel Performance Metrics

To evaluate H5a–H5d, Models 8–10 focused on room revenue indicators, all of which have been frequently used in relevant studies. The relationships revealed through Models 8–10 generally aligned with those of earlier research. All review features were significantly associated with *ADR* and *RevPAR*. These findings are consistent with OR and hotel performance literature (e.g. Phillips et al., 2017). Regarding *Occupancy*, significant relationships emerged between *ReviewVariance* ( $b=.035$ ,  $p=.099$ ), *ReviewVolume* ( $b=.0003$ ,  $p<.001$ ) and *ReviewLength* ( $b=-.001$ ,  $p<.001$ ), which

coincided with existing research (Xie et al., 2016). Surprisingly, and contrary to prior work (Xie et al., 2016, Phillips et al., 2017), no significant relationship manifested between *ReviewValence* and *Occupancy*. In summary, H5a, H5b, H5c and H5d were generally supported.

The results of Models 8–10 were then compared with those of Models 1, 3 and 4, which measured performance in PAR terms: adjusted  $R^2$  values of Models 1 versus 2 (.607 vs. .432) and Models 4 versus 5 (.42 vs. .23) highlight the superiority of the PAR term over the percentage term as a performance indicator. Overall, room revenue and total revenue indicators appeared more responsive to the effects of ORs, followed by operating profits. This suggests that ORs might be more influential for hotels' room revenue than for non-room revenue.

Further comparisons unveiled a number of intriguing findings. Across Models 1, 3, 4 and 8–10, the effects of *ReviewValence*, *ReviewVariance* and *ReviewVolume* were consistent across nearly all performance metrics in terms of significance and direction by contributing to revenue and profitability. Nevertheless, these three aspects of ORs could also potentially raise operating expenses as revealed in Model 6 (*OperExpPAR*). The finding that a hotel's review rating, variance and volume (except that of non-room revenue) were positively related to its performance parallels that of prevailing literature. Furthermore, upon comparing the aforementioned groups of models, review length was identified as a stronger predictor of room revenue indicators than of operating profit and non-room revenue indicators. *ReviewLength* was significantly and positively associated with *ADR* and *RevPAR*, but it had no significant impact on *GOPPAR* and *Non-roomRevPAR*.

## Discussion

Table 5 summarizes the findings of this study. Our research model hypothesized that eWOM as operationalized through ORs would affect various facets of hotel firm performance in addition to driving revenue. Therefore, we investigated how ORs influenced operating performance measures other than the most popular indicators of ADR, occupancy and RevPAR, all of which solely reflect room-related revenue.

We first consider our findings regarding the effects of ORs on hotels' non-room revenue and total revenue. Our study focused on revenue distinct from that generated by rooms department because hotels can produce considerable revenue through non-room demand (Dunn and Brooks, 1990). In many Asian hotel markets, relative to room revenue, food and beverage revenue can account for a comparable or even a larger proportion of total hotel revenue. For instance, among three- to five-star hotels in China, 30% to 50% of a property's total revenue in 2015 came from food and beverage alone, with the remaining proportion dominated by room revenue (Horwath HTL, 2016). Consequently, online hotel reviews include consumer discussions around food and beverage services although most reviews pertain to rooms.

As hypothesized, review valence and variance demonstrated significant positive impacts on non-room revenue and total revenue measured in PAR terms (Models 1 and 3). This is consistent with research identifying non-room related issues as some of the most frequently mentioned topics extracted via content analysis of online hotel reviews.

Examples of these non-room related issues include food and beverage service, front desk service and staff attitude (e.g. Kim et al., 2016). This finding also aligns with the positive influence of review valence and variance on room revenue (Model 8–10), demonstrating that these two aspects of eWOM are important in driving different revenue streams in a hotel. Hence, when non-room revenue was expressed as a percentage of total revenue, review valence and variance did not reflect significant differences (Model 2).

**Table 5: Summary of Hypothesis Testing**

Hypothesis	Decision				
	Dependent Variable in PAR	Model	Dependent Variable in %	Model	
H1a	Review Valence → Non-room Revenue	Supported	1	n.s.	2
H1b	Review Variance → Non-room Revenue	Supported	1	n.s.	2
H1c	Review Volume → Non-room Revenue	n.s.	1	n.s. <sup>a</sup>	2
H1d	Review Length → Non-room Revenue	n.s.	1	n.s. <sup>a</sup>	2
H2a	Review Valence → Total Revenue	Supported	3	--	--
H2b	Review Variance → Total Revenue	Supported	3	--	--
H2c	Review Volume → Total Revenue	Supported	3	--	--
H2d	Review Length → Total Revenue	Supported	3	--	--
H3a	Review Valence → Operating Profit	Supported	4	n.s.	5
H3b	Review Variance → Operating Profit	Supported	4	Supported	5
H3c	Review Volume → Operating Profit	Supported	4	Supported	5
H3d	Review Length → Operating Profit	n.s.	4	n.s. <sup>a</sup>	5
H4a	Review Valence → Operating Expense	n.s. <sup>a</sup>	6	n.s.	7
H4b	Review Variance → Operating Expense	n.s. <sup>a</sup>	6	Supported	7
H4c	Review Volume → Operating Expense	n.s. <sup>a</sup>	6	Supported	7
H4d	Review Length → Operating Expense	n.s. <sup>a</sup>	6	n.s. <sup>a</sup>	7
H5a	Review Valence → Room Performance	Supported <sup>b</sup>	8, 10	n.s. <sup>c</sup>	9
H5b	Review Variance → Room Performance	Supported <sup>b</sup>	8, 10	Supported <sup>c</sup>	9
H5c	Review Volume → Room Performance	Supported <sup>b</sup>	8, 10	Supported <sup>c</sup>	9
H5d	Review Length → Room Performance	Supported <sup>b</sup>	8, 10	n.s. <sup>a,c</sup>	9

n.s. = not supported.

<sup>a</sup> Significant but in opposite direction as hypothesized.

<sup>b</sup> Measured as ADR or RevPAR.

<sup>c</sup> Measured as occupancy.

Unexpectedly, review volume revealed significant but negative impacts on non-room revenue expressed in percentage terms (Model 2). This pattern initially appears somewhat counterintuitive, particularly since these two aspects of ORs were positively related to room revenue per our study (Models 8–10) and others (e.g. Xie et al., 2017, Xie et al., 2014). The positive association between review volume in relation to sales volume has also been established for other product types, e.g. electronic goods (Ghose, 2009), thus indicating relationship robustness. To shed greater light on this counter-intuition, it is necessary to also consider the significant positive association between hotels’ OR volume and total revenue (Model 3) as well as room revenue (Model 10).

More specifically, OR volume likely benefited room revenue more than non-room revenue; hence, when expressed as a percentage of total revenue, its positive effect yielded for room revenue could have outweighed the corresponding effect on non-room revenue.

This result is important because it suggests that, among firms with multiple revenue streams associated with selling different but complementary products, review volume may not necessarily demonstrate the same association with each revenue stream. OR research has overwhelmingly focused on individual product types, resulting in analyses of single sources of revenue. By including hotels' full revenue in absolute PAR and relative percentage terms, our study recognizes the complex nature of eWOM, particularly when a firm has multiple revenue sources. Theoretically, a customer contributes to either one or multiple revenue streams of a firm. For the former, multiple revenue streams could be a boundary condition to the positive effects of OR volume by potentially cannibalizing (vs. augmenting) other revenue streams. For the latter, the customer could be engaging in unprofitable cross-buying: when customers with persistent adverse behavioral traits, e.g. limited spending, promotion purchase behavior and excessive service requests, engage in cross-buying, they lead to unprofitability (Shah et al., 2012). This could manifest as a significant decline in the ratio of non-room revenue.

Similar to review volume, review length also demonstrated a significant negative relationship with non-room revenue percentage (Model 2). This finding is consistent with results demonstrating that review length has no effect on non-room revenue (Model 1) but is positively correlated with total revenue (Model 3), resulting in a lower ratio of non-room revenue to total revenue. Longer reviews could provide more information, thus increasing perceived usefulness of those reviews (Park and Nicolau, 2015). This may translate into higher room sales as revealed in Models 8 and 10 where lengthier reviews were linked to higher room revenue.

Next, we consider findings concerning the impacts of ORs on hotels' operating expenses and profits. Cost savings through lower marketing and/or transaction costs are advantages commonly associated with digital marketing (Sharma et al., 2020, Fesenmaier et al., 2004). However, our results demonstrate otherwise with review valence, variance, volume and length positively related to operating expenses on a PAR basis (Model 6). When faced with higher review valence, high variance in review ratings, a larger volume of reviews and lengthier reviews, firms may need to devote more resources to tracking and responding to ORs in an effort to maintain their online reputation. These tasks could have negated cost savings anticipated of digital marketing strategies.

Nevertheless, the positive impact of ORs on operating expenses is evident when considering hotels' operating efficiency. Findings revealed that the variance and volume of reviews were significantly and negatively associated with *OperExp%* (Model 7); that is, with greater review variance and volume, hotels' operating expenses accounted for a smaller proportion of total revenue. Such operating efficiency was likely achieved through one or both of the following:

- (a) An increase in demand volume for rooms. Significant associations between *OperExp%* and review variance, volume and length (Model 7) were likewise



significant for *Occupancy* and the same indicators but in the reverse direction (Model 9). Fixed costs do not vary with changes in the number of room nights sold (Pan, 2007). By driving demand, operating efficiency could result with the spreading out of fixed costs over larger sales volume.

- (b) An increase in revenue, particularly room revenue, instead of a decline in operating expenses. *OperExpPAR* was positively correlated with review valence, volume and length (Model 6) and *RevPAR* was positively associated with review valence, variance and volume (Model 10). Operating efficiency derived from driving revenue may be attributed to the nature of the technology used, which enables firms to engage with more consumers in a shorter time within virtual environments (Sawhney et al., 2005).

Gains in operating efficiency could have then led to a cascading effect on hotels' profitability. Review variance and volume were significantly associated with higher profitability in terms of *GOPPAR* and *GOP%* (Models 4 and 5). Although existing research examining the association between review variance and hotel performance has returned mixed results, this study unveiled a positive effect of review variance on profitability. This impact could be explained by the different units of analysis used in various studies. We referred to annual data, whereas earlier studies generally incorporated monthly and quarterly data (Yang et al., 2018). Variance over a longer timeframe could appear more credible to consumers when reading ORs compared with variance over a shorter timeframe, which may signify poor quality. Additionally, review volume was positively related to *GOPPAR* and *GOP%*, paralleling findings from other studies exploring review volume relative to top-line indicators, such as occupancy (Xie et al., 2016), average hotel rating (Melián-González et al., 2013) and purchase intention (Zhao et al., 2015). Review volume could signal a hotel's popularity (Zhang et al., 2013) in addition to serving as a way of rationalizing purchase decisions (Zhang et al., 2010).

In analyzing the relationships between ORs and hotels' operating profits, the effect of review length is particularly notable. A longer review was associated with lower profitability (i.e. *GOP%*, Model 5). To consumers, lengthier ORs tend to be deemed more useful and trustworthy (Sparks et al., 2013). However, these perceptions may not always translate into positive impacts for firms, as our study indicated that longer reviews were correlated with higher operating expenses and lower operating expense efficiency (Models 6 and 7).

Last but not least, we focused on results related to ORs' influence on room revenue compared to other performance indicators. Our findings suggest that ORs more extensively affected room revenue and total revenue than non-room revenue and operating profits. Furthermore, the positive effects of ORs on room revenue, although validated through this and other studies (e.g. Phillips et al., 2017), were only somewhat generalizable to vital firm performance metrics involving operating profits. Taken together, these observations contribute to the existing literature in two key ways. First, the trends imply that prevailing conceptualizations regarding tangible contributions of ORs may be overly optimistic, particularly when the performance indicators of non-room revenue and operating profit are used. Second, our work underscores the insufficiency of relying solely on room revenue indicators (i.e. ADR, occupancy and RevPAR) to fully understand the impact of ORs. Based on our findings, we believe

that, where possible, future research regarding ORs should incorporate hotels' non-room revenue and operating profits.

Our study also adds to existing literature on eWOM and its impact on firm performance in several ways. Current OR research predominantly utilizes room revenue indicators. Our study presents a more comprehensive investigation of the tangible impacts of ORs by considering operating expenses and profits. Additionally, our findings both support and challenge existing assumptions about the relationships between ORs and operating expenses and profits. This work is envisioned to serve as a stepping-stone towards a more vivid understanding of the financial value of ORs and eWOM.

### **Limitation and Future Research**

This study has several limitations. The first involves the non-consideration of expenses specific to firms' management of ORs. In most hotels, ORs (e.g. social media monitoring and subscriptions) fall under the purview of the sales and marketing department in accordance with the Uniform Systems of Accounts for the Lodging Industry (American Hotel & Lodging Association, 2015). We thus call for research investigating departmental expenses related to sales and marketing. Results could provide a clearer understanding of the relationship between hotels' OR actions and corresponding expenses, particularly if additional resources are used to handle more reviews, longer reviews and reviews with higher ratings. As an initial step towards quantifying the tangible benefits of eWOM, our study focused on higher-level firm performance indicators given their importance and the unavailability of longitudinal, departmental expenses for academic research purposes.

A second limitation pertains to our coverage of only ORs and those posted on TripAdvisor. Other forms of eWOM, e.g. blogs, could also influence firm performance. Also, while TripAdvisor is one of the most widely used hotel review website in the world (Elliott, 2018), some countries in our sample have alternative review platforms that are popular amongst the domestic market. Future research could include other forms of eWOM and/or review platforms to account for their potential effects. Finally, a third limitation involves the predominant inclusion of hotels of at least an upscale positioning. Future research on lower-positioned hotels would help to generalize the findings of this study.

### **Practical Implications for Asian Business**

Our study offers empirical evidence suggesting that ORs have limited effects on operating profitability of hotel businesses in Asia, especially when profits are measured as a percentage of total revenue. This outcome cautions against commonly held worldwide views on how ORs drive firm performance. Profitability is the primary goal of most commercially run hotels and unprofitable hotels are unlikely to survive long term. Therefore, managers of hotels in Asia should adopt a more circumspect approach to marketing activities regarding ORs, as these efforts may not yield anticipated benefits. For instance, hotel managers could track costs associated with OR monitoring and responding as well as implement control measures as needed to optimize financial profitability in this aspect.

Also, our study points to review volume and variance as indicators most closely tied to operating performance of Asian hotel businesses. To attract consumers' interest while ensuring profitability, hotel managers in Asia should focus on driving review volume and variance. Steps could also be taken to encourage guests to post reviews online, regardless of whether it is a positive/negative review. A larger review volume can more effectively signal hotels' popularity and credibility (Zhang et al., 2013, Zhang et al., 2010) while greater heterogeneity regarding customer reviews of the hotel could amplify product uniqueness (Wang et al., 2015). Moreover, by embracing reviews with variability (vs. positive reviews only), hotel managers could potentially convey a greater sense of reliability and authenticity in terms of quality (Sharma et al., 2020). For example, hotels could implement a reward system that gives loyalty points, credits or discounts for future use with each review, irrespective of review valence. Hotels could also encourage guests to post about the hotel during their actual stay. This approach could increase review volume and accord the hotel a chance to respond to guests' feedback, especially negative ones, while they are still on-site.

Importantly, although our dataset comprised operating performance and review data for a period preceding the COVID-19 pandemic, an understanding of how OR relates to hotels' pre-pandemic profitability can inform firms' decisions about ways to leverage ORs to recover from the consequences of COVID-19. ORs were prominently featured in hospitality (Wei et al., 2013) before the pandemic, as many potential tourists relied on ORs of hotels to reduce consumption risk and seek convenience, quality assurance and social assurance (Kim et al., 2011). With the pandemic, consumers will presumably continue to turn to OR platforms for information on hotels' safety measures and cleaning protocols when making purchase decisions. Our findings would therefore be helpful in uncovering which aspects of ORs hotels in Asia should consider so as to optimize firm profitability.

## References

- Aggarwal, S. & Gour, A. (2020). Peeking inside the minds of tourists using a novel web analytics approach. *Journal of Hospitality and Tourism Management*, 45, 580-591.
- Ahani, A., Nilashi, M., Zogaan, W. A., Samad, S., Aljehane, N. O., Alhargan, A., Mohd, S., Ahmadi, H. & Sanzogni, L. (2021). Evaluating medical travelers' satisfaction through online review analysis. *Journal of Hospitality and Tourism Management*, 48, 519-537.
- Akhtar, N., Ahmad, W., Siddiqi, U. I. & Akhtar, M. N. (2019a). Predictors and outcomes of consumer deception in hotel reviews: The roles of reviewer type and attribution of service failure. *Journal of Hospitality and Tourism Management*, 39, 65-75.
- Akhtar, N., Sun, J., Akhtar, M. N. & Chen, J. (2019b). How attitude ambivalence from conflicting online hotel reviews affects consumers' behavioural responses: The moderating role of dialecticism. *Journal of Hospitality and Tourism Management*, 41, 28-40.
- American Hotel & Lodging Association (2015). *Uniform System of Accounts for the lodging industry: 11th Revised Edition*, U.S., Educational Institute.
- An, Q., Ma, Y., Du, Q., Xiang, Z. & Fan, W. (2020). Role of user-generated photos in online hotel reviews: An analytical approach. *Journal of Hospitality and Tourism Management*, 45, 633-640.
- Anagnostopoulou, S. C., Buhalis, D., Kountouri, I. L., Manousakis, E. G. & Tsekrekos, A. E. (2019). The impact of online reputation on hotel profitability. *International Journal of Contemporary Hospitality Management*, 32, 20-39.
- Blal, I. & Sturman, M. C. (2014). The differential effects of the quality and quantity of online reviews on hotel room sales. *Cornell Hospitality Quarterly*, 55, 365-375.

- Cheung, C. M. & Thadani, D. R. (2012). The impact of electronic word-of-mouth communication: A literature analysis and integrative model. *Decision support systems*, 54, 461-470.
- Claver-Cortés, E., Pereira-Moliner, J. & Molina-Azorín, J. F. (2009). Strategic groups and performance in the Spanish hotel sector. *The Service Industries Journal*, 29, 943-961.
- De Pelsmacker, P., Van Tilburg, S. & Holthof, C. (2018). Digital marketing strategies, online reviews and hotel performance. *International Journal of Hospitality Management*, 72, 47-55.
- Dunn, K. D. & Brooks, D. E. (1990). Profit analysis: Beyond yield management. *Cornell Hotel and Restaurant Administration Quarterly*, 31, 80-90.
- Elliott, C. (2018). *These are the best hotel review sites in the world* [Online]. Forbes. Available: <https://www.forbes.com/sites/christopherelliott/2018/09/09/these-are-the-best-hotel-review-sites-in-the-world/#47c1ec87fbdc> [Accessed].
- Fesenmaier, D., Gretzel, U., Hwang, Y., Wang, R. & Bidgoli, H. (2004). Applications of internet technology in travel and tourism. In: Bidgoli, H. (ed.) *The Internet Encyclopaedia*. Bakersfield, CA: Wiley.
- Ghose, A. (2009). Internet exchanges for used goods: An empirical analysis of trade patterns and adverse selection. *Mis Quarterly*, 263-291.
- Godes, D. & Mayzlin, D. (2004). Using online conversations to study word-of-mouth communication. *Marketing science*, 23, 545-560.
- Guerreiro, J. & Rita, P. (2020). How to predict explicit recommendations in online reviews using text mining and sentiment analysis. *Journal of Hospitality and Tourism Management*, 43, 269-272.
- Hair, J. F., Anderson, R. E., Tatham, R. L. & Black, W. C. (1992). *Multivariate data analysis*, New York, Prentice Hall.
- Horwath HTL (2016). *China Hotel Industry Study 2016: Financial Year 2015*, China, China Travel & Tourism Press.
- Hotel Association of New York City Inc. (2014). *Uniform System of Accounts for the Lodging Industry* Michigan, U.S.A., American Hotel & Lodging Educational Institute.
- Hung, W.-T., Shang, J.-K. & Wang, F.-C. (2010). Pricing determinants in the hotel industry: Quantile regression analysis. *International Journal of Hospitality Management*, 29, 378-384.
- Kim, B., Kim, S. & Heo, C. Y. (2016). Analysis of satisfiers and dissatisfiers in online hotel reviews on social media. *International journal of contemporary hospitality management*.
- Kim, E. E. K., Mattila, A. S. & Baloglu, S. (2011). Effects of gender and expertise on consumers' motivation to read online hotel reviews. *Cornell Hospitality Quarterly*, 52, 399-406.
- Kim, W. G., Lim, H. & Brymer, R. A. (2015). The effectiveness of managing social media on hotel performance. *International Journal of Hospitality Management*, 44, 165-171.
- King, R. A., Racherla, P. & Bush, V. D. (2014). What We Know and Don't Know About Online Word-of-Mouth: A Review and Synthesis of the Literature. *Journal of Interactive Marketing*, 28, 167-183.
- Kwok, L., Xie, K. L. & Richards, T. (2017). Thematic framework of online review research: A systematic analysis of contemporary literature on seven major hospitality and tourism journals. *International Journal of Contemporary Hospitality Management*, 29, 307-354.
- Lee, J., Park, D.-H. & Han, I. (2008). The effect of negative online consumer reviews on product attitude: An information processing view. *Electronic Commerce Research and Applications*, 7, 341-352.
- Litvin, S. W., Goldsmith, R. E. & Pan, B. (2018). A retrospective view of electronic word-of-mouth in hospitality and tourism management. *International Journal of Contemporary Hospitality Management*, 30, 313-325.
- Liu, Z. & Park, S. (2015). What makes a useful online review? Implication for travel product websites. *Tourism Management*, 47, 140-151.

- Madanoglu, M. & Ozdemir, O. (2016). Is more better? The relationship between meeting space capacity and hotel operating performance. *Tourism Management*, 52, 74-81.
- Mariani, M. M. & Borghi, M. (2020). Online review helpfulness and firms' financial performance: an empirical study in a service industry. *International Journal of Electronic Commerce*, 24, 421-449.
- Mauri, A. G. & Minazzi, R. (2013). Web reviews influence on expectations and purchasing intentions of hotel potential customers. *International Journal of Hospitality Management*, 34, 99-107.
- Melián-González, S., Bulchand-Gidumal, J. & González López-Valcárcel, B. (2013). Online customer reviews of hotels: As participation increases, better evaluation is obtained. *Cornell Hospitality Quarterly*, 54, 274-283.
- Nickell, S. (1981). Biases in dynamic models with fixed effects. *Econometrica: Journal of the Econometric Society*, 1417-1426.
- Pan, C.-M. (2007). Market demand variations, room capacity, and optimal hotel room rates. *International Journal of Hospitality Management*, 26, 748-753.
- Pan, H., Ha, H.-Y. & Lee, J.-W. (2020). Perceived risks and restaurant visit intentions in China: Do online customer reviews matter? *Journal of Hospitality and Tourism Management*, 43, 179-189
- Park, C. W., Sutherland, I. & Lee, S. K. (2021). Effects of online reviews, trust, and picture-superiority on intention to purchase restaurant services. *Journal of Hospitality and Tourism Management*, 47, 228-236.
- Park, S. & Nicolau, J. L. (2015). Asymmetric effects of online consumer reviews. *Annals of Tourism Research*, 50, 67-83.
- Perez-Aranda, J., Vallespín, M. & Molinillo, S. (2019). Hotels' online reputation management: Benefits perceived by managers. *International Journal of Contemporary Hospitality Management*.
- Phillips, P., Barnes, S., Zigan, K. & Schegg, R. (2017). Understanding the impact of online reviews on hotel performance: An empirical analysis. *Journal of Travel Research*, 56, 235-249.
- Phillips, P., Zigan, K., Silva, M. M. S. & Schegg, R. (2015). The interactive effects of online reviews on the determinants of Swiss hotel performance: A neural network analysis. *Tourism Management*, 50, 130-141.
- Raguseo, E. & Vitari, C. (2017). The effect of brand on the impact of e-WOM on hotels' financial performance. *International Journal of Electronic Commerce*, 21, 249-269.
- Rosario, A. B., De Valck, K. & Sotgiu, F. (2020). Conceptualizing the electronic word-of-mouth process: What we know and need to know about eWOM creation, exposure, and evaluation. *Journal of the Academy of Marketing Science*, 1-27.
- Sawhney, M., Verona, G. & Prandelli, E. (2005). Collaborating to create: The Internet as a platform for customer engagement in product innovation. *Journal of interactive marketing*, 19, 4-17.
- Schuckert, M., Liu, X. & Law, R. (2015). Hospitality and tourism online reviews: Recent trends and future directions. *Journal of Travel & Tourism Marketing*, 32, 608-621.
- Shah, D., Kumar, V., Qu, Y. & Chen, S. (2012). Unprofitable cross-buying: evidence from consumer and business markets. *Journal of Marketing*, 76, 78-95.
- Sharma, A., Sharma, S. & Chaudhary, M. (2020). Are small travel agencies ready for digital marketing? Views of travel agency managers. *Tourism Management*, 79, 104078.
- Sparks, B. A. & Browning, V. (2011). The impact of online reviews on hotel booking intentions and perception of trust. *Tourism Management*, 32, 1310-1323.
- Sparks, B. A., Perkins, H. E. & Buckley, R. (2013). Online travel reviews as persuasive communication: The effects of content type, source, and certification logos on consumer behavior. *Tourism Management*, 39, 1-9.
- STR Inc. (2019). *Consumer Travel Insights by STR: Traveller Journey Report*, Edinburgh, Scotland, Author.
- Tan, K. P. S., Li, X. & Lee, S. (2021). Exploring the determinants of hotel operating performance stabilization in emerging markets: Deciphering the myth. *Journal of Hospitality & Tourism Research*.

- Torres, E. N., Singh, D. & Robertson-Ring, A. (2015). Consumer reviews and the creation of booking transaction value: Lessons from the hotel industry. *International Journal of Hospitality Management*, 50, 77-83.
- Viglia, G., Minazzi, R. & Buhalis, D. (2016). The influence of e-word-of-mouth on hotel occupancy rate. *International Journal of Contemporary Hospitality Management*, 28, 2035-2061.
- Wang, F., Liu, X. & Fang, E. E. (2015). User reviews variance, critic reviews variance, and product sales: An exploration of customer breadth and depth effects. *Journal of Retailing*, 91, 372-389.
- Wang, Y. & Kim, J. (2021). Interconnectedness between online review valence, brand, and restaurant performance. *Journal of Hospitality and Tourism Management*, 48, 138-145.
- Wei, W., Miao, L. & Huang, Z. J. (2013). Customer engagement behaviors and hotel responses. *International Journal of Hospitality Management*, 33, 316-330.
- Xie, K. L., Chen, C. & Wu, S. (2016). Online consumer review factors affecting offline hotel popularity: Evidence from Tripadvisor. *Journal of Travel & Tourism Marketing*, 33, 211-223.
- Xie, K. L., So, K. K. F. & Wang, W. (2017). Joint effects of management responses and online reviews on hotel financial performance: A data-analytics approach. *International Journal of Hospitality Management*, 62, 101-110.
- Xie, K. L., Zhang, Z. & Zhang, Z. (2014). The business value of online consumer reviews and management response to hotel performance. *International Journal of Hospitality Management*, 43, 1-12.
- Xu, X. (2021). Closed-form evaluations and open-ended comment options: How do they affect customer online review behavior and reflect satisfaction with hotels? *Decision Support Systems*, 145
- Xu, X. (2019). Examining the relevance of online customer textual reviews on hotels' product and service attributes. *Journal of Hospitality & Tourism Research*, 43, 141-163.
- Yang, Y., Park, S. & Hu, X. (2018). Electronic word of mouth and hotel performance: A meta-analysis. *Tourism management*, 67, 248-260.
- Ye, Q., Law, R. & Gu, B. (2009). The impact of online user reviews on hotel room sales. *International Journal of Hospitality Management*, 28, 180-182.
- Zhang, X., Qiao, S., Yang, Y. & Zhang, Z. (2020). Exploring the impact of personalized management responses on tourists' satisfaction: A topic matching perspective. *Tourism Management*, 76, 103953.
- Zhang, Z., Ye, Q., Law, R. & Li, Y. (2010). The impact of e-word-of-mouth on the online popularity of restaurants: A comparison of consumer reviews and editor reviews. *International Journal of Hospitality Management*, 29, 694-700.
- Zhang, Z., Zhang, Z., Wang, F., Law, R. & Li, D. (2013). Factors influencing the effectiveness of online group buying in the restaurant industry. *International Journal of Hospitality Management*, 35, 237-245.
- Zhao, X., Wang, L., Guo, X. & Law, R. (2015). The influence of online reviews to online hotel booking intentions. *International Journal of Contemporary Hospitality Management*, 27, 1343-1364.



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## Appendix

### Appendix 1. Summary of Selected Tourism and Hospitality Online Review Literature

Source	Key Research Focus	Independent, Mediating, Moderating, Control &/or Grouping Variable		Outcome Variable	
		Online Review Textual Feature	Others	Consumer-based	Firm-based
Ahani et al. (2021)	Evaluation of medical tourists' satisfaction	Review valence	Reviewer gender	Dominant topic	
Park et al. (2021)	Effect of trust and images on relationship between ORs and restaurant patrons	Review valence	Price; Perceived trust; Food image	Purchase intention	
Wang and Kim (2021)	Effect of branding on relationship between ORs and firm performance	Review valence	Restaurant brand		Restaurant group profit
Xu (2021)	Impact of different online review designs on customer behavior and satisfaction	Open-form comments; Closed-form evaluations	Hotel management mode	Satisfaction; Online review writing behavior	
Aggarwal and Gour (2020)	Evaluation of destination reviews through web analytics	Review valence		Dominant topic	
An et al. (2020)	Role of user-generated photos in online hotel reviews	Review valence	Hotel class	Posting of user-generated photos; Review helpfulness	
Guerreiro and Rita (2020)	Prediction of explicit recommendations in ORs	Explicit positive/negative direct recommendations		Topic endorsed	
Mariani and Borghi (2020)	Impact of online review helpfulness on firm performance	Review valence; Review volume	Review helpfulness		RevPAR
Pan et al. (2020)	Effect of review trustworthiness and perceived risks on restaurant visit intention		Reviewer trustworthiness; Performance risk; Financial risk	Visit intention	

Source	Key Research Focus	Independent, Mediating, Moderating, Control &/or Grouping Variable		Outcome Variable	
		Online Review Textual Feature	Others	Consumer-based	Firm-based
Zhang et al. (2020)	Impact of personalized management responses on tourists' satisfaction	Review valence; Review variance	Topic matching between online review and managerial response	Growth rate of review valence	
Akhtar et al. (2019b)	Effect of conflicting online review attributes on hotel guest behavior	Font diagnosticity; Perceived language comprehension	Dialectic thinking; Attitude ambivalence; Psychological discomfort	Review evaluation; Purchase intention	
Akhtar et al. (2019a)	Impact of manipulated online hotel reviews by peer and expert reviewers		Reviewer expertise; Attribution of service failure	Dissatisfaction	
Anagnostopoulou et al. (2019)	Impact of online customer reputation on firm performance	Positive textual themes; Negative textual themes			Return on assets; Pre-tax profitability as a percentage of sales
De Pelsmcker et al. (2018)	Relationship between digital marketing strategies, ORs and firm performance	Review valence; Review volume	Digital marketing strategies; Hotel management mode; Hotel class		Occupancy; RevPAR
Phillips et al. (2017)	Impact of online hotel reviews on firm performance	Review valence of hotel attributes, food and drink quality, service quality and location			Occupancy; RevPAR
Raguseo and Vitari (2017)	Effect of branding on relationship between ORs and firm performance	Review valence; Review volume	Hotel management mode		RevPAR; Returns on sales



Source	Key Research Focus	Independent, Mediating, Moderating, Control &/or Grouping Variable		Outcome Variable	
		Online Review Textual Feature	Others	Consumer-based	Firm-based
Xie et al. (2017)	Impact of hotels' managerial responses to ORs on firm performance	Review valence; Review variance; Review volume; Review length; Value for money rating; Location rating; Rooms rating; Cleanliness rating; Service rating	Managerial response volume and timeliness; Topic repetition between online review and managerial response		Revenue; ADR; Occupancy
Viglia, Minazzi & Buhalis (2016)	Impacts of consumer reviews on hotel occupancy rates	Review valence; Review volume; Review variance			Occupancy
Xie et al. (2016)	Impact of online hotel reviews on firm performance	Review valence; Review variance; Review volume			Occupancy
Kim et al. (2015)	Impact of managing online hotel reviews on firm performance	Review valence; Review volume; Review variance	Managerial response volume		ADR; RevPAR
Liu and Park (2015)	Factors impacting perceived usefulness of online restaurant reviews	Review valence; Review length; Review enjoyability; Review readability	Reviewer characteristics (e.g. expertise and reputation)	Perceived usefulness of reviews	
Park and Nicolau (2015)	Heuristic cues in online restaurant reviews	Review valence; Review length		Perceived usefulness of reviews; Perceived enjoyment of reviews	
Phillips et al. (2015)	Relationships among user generated ORs, hotel characteristics, and RevPAR	Review valence; Review volume; Ratio of positive reviews; Number of review sources	Location; Hotel class; Hotel scale		RevPAR

Source	Key Research Focus	Independent, Mediating, Moderating, Control &/or Grouping Variable		Outcome Variable	
		Online Review Textual Feature	Others	Consumer-based	Firm-based
Torres, Singh & Robertson-Ring (2015)	Impact of hotel rating and review volume on value generated through online transactions	Review valence; Review volume	Hotel ranking on review site		Average revenue from each online booking transaction
Zhao et al. (2015)	Impact of online hotel reviews on business travelers	Review valence; Review volume; Review usefulness; Review comprehensiveness	Reviewer expertise, Review timeliness	Online booking intention	
Blal and Sturman (2014)	Effects of volume and valence of ORs on hotel room sales	Review valence; Review volume	Hotel class (moderator)		RevPAR
Xie et al. (2014)	Business value of online hotel reviews & managerial responses on firm performance	Review valence; Review variance; Value for money rating; Location rating; Rooms rating; Cleanliness rating; Service rating	Managerial response volume		RevPAR