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Booking hotels online: Can scarcity messages mitigate the effect of a mediocre aggregated eWOM valence?

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Booking hotels online: Can scarcity messages mitigate the effect of a mediocre aggregated eWOM valence?

Abstract

Purpose: This research examines the interplay of scarcity message type and aggregated electronic word-of-mouth (eWOM) valence in influencing consumer intentions in response to online hotel price promotions.

Design/methodology/approach: Two experimental studies were conducted, manipulating scarcity message type (limited-quantity vs. limited-time) and aggregated eWOM valence (positive vs. mediocre). Study 1 focused on budget hotels and Study 2 on midscale hotels. Data came from Amazon Mechanical Turk.

Findings: A positive aggregated eWOM valence always inspired greater confidence than a mediocre one. For midscale hotels, limited-quantity scarcity messages were more effective. However, the type of scarcity did not matter for budget hotels. Moreover, limited-quantity cues consistently worked better than limited-time cues in the mediocre aggregated eWOM valence condition.

Originality: This work responds to the call for research on the effect of online scarcity messages in tandem with eWOM. Also, it is the earliest attempt to reveal how scarcity messages fare differently for various hotel categories.

Practical implications: A positive aggregated eWOM valence is obviously preferred to a mediocre one. That said, if a hotel ends up with a mediocre aggregated eWOM valence, it should use limited-quantity scarcity messages to tilt the balance in its favor.

Keywords: eWOM valence; hotel category; intention to book; intention to recommend; online reviews; online scarcity messages.

Introduction

Advances in web technologies coupled with consumers' rising screen time continue to create opportunities for businesses to innovate with their online revenue management practices. Especially for businesses such as hotels, which operate with fixed and time-sensitive capacity, online price promotions constitute a crucial strategic lever of revenue management (Huang *et al.*, 2020; Noone and Lin, 2020). Hotels regularly implement online price promotions to balance demand and supply through nudges called online scarcity messages (OSMs).

OSMs are typically linked to price promotions through either a limited-quantity or a limited-time offer (Aggarwal *et al.*, 2011; Noone and Lin, 2020). A limited-quantity OSM is used to highlight the possibility of imminent sell-out of the discounted offerings (e.g., "20% discount—only 1 room left"). In contrast, a limited-time OSM is one where a hotel makes a discount available for a specified duration (e.g., "20% discount—only 1 day left"). OSMs are commonly used to infer quality and thus are known to promote purchases (Barton *et al.*, 2022; Wu *et al.*, 2021). This is underpinned by commodity theory and psychological reactance theory, which suggest that OSMs promote fear of missing out on a valuable commodity (Brehm and Brehm, 1981; Brock, 1968).

Consumers, however, seldom consider OSMs in a vacuum. Instead, they tend to process OSMs in tandem with available electronic word-of-mouth (eWOM) about the commodity in question (Banerjee *et al.*, 2024; Kordrostami *et al.*, 2022; Mukhopadhyay *et al.*, 2023). According to a market research survey, 97% of consumers consulted eWOM in 2018 but this figure rose to 99.75% by 2023 (PowerReviews, 2023). According to signaling theory, eWOM serves as a signal of quality that informs consumers' decisions (Kumar and Singh, 2023; Spence, 1973). The relevance of eWOM as a signal of quality is particularly high in the hospitality and tourism industry. After all, intangibles such as hotel services are difficult to evaluate prior to the consumption experience (Agapito and Sigala, 2024).

Hotel-related eWOM, in the form of guests' reviews, is typically accompanied by ratings on a scale of one to five. As the volume of eWOM continues to grow, processing all reviews and ratings received by a hotel may become impossible. To help consumers gauge the collective eWOM quickly, hotel review websites display average ratings based on the corpus of all reviews accumulated by each hotel until that point (Lei *et al.*, 2022; Shen *et al.*, 2018). These average ratings are referred to as aggregated eWOM valence in this article.

Intuitively, to stimulate bookings, hotels must not only leverage OSMs but also cultivate a positive aggregated eWOM valence. Consumers' engagement with eWOM has been shown to result in a 108% lift in conversion rate (PowerReviews, 2023). Specifically, eWOM valence is known to correlate positively with sales (Gavilan *et al.*, 2018; Ye *et al.*, 2011). Yet, no matter how hard managers try, hotels will invariably receive some negative and/or neutral reviews that will drag down their overall ratings. Consequently, hotels risk a mediocre aggregated eWOM valence (e.g., 3/5) rather than an overwhelmingly positive one (e.g., 4.5/5).

In this vein, a natural question for managers is: Can OSMs mitigate the effect of a mediocre aggregated eWOM valence? Moreover, as OSMs are mostly either limited-quantity or limited-time, another question is: How do the two types of OSMs fare under varying levels of aggregated eWOM valence? The academic literature has yet to fully tackle these questions. Hence, the objective of this research is to examine the interplay of scarcity message type and aggregated eWOM valence in influencing consumer intentions in response to online hotel price promotions.

Two online experiments were conducted: the first focusing on budget hotels (Study 1) and the second on midscale hotels (Study 2). As hotel category shapes consumer perceptions (El-Said, 2020; Gunasekar and Sudhakar, 2019), it was important to examine whether the findings for a budget hotel were replicated for a midscale hotel. Luxury hotels were not considered because they mostly receive positive reviews (Banerjee and Chua, 2019; Chang *et*

al., 2023). Given the absence of sufficient negative and/or neutral reviews, luxury hotels are unlikely to have a mediocre aggregated eWOM valence after having accumulated a sizable corpus of entries (Gunasekar and Sudhakar, 2019; Murray *et al.*, 2025; Park *et al.*, 2020; Tsiotsou, 2022).

This research is important for both theory and practice. On the theoretical front, it serves as a response to the call for research on the effect of OSMs in tandem with other cues, such as eWOM (Banerjee and Pal, 2020; He *et al.*, 2022). As the online setting facilitates easy access to a smorgasbord of information, consumers are rarely influenced by a single factor. However, prior studies have often focused on either eWOM (e.g., Serra-Cantallops *et al.*, 2020) or OSMs (e.g., Wu *et al.*, 2021). As studying elements such as eWOM and OSMs in isolation leads to a fragmented understanding (Banerjee *et al.*, 2024; He *et al.*, 2022), this research advances the literature by studying OSMs and eWOM jointly. Building on commodity theory and psychological reactance theory, the literature posits that OSMs drive purchases by creating a fear of missing out on a valuable commodity (Brehm and Brehm, 1981; Brock, 1968). We test this proposition in situations where the commodity's value is challenged by the signal of quality presented by aggregated eWOM valence (Spence, 1973), contributing to a more nuanced theorization of OSMs. On the practical front, the findings provide businesses with guidance on how to optimize their use of OSMs and manage a mediocre aggregated eWOM valence.

The rest of the article proceeds as follows: The next section reviews the literature on OSMs and eWOM. It is followed by the development of the hypotheses. Thereafter, the methods employed to conduct the two studies are explained. The results are presented next, followed by a discussion of the findings. The concluding section highlights the implications and the limitations of this research.

Literature Review

Online scarcity messages (OSMs)

'Scarcity effect' refers to the phenomenon of heightening the value of an offering by constraining its availability (Aggarwal *et al.*, 2011). Commodity theory and psychological reactance theory explain its underlying mechanism. Commodity theory states that the value of a commodity is changed by manipulating the difficulties of obtaining the commodity, until it is no longer available (Brock, 1968; Kim *et al.*, 2020). Psychological reactance theory states that when individuals' available choices are limited, they strive to regain their behavioral freedoms (Brehm and Brehm, 1981). These two theoretical perspectives suggest that when consumers are exposed to scarcity cues that constrain availability—either in terms of quantity or time, they will be aroused. With relatively little thought, they may infer that the commodity is valuable but difficult to obtain. This in turn entices them to make a purchase for fear of missing out.

Scarcity messages have been studied for decades in marketing (Inman *et al.*, 1997) and psychology (Verhallen, 1982). Reviews have also been published covering about 50 years of research on scarcity messages (Barton *et al.*, 2022; Shi *et al.*, 2020). With the evolution of e-commerce, however, scholars have started to probe into the effects of OSMs with a renewed sense of urgency.

Specifically, in the hospitality and tourism context, Noone and Lin (2020) studied OSMs with respect to the interval between the point of booking and the point of hotel stay. OSMs were found to be effective in the case of a long interval but made no difference when the interval was short. In the COVID-19 pandemic setting, Li *et al.* (2021) studied how OSMs reflect crowdedness and affect safety perceptions, finding that OSMs decreased perceived safety and purchase intention. Song *et al.* (2021) compared the effectiveness of limited-quantity and limited-time OSMs while considering the role of social cues such as "1 person watching

this deal now." Social cues effectively promoted purchase intention for limited-quantity but not limited-time OSMs. Park *et al.* (2022) studied how response to OSMs is shaped by individual differences. The preference for scarce hotel rooms was stronger for those who had low childhood socioeconomic status and low materialistic traits. Kim (in press) examined whether limited-time OSMs affect the urge to buy conditional hotel upgrades. Upgrade messages with time restrictions predicted positive affect, which in turn induced purchases. Despite these works, hospitality and tourism research has not yet studied OSMs along with aggregated eWOM valence.

Electronic word-of-mouth (eWOM)

The role of eWOM in consumer behavior can be understood based on signaling theory (Spence, 1973). According to this theory, information asymmetry in a context leads individuals to employ a signal interpretation approach to comprehend the situation. Signals are cues or attributes that help fill the information gap and in turn affect the individuals' perceptions. Before making an online purchase, consumers lack complete information about the quality of products and services. They naturally turn to the signal of eWOM to assess quality and make purchase decisions (Kumar and Singh, 2023).

There are two distinct streams of eWOM research. One deals with the role of individual reviews. For example, Banerjee and Chua (2019) explored how perceptions of individual hotel reviews predict trust, finding that attractiveness of review titles and credibility of review descriptions were positive predictors of trust. Simonetti and Bigne (2022) studied how the valence of individual reviews affects viewing behavior in the context of restaurant booking. In the negative valence condition, reviews attracted greater visual attention. Vana and Lambrecht (2021) compared the relevance of individual reviews and aggregated eWOM valence. Individual reviews were found to influence decision-making when they provided information

that contradicted the aggregated eWOM valence. However, they had little effect when they provided information that was consistent with the aggregated eWOM valence.

The other stream of eWOM research focuses on aggregated eWOM valence as opposed to individual reviews. Aggregated eWOM valence is an important signal to infer quality because it condenses the essence of all historical reviews—impossible to process manually—into a single, easily interpretable metric (Lei *et al.*, 2022). Research on aggregated eWOM valence has been mostly conducted through empirical analyses of secondary datasets containing information on eWOM and sales. Chevalier and Mayzlin (2006) demonstrated a positive relationship between eWOM valence and the sales of books. In the movie industry, Duan *et al.* (2008) found eWOM valence to be positively associated with box office revenues. In hospitality and tourism, while Ye *et al.* (2011) detected a positive effect of eWOM valence on hotel bookings, Abdullah *et al.* (2022) found no such relationship for restaurants. At the yearly level, Banerjee and Bonfield (2019) found no relationship between eWOM valence and hotel bookings. However, at the daily level, Nicolau *et al.* (2024) showed a positive relationship between eWOM sentiment and hotel performance.

This research specifically contributes to the second stream of the eWOM literature, which focuses on aggregated eWOM valence but with two extensions. First, instead of analyzing secondary datasets, it conducts experiments to study the effects of aggregated eWOM valence. Given the mixed findings pointed out earlier (Abdullah *et al.*, 2022; Banerjee and Bonfield, 2019; Nicolau *et al.*, 2024; Ye *et al.*, 2011), the goal is to tease out the relationship in a more controlled setting. Second, it adds the use of OSMs to the study of aggregated eWOM valence. This is important because recent years have witnessed calls for research on OSMs in conjunction with other online information cues, such as eWOM (Banerjee and Pal, 2020; He *et al.*, 2022).

Hypotheses Development

Online scarcity message (OSM) types

Commodity theory and psychological reactance theory imply that both limited-quantity and limited-time OSMs will trigger arousal and ultimately result in purchases (Brehm and Brehm, 1981; Brock, 1968). Nonetheless, a limited-quantity OSM differs from a limited-time offer in its degree of competitiveness (Aggarwal *et al.*, 2011; Noone and Lin, 2020). A limited-quantity offer operates on the principle of 'first come, first served' and creates a zero-sum game. Every purchase diminishes the available stock, intensifying competition among other prospective buyers. The dwindling supply heightens the perceived value and urgency of the scarce resource (Kristofferson *et al.*, 2017). In contrast, a limited-time OSM does not create a zero-sum game for consumers but simply places a deadline on the purchase. Consumers exposed to limited-time OSMs do not see others as competitive threats (Aggarwal *et al.*, 2011; Song *et al.*, 2021).

In this vein, the competitive arousal model of decision-making posits that as the degree of competitive arousal increases, one is more likely to make hasty, impaired decisions (Ku *et al.*, 2005). If a limited-quantity OSM engenders greater competitiveness than a limited-time OSM, the former should give rise to greater intention to buy. A limited-quantity OSM could also trigger greater intention to recommend due to altruism and social motives (Mathwick and Mosteller, 2017; Song *et al.*, 2020). This could be particularly true when individuals are aware of others in their networks who need a commodity that they themselves are not desperate for. Several studies have suggested limited-quantity OSMs to be more impactful than limited-time OSMs for various products and services (Jang *et al.*, 2015; Lee *et al.*, 2015; Song *et al.*, 2021), leading to what we call the OSM type hypothesis:

H1: For hotel price promotions with OSMs, limited-quantity cues produce a more favorable impact on consumer intentions than limited-time cues.

Aggregated eWOM Valence

Valence is one of the most studied attributes of eWOM (Duan *et al.*, 2008; Kitirattarkarn *et al.*, 2021; Mukhopadhyay *et al.*, 2023; Nicolau *et al.*, 2024). Signaling theory implies that eWOM valence should have a positive association with consumer behavior (Spence, 1973). Positive reviews are interpreted as favorable signals, and negative reviews as unfavorable. By extension, a positive aggregated eWOM valence (e.g., 4.5/5) should act as a more favorable signal compared with a mediocre aggregated eWOM valance (e.g., 3/5).

Barring a few exceptions (Abdullah *et al.*, 2022; Banerjee and Bonfield, 2019), most research on aggregated eWOM valence has found it to be positively related to sales in a variety of settings (e.g., Chevalier and Mayzlin, 2006; Duan *et al.*, 2008; Nicolau *et al.*, 2024; Ye *et al.*, 2011). Although these studies were largely based on big data analyses, we expect a similar pattern to emerge in more controlled experimental settings. Aggregated valence of eWOM can be particularly influential for experience products such as hotels, whose quality can be evaluated not a priori but only after booking and staying (Agapito and Sigala, 2024; Banerjee and Chua, 2019). Therefore, regardless of the use of scarcity marketing, a hotel with a largely positive aggregated eWOM valence would inspire greater trust and confidence than one with a middling overall rating. Hence, we posit the positivity effect hypothesis:

H2: For hotel price promotions with OSMs, a positive aggregated eWOM valence produces a more favorable impact on consumer intentions than a mediocre aggregated eWOM valence, regardless of the OSM type.

Furthermore, OSM type and aggregated eWOM valence could interact with each other. Between the two cues, eWOM plays a more fundamental role (Ruiz-Equihua *et al.*, 2023). This is because eWOM is more ubiquitous than OSMs. Any offering that is available for online purchase tends to come with the option of submitting a post-purchase review. Most products

and services sold online, therefore, are accompanied by their aggregated eWOM valence unless they have just entered the market. However, the use of OSMs, although popular, is not so ubiquitous. According to an analysis of a dataset from Amazon.com, about one-third of products use OSMs at a given point in time (Kordrostami *et al.*, 2022).

The relatively greater prevalence of eWOM vis-à-vis OSMs suggests that when both cues are present, the former could dictate attention to a greater extent. In consequence, eWOM valence could play a more decisive role in the decision-making process. When individuals find the aggregated eWOM valence for a hotel to be positive, they might not be overly keen to consider other promotional cues such as OSMs. Therefore, OSM type might make little difference.

However, when the aggregated eWOM valence for a hotel is mediocre, consumers are likely to experience great uncertainty. The high information asymmetry in such a situation would call for a stronger need for signals in the decision-making process (Spence, 1973). Therefore, in the mediocre aggregated eWOM valence condition, individuals could be more willing to pay attention to OSMs to make sense of the deal. This is when the greater impact of a limited-quantity (vs. limited-time) OSM (Aggarwal *et al.*, 2011; Song *et al.*, 2021)—as hypothesized in H1—would make its presence felt. This leads us to what we call the mediocre valence mitigation hypothesis:

H3: For hotel price promotions with OSMs, OSM type interacts with aggregated eWOM valence to affect consumer intentions.

More granularly, we expect the following:

H3a: In the mediocre aggregated eWOM valence condition, limited-quantity OSMs have a more favorable impact than limited-time OSMs.

H3b: However, in the positive aggregated eWOM valence condition, the difference between the two OSM types will be attenuated.

Methods

Research design

Two online experiments were conducted. Experimental research design is common in the hospitality and tourism literature (e.g., Choi *et al.*, 2020; Lo and Yao, 2019; Pape and Toporowski, 2023). Study 1 was set in the context of a budget hotel and adopted a 2 (OSM type: limited-quantity vs. limited-time) × 2 (aggregated eWOM valence: positive vs. mediocre) between-participants design. Study 2 replicated Study 1 with the same research design and procedure but in the context of a midscale hotel.

The research received ethics approval from the authors' institution. Participants provided informed consent electronically, were fully informed about the purpose of the research, and were assured of anonymity and confidentiality. No personal information was collected. Participants were also notified that the data would be securely stored and used solely for research purposes, and that participation posed no known risks.

Pre-tests and experimental stimuli

A simulated hotel booking website was created to manipulate the two OSM types (limited-quantity and limited-time), the two variations of aggregated eWOM valence (positive and mediocre), as well as the two contexts of a budget (Study 1) and a midscale (Study 2) hotel. The hotel in the experimental stimuli was indicated to be in Paris, one of the most popular tourist destinations (Statista, 2023). As with prior studies (Ahmad and Guzmán, 2023; Choi *et al.*, 2020; Lo and Yao, 2019), a fictitious hotel name and logo was used to eliminate the potential confounding effect of brand familiarity with actual hotels.

Pre-tests of an initial version of the experimental stimuli were conducted in two stages. In the first stage, face-to-face focus group discussions were conducted with two sets of five

participants, who were regular travelers with experience of at least three online hotel bookings within the previous year. They were asked to voice their opinion on the extent to which the stimuli were realistic. Suggestions on possible confounding factors were also solicited.

Two key insights emerged. First, a study of OSM type should hold constant the number of units in the limited-quantity version and the number of days in the limited-time version. Annotations such as "3 rooms left" and "5 days left" could be confounding because of the difference in the number itself. Eventually, 'one' was suggested as a number that would look realistic for both quantity and time and could greatly heighten the sense of urgency. This also aligned with the literature. Previous research has used labels such as "we have 1 left at this rate" and "today only" to denote quantity and time scarcity, respectively (Noone and Lin, 2020; Song *et al.*, 2021).

Second, a study of aggregated eWOM valence would be meaningful only with a substantial volume of eWOM. An overall positive or mediocre rating would not be taken too seriously if it were based on only a handful of reviews. Therefore, this research examines the effect of aggregated eWOM valence based on over 500 reviews. For the positive aggregated eWOM valence condition, the annotation "4.5 out of 5 based on over 500 customer reviews" was used. A "5 out of 5" label was avoided because some of the focus group participants suggested that it would appear contrived. Consumers are usually suspicious of products with an aggregated eWOM valence of "5 out of 5" (PowerReviews, 2023). For the mediocre aggregated eWOM valence condition, the annotation "3 out of 5 based on over 500 customer reviews" was used as it reflects an average level of service (Liu *et al.*, 2019; Mudambi and Schuff, 2010).

In the second stage of the pre-test, 20 university students were exposed to eight versions of the simulated website—uniformly distributed across OSM type, eWOM valence, and hotel category—in a random order. Two examples are shown in Figure 1. For each website version,

participants answered close-ended questions on OSM type (limited-quantity vs. limited-time), aggregated eWOM valence (positive vs. mediocre), and hotel category (budget vs. midscale). There was unanimous agreement, and the manipulations worked in expected ways.

[Insert Figure 1 here]

Data collection

Data came from Amazon Mechanical Turk (MTurk), a popular crowdsourcing platform that gives researchers access to a diverse pool of participants. Samples recruited through MTurk are usually more representative than student samples (Jeong and Kim, 2024; Ogbanufe, 2023). Hence, it has been widely used for data collection in hospitality and tourism research (Sharma *et al.*, 2024; Smith *et al.*, 2023). Furthermore, MTurk participants typically possess strong technological proficiency (Sharma *et al.*, 2024), making them well-suited for this research on OSMs and eWOM.

Study 1 and Study 2 comprised 387 and 385 participants, respectively. Both studies employed purposive sampling. Individuals on MTurk were eligible to participate if they were familiar with online purchases but had not been to Paris before. Participants were randomly assigned to one of the four experimental conditions. They were asked to imagine that they were planning a trip to Paris next month. They were thereafter told that Hotel Kayis was an affordable option for them. This helped control for participants' budget constraints. Next, the experimental stimuli, involving Hotel Kayis, were shown (cf. Figure 1). Finally, participants completed a questionnaire.

In Study 1, the questionnaire included items to measure intention to book the hotel and perceived verisimilitude of the scenario. For intention to book, participants indicated the extent to which they agreed with the following statements on a scale of 1 (strongly disagree) to 7 (strongly agree): "The probability that I would consider booking my stay at this hotel is high,"

"The likelihood that I would book my stay at this hotel is high," and "The possibility of booking my stay at this hotel is high" (Essawy, 2019). Responses to these items were averaged to create a composite index, with higher scores indicating greater intention to book (Cronbach's Alpha > .7, Composite Reliability > .7).

For perceived verisimilitude, participants indicated whether the scenario was unrealistic/realistic, not believable/believable, and not credible/credible on a seven-point semantic differential scale. Responses to these items were averaged to create a composite index, with higher scores indicating greater perceived verisimilitude (Cronbach's Alpha > .7, Composite Reliability > .7).

In Study 2, the questionnaire assessed intention to book, intention to recommend, and perceived verisimilitude. The measures of intention to book and perceived verisimilitude were identical to Study 1 (Cronbach's Alpha > .7 and Composite Reliability > .7 for both constructs). For intention to recommend, a seven-point semantic differential scale was used. Participants indicated whether it was unlikely/likely, improbable/probable, and impossible/possible for them to recommend the hotel to others (Huang and Jia, 2019). Responses to these items were averaged to create a composite index, with higher scores indicating greater intention to recommend (Cronbach's Alpha > .7, Composite Reliability > .7).

Data analyses

To test the hypotheses H1, H2 and H3, the data were analyzed using a 2 (OSM type: limited-quantity vs. limited-time) × 2 (aggregated eWOM valence: positive vs. mediocre) analysis of covariance (ANCOVA) with age and perceived verisimilitude as covariates. If H3 indicated a significant interaction, independent samples t-tests were used to test H3a and H3b. In Study 1, the outcome variable was intention to book. Study 2 included two outcome variables: intention to book and intention to recommend.

Results

As stated earlier, sample sizes in Study 1 and Study 2 were 387 and 385, respectively. The number of participants per experimental condition ranged from 93 to 99 across both studies. Sample sizes exceeding 30 per condition ensure analytical robustness to any violation of assumptions (Dattalo, 2013; Pallant, 2005). Table I presents the sample details. Table II and Table III provide the descriptive statistics.

[Insert Table I, Table II, and Table III here]

Study 1: Intention to Book a Budget Hotel

Test of H1-H2. Type of OSM did not affect booking intention, $F(1, 381) = .58$, $p = .45$. Hence, H1 was not supported. However, aggregated eWOM valence had a significant effect, $F(1, 381) = 204.83$, $p < .001$, $\eta_p^2 = .35$. Booking intention was significantly higher in the positive eWOM condition ($M = 4.73$, $SD = 1.77$) than in the mediocre eWOM condition ($M = 2.43$, $SD = 1.57$). This lends support to H2.

Test of H3. The OSM type × aggregated eWOM valence interaction was significant, $F(1, 381) = 4.70$, $p = .03$, $\eta_p^2 = .01$ (Figure 2). This lends support to H3. In the mediocre aggregated eWOM valence condition, there was a marginally significant difference in booking intention, $t(196) = -1.67$, $p = .097$, Cohen's $d = -.24$. Booking intention was higher for limited-quantity OSM ($M = 2.62$, $SD = 1.66$) vis-à-vis limited-time OSM ($M = 2.24$, $SD = 1.46$), supporting H3a. Moreover, in the positive aggregated eWOM valence condition, there was no significant difference in booking intention between limited-quantity OSM ($M = 4.59$, $SD = 1.78$) and limited-time OSM ($M = 4.86$, $SD = 1.77$), $t(187) = 1.03$, $p = .30$. Thus, H3b was also supported.

[Insert Figure 2 here]

Limitation of Study 1 and the need for Study 2

Study 1 considered intention to book but overlooked intention to recommend. While purchase/booking intention has been studied quite widely as an outcome variable in the OSM literature (e.g., Kim *et al.*, 2020; Noone and Lin, 2020), recommendation intention has been largely ignored. Nonetheless, recommendations are of significant managerial importance (Pape and Toporowski, 2023; Ye *et al.*, 2011). This limitation is addressed in Study 2 in the context of a midscale hotel. In sum, Study 2 differs from Study 1 in two ways. First, it is set in the context of a midscale hotel as opposed to a budget hotel. Second, it widens the measurement of consumer intentions to include not only intention to book but also intention to recommend.

Study 2: Intentions to book and recommend a midscale hotel

Test of H1-H2. OSM type had a significant effect on booking intention, $F(1, 379) = 28.44$, $p < .001$, $\eta_p^2 = .07$, and recommendation intention, $F(1, 379) = 22.98$, $p < .001$, $= \eta_p^2 = .06$. Booking intention was significantly higher in the limited-quantity condition ($M = 4.94$, $SD = 1.61$) than in the limited-time condition ($M = 4.15$, $SD = 2.05$). Similarly, recommendation intention was significantly higher in the limited-quantity condition ($M = 4.75$, $SD = 1.81$) than in the limited-time condition ($M = 4.01$, $SD = 2.11$). Thus, H1 was supported for both booking and recommendation intentions.

Aggregated eWOM valence, too, had a significant effect on booking intention, $F(1, 379) = 123.93$, $p < .001$, $\eta_p^2 = .25$, and recommendation intention, $F(1, 379) = 86.76$, $p < .001$, $\eta_p^2 = .19$. Booking intention was significantly higher in the positive eWOM condition ($M = 5.41$, $SD = 1.37$) than in the mediocre eWOM condition ($M = 3.68$, $SD = 1.94$). Similarly, recommendation intention was significantly higher in the positive eWOM condition ($M = 5.15$,

SD = 1.65) than in the mediocre eWOM condition (M = 3.60, SD = 2.02). Thus, H2 was supported for both booking and recommendation intentions.

Test of H3. With respect to booking intention, the OSM type × aggregated eWOM valence interaction was significant, $F(1, 379) = 32.50$, $p < .001$, $\eta_p^2 = .08$ (Figure 3). In the mediocre aggregated eWOM valence condition, booking intention was significantly higher for limited-quantity OSM (M = 4.53, SD = 1.75) vis-à-vis limited-time OSM (M = 2.86, SD = 1.75), $t(191) = -6.62$, $p < .001$, Cohen's d = -.95. However, in the positive aggregated eWOM valence condition, there was no significant difference in booking intention between limited-quantity OSM (M = 5.35, SD = 1.35) and limited-time OSM (M = 5.47, SD = 1.39), $t(190) = .61$, $p = .54$. Thus, H3, H3a and H3b were all supported for intention to book.

[Insert Figure 3 here]

With respect to recommendation intention, the OSM type × aggregated eWOM valence interaction was also significant, $F(1, 379) = 14.85$, $p < .001$, $\eta_p^2 = .04$ (Figure 4). In the mediocre aggregated eWOM valence condition, recommendation intention was significantly higher for limited-quantity OSM (M = 4.31, SD = 1.92) vis-à-vis limited-time OSM (M = 2.92, SD = 1.89), $t(191) = -5.09$, $p < .001$, Cohen's d = -.73. However, in the positive aggregated eWOM valence condition, there was no significant difference in recommendation intention between limited-quantity OSM (M = 5.19, SD = 1.58) and limited-time OSM (M = 5.12, SD = 1.72), $t(190) = .28$, $p = .39$. Thus, H3, H3a and H3b were all also supported for intention to recommend. Table IV summarizes the results across the two studies.

[Insert Table IV here]

[Insert Figure 4 here]

Discussion

This research tested three hypotheses. The OSM type hypothesis (H1) argued that limited-quantity OSMs are more impactful than limited-time OSMs. This was informed by the competitive arousal model of decision-making, which posits that competitive arousal increases the propensity for hasty decision-making (Ku *et al.*, 2005). As limited quantity OSMs trigger greater competitiveness than limited-time ones (Aggarwal *et al.*, 2011; Kristofferson *et al.*, 2017), the former was expected to sway consumer intentions more favorably. However, this turned out to be true only for midscale hotels but not for budget hotels. In general, budget hotels are associated with lower prices and more basic amenities compared with midscale hotels (Banerjee and Chua, 2019; El-Said, 2020). The lower expectations of a budget hotel might have resulted in their OSMs being taken with a pinch of salt, resulting in a non-significant relationship between OSM type and consumer intentions. There is evidence that eWOM matters more for expensive commodities (Pangarkar *et al.*, 2023; PowerReviews, 2023). This research augments the current understanding by showing that OSMs, too, matter more for expensive commodities—all else being equal.

The positivity effect hypothesis (H2) argued that a positive aggregated eWOM valence (e.g., "4.5 out of 5 based on over 500 customer reviews") results in more favorable consumer intentions than a mediocre aggregated eWOM valence (e.g., "3 out of 5 based on over 500 customer reviews"). Based on signaling theory, the former should connote a more favorable signal (Spence, 1973). Consistent with the theory, a positive aggregated eWOM valence enhanced booking intention for both budget and midscale hotels. It also resulted in greater intention to recommend for midscale hotels. This finding echoes the wider eWOM literature that has shown aggregated eWOM valence to be positively correlated with sales (Chevalier and Mayzlin, 2006; Duan *et al.*, 2008; Nicolau *et al.*, 2024; Ye *et al.*, 2011).

The mediocre valence mitigation hypothesis (H3) argued that OSMs could offset the negative effect of a mediocre aggregated eWOM valence. Regardless of hotel category, when eWOM valence was mediocre, consumer intentions were more favorable with limited-quantity OSMs than limited-time OSMs. In the presence of a mediocre aggregated eWOM valence, individuals might experience higher uncertainty about their decision. Exposure to OSM could help attenuate the ambiguity in favor of a booking. This could be particularly true for limited-quantity OSMs that make consumers see others as competitive threats (Ku *et al.*, 2005). Limited-time OSMs did not work well in the mediocre aggregated eWOM valence condition perhaps because such messages pressurize consumers to decide quickly (Shi *et al.*, 2020). However, when individuals come across a hotel with middling ratings, they might prefer to take their time to evaluate the hotel's attributes with greater caution. A time constraint could conflict with their intended decision-making process and hence might have been interpreted unfavorably.

In the positive aggregated eWOM valence condition, the difference in consumer intentions between the two OSM types was largely attenuated. Between eWOM and OSM, the former could play a more fundamental role in shaping purchase decisions due to its greater prevalence (Ruiz-Equihua *et al.*, 2023). For this reason, a positive aggregated eWOM valence might have been perceived as a sufficient signal for decision-making, rendering OSM type inconsequential.

Conclusions

The objective of this research was to examine the interplay of scarcity message type and aggregated eWOM valence in influencing consumer intentions in response to online hotel price promotions. Two studies were conducted covering different contextual settings—budget and midscale hotels—as well as different measures of consumer intentions—intention to book

and intention to recommend. The key findings are as follows: A positive aggregated eWOM valence always inspired greater confidence than a mediocre one. For midscale hotels, limited-quantity OSMs were more effective. However, the type of scarcity did not matter for budget hotels. Moreover, limited-quantity OSMs consistently worked better than limited-time OSMs in the mediocre aggregated eWOM valence condition, regardless of hotel category.

Theoretical implications

This research makes three major theoretical contributions. First, it brings together two streams of literature: one that focuses on OSMs but ignores eWOM (e.g., Wu *et al.*, 2021) and the other that studies eWOM but ignores OSMs (e.g., Serra-Cantallops *et al.*, 2020). Easy access to a plethora of information online empowers consumers to consider multiple factors when making purchase decisions (Kordrostami *et al.*, 2022; PowerReviews, 2023). Predictably, scholars have been calling for research on the effect of OSMs in conjunction with other online cues (Banerjee *et al.*, 2024; He *et al.*, 2022). As a response to the call, this research adds to the scholarly understanding of how OSMs and eWOM jointly influence consumer intentions.

Second, this research contributes to the theorization of eWOM's influence on consumers when the 'signal' is neither positive nor negative (Spence, 1973). While prior studies have widely highlighted the benefits of positive reviews (e.g., Gavilan *et al.*, 2018; Ye *et al.*, 2011) and showed how managers should respond to negative reviews (e.g., Li *et al.*, 2018), this research casts the spotlight on the problem of a mediocre aggregated eWOM valence—an understudied aspect of eWOM. Aggregated eWOM valence is important as it is based on the historical average of all ratings (Lei *et al.*, 2022). Conceivably, one cannot rule out the possibility of any product/service having a mediocre aggregated eWOM valence at a given point in time. Research on aggregated eWOM valence has been mostly conducted

through empirical analyses of secondary datasets (Abdullah *et al.*, 2022; Chevalier and Mayzlin, 2006; Duan *et al.*, 2008; Nicolau *et al.*, 2024; Ye *et al.*, 2011). Augmenting these works, this research demonstrates the favorable impact of a positive (vs. mediocre) aggregated eWOM valence in more controlled, experimental settings. It also advances the theorization of OSMs' influence on consumers by testing it when the commodity's value is contradicted by a mediocre aggregated eWOM valence. In such a condition, limited-quantity OSMs consistently worked better than limited-time OSMs.

Third, this research expands the scope of outcome variables in the OSM literature. In existing studies, purchase/booking intention remains the most studied outcome variable (e.g., Kim *et al.*, 2020; Noone and Lin, 2020; Song *et al.*, 2021). Recommendation intention is conspicuous by its absence even though recommendations are crucial for businesses (Pape and Toporowski, 2023; Ye *et al.*, 2011). Extending prior studies, Study 2 of this research considered both booking intention and recommendation intention as outcome variables. Furthermore, the research specifically advances the OSM literature in hospitality and tourism by considering different hotel categories: budget and midscale. Some studies have considered only midscale hotels (e.g., Song *et al.*, 2021), while others considered luxury hotels (e.g., Banerjee and Pal, 2020). However, this is the first research to reveal how OSMs fare differently for various categories of hotels.

Practical implications

This research offers two implications for hotel managers. First, a positive aggregated eWOM valence is obviously preferred to a mediocre one. That said, if a hotel ends up with a mediocre aggregated eWOM valence, it should use limited-quantity OSMs to tilt the balance in its favor. This is supported by both Study 1 and Study 2, which demonstrated that limited-

quantity OSMs engender more favorable consumer intentions than limited-time OSMs in cases of middling eWOM valence.

Second, if budget hotels are short of resources, they are better off not investing in scarcity marketing. OSM type was found to matter for midscale hotels but not for budget hotels. Hence, OSMs appear more strategically relevant for midscale hotels. In contrast, the interest of budget hotels might be better served if they invest their limited resources toward enhancing the guest experience This could organically lead to a greater inflow of positive reviews and consequently elevate their aggregated eWOM valence.

Limitations and future research

The following limitations of this research open avenues for future studies. First, it did not consider any potential mediators. The underlying mechanism of how OSMs and eWOM affect consumer behavior needs further exploration. Qualitative approaches could also be utilized to better understand the reasons behind the statistically significant results that emerged in this research.

Second, the use of a fictitious hotel name in the experimental stimuli meant that this research could not uncover how brand affiliation (branded vs. non-branded hotels) in combination with consumers' prior brand knowledge might impact their responses to OSMs. Addressing this limitation is important as brand perception can influence consumer expectations and responses.

Third, the findings of this research need to be viewed in the context of its sampling strategy. Participants were invited to take part in the studies if they were familiar with online purchases in general, not online hotel bookings in particular. Future research is encouraged to replicate the studies using a more targeted sample of respondents who frequently use hotel booking websites.

Finally, this research studied intentions rather than actual behaviors. Intentions to book and recommend—the outcome variables in this research—do not reflect actual bookings and referrals. An extension of this research could involve linking self-reported consumer intentions to actual behaviors. We invite future research on OSMs and eWOM to address these limitations of the current work.

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Table I: Sample details. [Source: Developed by authors]

	Study 1 (Budget, N = 387)	Study 2 (Midscale, N = 385)
OSM type		
Limited-quantity	192	191
Limited-time	195	194
Aggregated eWOM valence		
Positive	189	192
Mediocre	198	193
Gender		
Male	179	181
Female	208	204
Age		
18-24 years	61	60
25-34 years	176	174
35-44 years	30	31
45-54 years	54	54
55 years or above	66	66

Table II: Descriptive statistics. [Source: Developed by authors]

	Mean (SD)	Median	Skewness	Kurtosis
Intention to book (Study 1)	3.55 (2.03)	3.67	.14	-1.37
Perceived verisimilitude (Study 1)	4.36 (1.58)	4.00	-.04	-.76
Intention to book (Study 2)	4.54 (1.88)	5.00	-.53	-.84
Intention to recommend (Study 2)	4.38 (2.00)	5.00	-.36	-1.17
Perceived verisimilitude (Study 2)	4.35 (1.58)	4.00	-.04	-.74

Table III: Mean (SD) of outcome variables across OSM type and aggregated eWOM valence. [Source: Developed by authors]

	Study 1 (Budget)	Study 2 (Midscale)	
	Intention to book	Intention to book	Intention to recommend
OSM type			
Limited-quantity	3.57 (1.98)	4.94 (1.61)	4.75 (1.81)
Limited-time	3.53 (2.08)	4.15 (2.05)	4.01 (2.11)
Aggregated eWOM valence			
Positive	4.73 (1.77)	5.41 (1.37)	5.15 (1.65)
Mediocre	2.43 (1.57)	3.68 (1.94)	3.60 (2.02)

Table IV: Summary of the results. [Source: Developed by authors]

Hypothesis	**Budget Hotel (Study 1)**	**Midscale Hotel (Study 2)**
H1: OSM type hypothesis	No effect	Booking and recommendation intentions were higher in the limited-quantity OSM condition.
H2: Positivity effect hypothesis	Booking intention was higher in the positive aggregated eWOM valence condition.	Booking and recommendation intentions were higher in the positive aggregated eWOM valence condition.
H3: Mediocre valence mitigation hypothesis	In the mediocre aggregated eWOM valence condition, booking intention was higher for limited-quantity OSM vis-à-vis limited-time OSM. However, there was no such significant difference in the positive aggregated eWOM valence condition.	In the mediocre aggregated eWOM valence condition, booking and recommendation intentions were both higher for limited-quantity OSM vis-à-vis limited-time OSM. However, there were no such significant differences in the positive aggregated eWOM valence condition.

Figure 1(a): OSM type: limited-quantity, aggregated eWOM valence: positive, hotel category: budget. [Source: Developed by authors]

Figure 1(b): OSM type: limited-time, aggregated eWOM valence: mediocre, hotel category: midscale. [Source: Developed by authors]

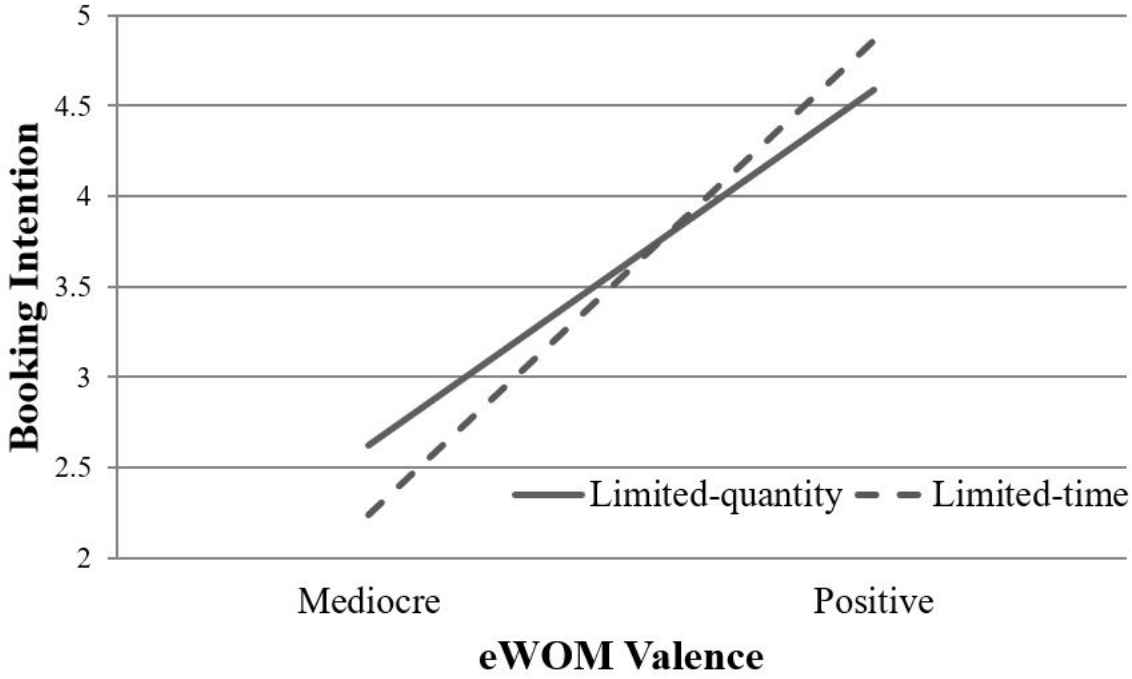

Figure 2: OSM type × aggregated eWOM valence interaction on booking intention for budget hotel. [Source: Developed by authors]

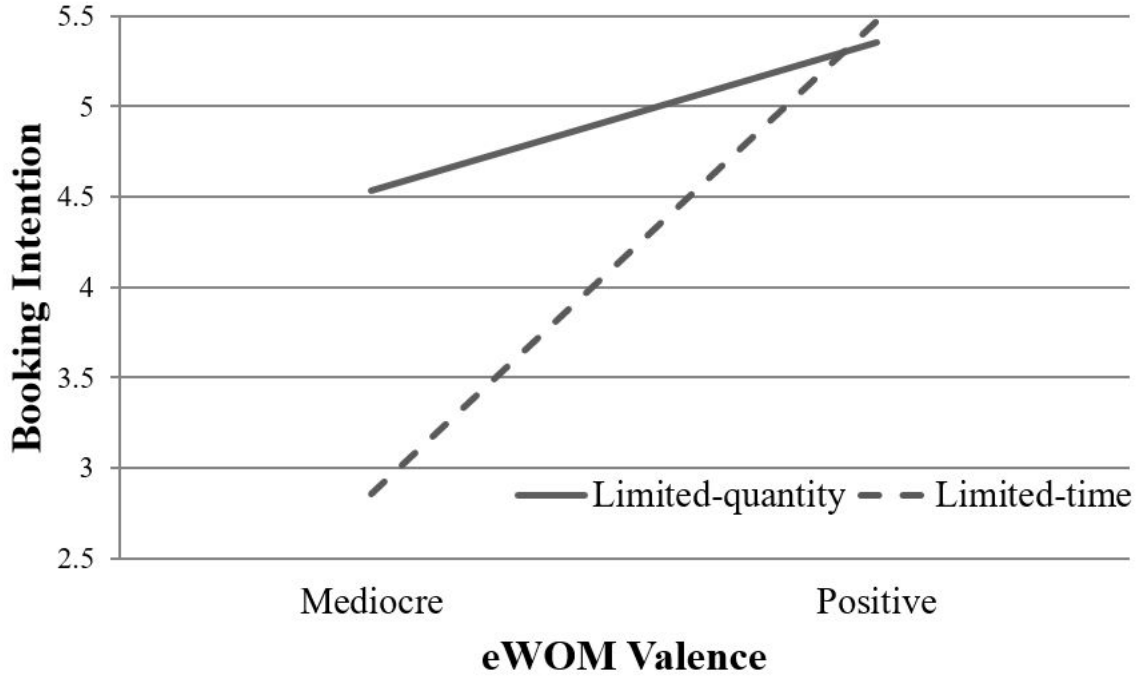

Figure 3: OSM type × aggregated eWOM valence interaction on booking intention for midscale hotel. [Source: Developed by authors]

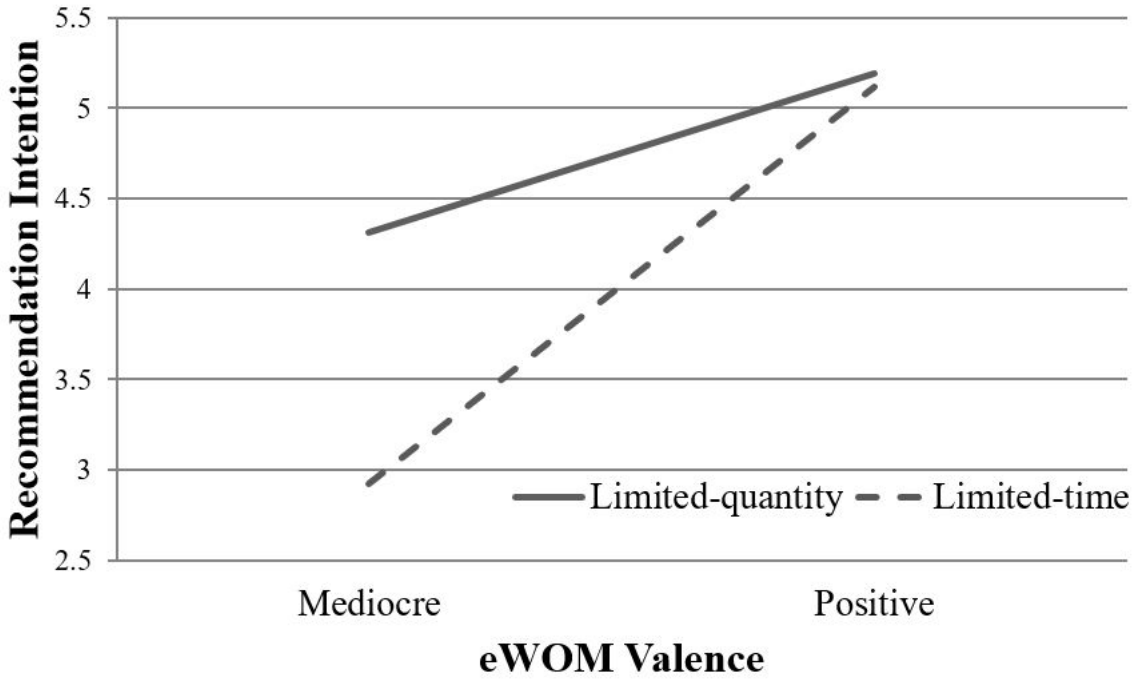

Figure 4: OSM type × aggregated eWOM valence interaction on recommendation intention for midscale hotel. [Source: Developed by authors]