



ISSN: 2508-7894

KJAI website: <http://accesson.kr/kjai>doi: <http://dx.doi.org/10.24225/kjai.2024.12.2.25>

# Consumer Experience and Management Response Under the Impact of COVID-19 Crisis

Hyunsoo YOO<sup>1</sup>

Received: April 14, 2024. Revised: May 09, 2024. Accepted: June 05, 2024.

## Abstract

This study examines the relationship between customer satisfaction and management response in the hotel industry amid the COVID-19 pandemic. By applying regression analysis and topic modeling to consumer reviews on online platforms, we assess how consumer perceptions and management behaviors have shifted since the onset of the pandemic. The findings reveal a significant decline in customer satisfaction linked to COVID-19. Significantly, while the pandemic has reduced overall customer satisfaction levels, high response rates and high review-response content similarity mitigate the impact of the crises. These results highlight the critical need for hotel managers to continuously monitor online reviews and adapt their engagement strategies to maintain and enhance customer satisfaction during ongoing and future crises. This research not only corroborates existing theories on customer satisfaction but also exposes novel dynamics introduced by the pandemic, offering new insights for effective customer relationship management in turbulent times.

**Keywords :** Consumer Experience, COVID-19, Customer Satisfaction, Management Response, Online Review

**Major Classification Code :** L83, M31, Z32

## 1. Introduction

The COVID-19 crisis, which began in 2019, has profoundly impacted various industries worldwide, with the hospitality and tourism sector facing some of the most severe effects. Due to issues directly related to hygiene, there has been a significant drop in travel demand, and service staff have faced unprecedented challenges. In response, hotel businesses have been forced to innovate to survive. As society has shifted towards remote interactions, the role of online platforms has become more pronounced, and consumers have increasingly turned to these platforms for information exchange. This paper aims to examine how

service employees' responses on online platforms can mitigate the impact of the crisis.

While the literature has extensively explored consumer reviews from various angles, studies on responses are more limited. For instance, research has been conducted to assess the authenticity of responses and the frequency of responses to understand the role of response strategies in shaping appropriate interaction frameworks. Not only are reviews but also responses considered unstructured textual data, understanding various features of this data is essential, particularly in identifying which features are most effective in crises. This process will examine how traditional response features influence consumer satisfaction during crises,

\* The publication fees of this paper is supported by 4<sup>th</sup> BK21 Program.

<sup>1</sup> First Author. Post-Doctoral Researcher, Business and Technology Management, KAIST, Korea. Email: [harry\\_ryoo@kaist.ac.kr](mailto:harry_ryoo@kaist.ac.kr)

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contributing to a comprehensive understanding of responses and enhancing the literature on managerial actions during crises.

This study utilizes data from prominent online review platforms to investigate the influence of service quality on consumer satisfaction and further explores the role of consumer online activities and managerial responses. On these platforms, while consumers leave reviews about the service quality they receive, the information available at the time of reviewing also influences their submissions. This information includes prior consumers' feedback and managers' reactions, which could alter the intent behind new submissions. Thus, by analyzing the textual information in management responses, this research seeks to understand how consumer satisfaction adjusts during crises like COVID-19.

The remainder of the paper is structured as follows: We begin by reviewing the relevant literature on the hospitality and tourism industry during crises and develop analytical hypotheses concerning customer satisfaction and management response during the COVID-19 period. We then utilize regression analysis and topic modeling to evaluate COVID-19's impact, presenting these findings and discussing the resulting changes. The paper concludes with managerial implications and suggestions for future research.

## 2. Literature Review

### 2.1. Impact of COVID-19 on Hospitality and Tourism

The hospitality and tourism industry, highly susceptible to crises from health risks, natural disasters, and accidental crises, has historically faced significant challenges in managing disruptions (Elston, 2005; Page et al., 2006; Hall, 2010; Paraskevas et al., 2013). Defined by the World Tourism Organization as unexpected events that undermine tourist confidence and disrupt destination management (WTO, 1998; Volo, 2008; WTO, 2020), crises like the September 11 attacks, the 2003 SARS outbreak, the 2004 Indonesian tsunami, the 2009 H1N1 virus, the 2014 and 2019 Ebola outbreaks, the 2013 MERS coronavirus, and the 2016 Zika virus have profoundly impacted the sector. The emergence of COVID-19 in 2019 has further exacerbated these challenges, particularly affecting the hotel sector where, for instance, in China, around 74.29% of hotels stopped operations in early 2020, and hotel occupancy rates in Germany fell by 36% (Nicola et al., 2020). The pandemic's influence has seen a correlation between increased international tourist volumes and rises in COVID-19 cases and fatalities (Farzanegan et al., 2021).

Under COVID-19, the hotel industry must adapt to

rapidly changing business environments, necessitating strategic changes beyond returning to pre-crisis operations (Alonso et al., 2020). Key areas for adaptation include marketing, maintenance, human resources, and government liaison (Israeli & Reichel, 2003). The crisis profoundly affects consumer psychology, impacting consumption behavior within the hospitality sector, as normal operations are disrupted by lockdowns and social distancing, leading to decreased demand and increased unemployment (Foroudi et al., 2021; Gursoy & Chi, 2020; Dube et al., 2020). This understanding of risk perception and psychological impacts is essential for recovery (Shin & Kang, 2020). Post-pandemic, significant adaptations are required as the industry navigates a transformed landscape (Gössling et al., 2020).

Research has consistently emphasized the need for robust responses to health crises within the hospitality industry. Enhancing immigration processes to better prepare for emergencies has been a focus following diseases like SARS and MERS (Richter, 2003). Proactive crisis management strategies were advocated by studies discussing measures taken by Hong Kong restaurants during the SARS outbreak and strategies for understanding risk factors such as those for Lyme disease (Alan et al., 2006; Donohoe et al., 2015). Despite these efforts, the unprecedented scale and impact of COVID-19, characterized by enhanced mobility restrictions and ongoing social distancing requirements, present novel challenges (Gössling et al., 2020). There is an urgent need for research to develop effective strategies enabling the hospitality industry to coexist with the enduring threats posed by COVID-19.

Additionally, the escalating threat of pandemics has shifted scholarly focus toward understanding the dual impact of such crises on the inherent characteristics of the industry and consumer behavior (Hall, 2010). Pandemics uniquely affect the industry by directly impacting service delivery and consumer experience, reducing travel and destination appeal (Senge, 1990; Richter, 2003). Negative perceptions during crises discourage visitations and adversely affect tourism economies (Goh, 2012; Tavitiyaman & Qu, 2013; Bhati et al., 2020), as evidenced during the MERS outbreak where regions like Asia saw significant declines in tourism compared to lesser impacts in the U.S. and Europe (Donnelly et al., 2019). The COVID-19 pandemic has compounded these challenges, fostering economic downturns and a conservative consumption mindset among potential tourists, emphasizing the need for the industry to adapt to changing expectations and service delivery (Chen et al., 2007; Mariolis et al., 2020; Baum & Hai, 2020), as outlined by expectancy-disconfirmation theory (Oliver, 1981).

This analysis sets the stage for hypothesizing that

customer satisfaction has notably decreased under the influence of COVID-19, highlighting the need for continued adaptation and innovation within the hospitality and tourism industry.

**H1:** Customer satisfaction has decreased under the influence of COVID-19.

### 2.3. Management Response and Online Reviews During Crisis

Effective crisis management within the hospitality and tourism industry underscores the critical role of swift communication, rapid response, and dynamic marketing strategies. He and Harris (2020) emphasize the necessity for adaptable marketing strategies to effectively respond to the changing conditions prompted by COVID-19. Lee et al. (2012) illustrate that non-pharmaceutical interventions significantly influence tourist behaviors, suggesting that the adaptability of marketing strategies directly impacts tourist demand. Furthermore, Hao et al. (2020) argue for the essential role of digital transformation within the hospitality industry to maintain pace with the evolving pandemic environment, stressing a customer-centric approach.

During pandemics, the potential for reduced service levels increases, possibly cementing negative consumer perceptions. Historical events, such as the stigmatization faced by Ebola-free African countries during regional outbreaks, demonstrate how strategic social media utilization can counteract adverse public perceptions through positive messaging and comprehensive risk assessments (Mizrachi & Fuchs, 2016). This is supported by Yu et al. (2020), who found active engagement on social media platforms addressing a range of issues from risk perceptions to service quality during COVID-19, highlighting the significance of digital engagement in managing crises.

In the hospitality sector, engaging consumers beyond the immediate point of service is crucial (Wei et al., 2013). Online reviews, in particular, serve as a pivotal platform for consumer engagement, where management responses significantly affect guest perceptions and overall hotel evaluations (Gu & Ye, 2014; Sparks et al., 2016; Li et al., 2017; Wang & Chaudhry, 2018; Chen et al., 2019; Zhang et al., 2019). The dynamics between review volume and ratings are instrumental in shaping a hotel's reputation, illustrating the importance of strategic responses to potentially negative reviews to enhance customer satisfaction and mitigate reputational damage.

The management's strategic response to online reviews is essential for influencing consumer engagement (Wei et al., 2013; Xie et al., 2014; Schamari & Schaefer, 2015). Adjusting these strategies requires consideration of evolving consumer expectations, which are shaped by new

information and experiences. Unmet expectations concerning management responses can significantly impact customer satisfaction negatively (Gu & Ye, 2014). The ongoing challenges of COVID-19 have necessitated a nuanced approach to these management strategies to address shifting consumer expectations effectively. Considering these factors, the central hypothesis of this study is formulated as follows:

**H2:** Management response would mitigate the negative impact of the presence of COVID-19 on customer satisfaction.

Different facets of management response, such as the speed, comprehensiveness, and attentiveness of replies, play pivotal roles in shaping consumer engagement and satisfaction. Li et al. (2017) and Sheng (2019) both emphasize that timely and thorough responses positively influence review valence and volume. In contrast, inconsistent or selective responses can frustrate customers, particularly when they perceive unequal levels of engagement (Gu & Ye, 2014).

Additionally, the manner in which responses are crafted—whether personalized or generic—significantly influences consumer trust and satisfaction. Zhang et al. (2019) stress the importance of aligning response content closely with review content, which enhances the perceived sincerity and attentiveness of the management. Therefore, detailed and empathetic responses are likely to foster greater consumer satisfaction and loyalty. From this understanding, the following additional hypotheses are proposed:

**H2a:** Management response speed would moderate the negative impact of COVID-19 on customer satisfaction.

**H2b:** Management response rate would moderate the negative impact of COVID-19 on customer satisfaction.

**H2c:** Review-response similarity would moderate the negative impact of COVID-19 on customer satisfaction.

## 3. Methodology

### 3.1. Data and Sample

This research explores the impact of COVID-19 on customer satisfaction and management response, utilizing data from TripAdvisor, one of the largest online review platforms. TripAdvisor offers extensive tourism-related information, including hotel reviews and reservations. We gathered data using a Python crawler, focusing on the United States due to its high number of COVID-19 cases and substantial hotel and review volume. As of July 30, 2020, the U.S. had over 4.5 million COVID-19 cases and 150,000 related deaths.

We specifically analyzed reviews from major tourist cities like New York, Chicago, San Francisco, and Las Vegas,

which also report high COVID-19 cases. The dataset comprises consumer reviews and hotel information from March to July 2020, compared with the same period in 2019. Overall, we collected 108,147 reviews from 808 hotels, including 102,221 reviews from 2019 and 5,926 from 2020.

Data were categorized into hotel-level and review-level information. Hotel-level data included attributes like free cancellation, COVID-19 precautions, total reviews, and room count. Review-level data encompassed contents of the review and response, timing of both, and were processed into numeric variables for analysis.

### 3.2. Analysis

#### 3.2.1. Topic modeling

Prior to regression analysis, exploratory analysis using online review content was conducted to understand the hospitality environment and conditions surrounding tourist destinations (Schuckert et al., 2015). Topic modeling, specifically through Latent Dirichlet Allocation (LDA), was utilized to infer and interpret the thematic structure of the reviews. LDA, a probabilistic model, maximizes the joint probability distribution of word distributions within topics and topic distributions across documents (Blei et al., 2003). This approach involves assigning each word in a document to a topic, aiming to maximize the model's posterior distribution with hyperparameters  $\alpha$  and  $\beta$  guiding Bayesian inference.

The analysis required careful text preprocessing to filter out non-informative elements such as punctuation and prepositions and enhance interpretability. This was achieved by generating bigrams and trigrams and setting word frequency limits to ensure relevance and coherence in the analysis.

For practical analysis, reviews from hotels in New York and Las Vegas during the COVID-19 period and the corresponding period in 2019 were compared. New York reviews numbered 1,584 and 28,312 for each period, respectively, while Las Vegas had 2,866 and 47,508 reviews, respectively. Each dataset underwent preprocessing to optimize topic number selection based on interpretability, coherence, and perplexity scores, enabling a structured comparison of consumer sentiment and topics pre- and post-COVID-19 outbreak.

#### 3.2.2. Regression analysis

To examine the hypotheses, we conducted a regression analysis using the COVID-19 dummy variable as a moderator. Figure 1 explains the conceptual framework of the analysis. The dependent variable was customer satisfaction, which was measured based on star ratings (Gu & Ye, 2014; Engler et al., 2015; Radojevic et al., 2015; Nunkoo et al., 2019). To check the differences in customer

satisfaction, we divided the data set into two parts: during COVID-19 and before COVID-19. Using a dummy variable indicating the presence of COVID-19, we checked the impact of COVID-19 on customer satisfaction.

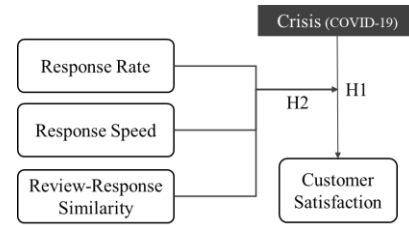


Figure 1: Conceptual Framework

We examined three major independent variables related to management response: response speed, response rate, and review-response similarity. Response speed measures the days taken by a manager to respond to a review, quantified as the average time difference between review and response over the five most recent interactions (1). Response rate is defined as the proportion of reviews that receive a response, reflecting the manager's engagement level (2). Review-response similarity quantifies the semantic closeness between the content of a review and its corresponding response, calculated using Word Mover's Distance (WMD) in the GloVe space to measure the semantic similarity of embedded words (Kusner et al., 2015) (3).

$$(\text{ResponseSpeed})_t = \sum_{k=t-1}^{t-5} (\text{ResponseTime}_k - \text{ReviewTime}_k) / 5 \quad (1)$$

$$(\text{ResponseRate})_t = \sum_{k=t-1}^{t-5} (\text{ReviewsWithResponse}_k) / 5 \quad (2)$$

$$(\text{RevResSimilarity})_t = \sum_{k=t-1}^{t-5} (\text{WMD}(\text{Review}_k, \text{Response}_k)) / 5 \quad (3)$$

Additional hotel-level features such as the number of rooms, total reviews, COVID-19 safety measures, free cancellation policies, and reservation promotions were included as control variables to account for hotel-fixed effects. Period-specific variables such as review length, response length, reviewer contribution, and helpfulness votes were also considered. Descriptive statistics are provided in Table 1.

Table 1: Descriptive Statistics

VARIABLE	Description	N	Mean	SD
Response Speed	The average response time gap of hotel h in period t	1,117	21.37	20.36
Review-Response Similarity	The average distance of reviews and responses of hotel h in period t	1,117	1.14	0.05
Response Rate	The ratio of reviews responded by the hotel h in period t	1,489	0.58	0.43
COVID-19 Safety Measures	Dummy variable indicating whether the hotel is taking COVID-19 safety measures	1,489	0.46	0.50
Review Length	The average length of a review of hotel h in period t	1,489	46.09	108.63
Contribution	The average contribution of the reviews of hotel h in period t	1,489	95.85	264.60

Helpfulness Vote	Average vote of the helpfulness of hotel h in period t	1,489	25.46	115.00
Free Cancellation	Average cancellation of a free of hotel h in period t	1,489	0.61	0.49
Reservation Promotion	Average promotion of a reservation of hotel h in period t	1,489	0.22	0.42
Number of Reviews	Number of reviews of hotel h in period t	1,489	3109.94	4498.69
Number of Rooms	Number of rooms of hotel h	1,479	385.60	629.14

COVID-19 not only affected consumers but also hotels. As discussed in the previous section, we introduced COVID-19 as a moderator of management response. Under the impact of COVID-19, hotels need to adapt to the new environment and create tactics to overcome such difficulties (Alonso et al., 2020; Hao et al., 2020). The usage of the COVID-19 moderator can verify changes made by hotels in online review management. The resulting model is as follows:

$$CS_h = \beta_1 RR_h + \beta_2 RS_h + \beta_3 RRS_h + COVID \times (\beta_4 RR_h + \beta_5 RS_h + \beta_6 RRS_h) + \sum_j \gamma_j C_{j,h} + \epsilon_h \tag{4}$$

City-wise effects were controlled for, and response-related variables were all mean-centered to avoid multicollinearity issues. Other variables were also checked for multicollinearity and came out with no issues.

## 4. Results

### 4.1. Topic Modeling

We employed Latent Dirichlet Allocation (LDA) to analyze consumer reviews from hotels in New York and Las Vegas, comparing the periods during COVID-19 and the same timeframe in 2019. This analysis helped identify how topics discussed by consumers shifted due to the pandemic. The topic modeling revealed that the variety of topics discussed during 2020 decreased compared to 2019, suggesting a narrowing of consumer experiences and concerns, likely influenced by pandemic-related restrictions.

Notably from Figure 2, topics specific to regions, such as casino and pool area discussions in Las Vegas, remained prevalent, although with different nuances in 2020 reflecting the impact of COVID-19. For instance, the discussion shifted towards terms like "disappoint," "COVID," and "close" in 2020, indicating a negative shift in consumer sentiment related to these amenities.



**Figure 2:** Topic Dimensions and The Number of Documents for New York and Las Vegas in 2019 and 2020

The results from the topic modeling serve to underline the significant changes in consumer discourse and priorities, illustrating a direct response to the operational and experiential changes imposed by the pandemic. This analysis provides a data-driven basis for understanding the shifts in consumer perception and experience, essential for managing customer satisfaction and expectations during such crises.

### 4.2. Regression Analysis with Moderator

The estimation results of the COVID-19 model are presented in Table 2. Column 1 is a model without any explanatory variables, and column 2 is a model with the COVID-19 indicator variable. The result accepts hypothesis 1 by showing a negative sign for the COVID-19 variable ( $\beta = -0.092, p < 0.05$ ). This indicates that customer satisfaction diminished due to COVID-19. Column 3 presents the analysis regarding hypotheses H2a, H2b, and H2c. Hypothesis 2a is rejected, referring to no moderating effect of the speed of management response. Hypothesis 2b is accepted, confirming the positive moderating effect of the response rate ( $\beta = 0.291, p < 0.05$ ). Hypothesis 2c is also accepted that similarity moderates the impact of COVID-19 ( $\beta = -2.117, p < 0.01$ ).

**Table 2:** Result of Regression Analysis with Moderator

VARIABLES	(1)	(2)	(3)
COVID-19 (Year)		-0.092*	-0.147**
		(0.017)	(0.004)
Response Speed	0.002†	0.003*	0.003**
	(0.056)	(0.027)	(0.001)
Response Speed × COVID-19 (Year)			-0.003
			(0.309)
Response Rate	0.404**	0.409**	0.346***
	(0.008)	(0.007)	(0.000)
Response Rate × COVID-19 (Year)			0.291*
			(0.033)
Review-Response Similarity	2.197***	2.225***	4.053***
	(0.000)	(0.000)	(0.000)
Review-Response Similarity × COVID-19 (Year)			-2.117**
			(0.003)
Review Length	-0.002***	-0.002***	-0.002***
	(0.000)	(0.000)	(0.000)
Response Length	-0.001**	-0.001**	-0.001***
	(0.004)	(0.004)	(0.000)
Contribution	0.000**	0.000**	0.000
	(0.005)	(0.003)	(0.183)
Helpfulness Vote	0.000***	0.000***	0.000†
	(0.000)	(0.000)	-0.098
COVID-19 Safety Measures	0.091**	0.093**	0.093**
	(0.042)	(0.038)	(0.019)
City (Las Vegas)	-0.174**	-0.169**	-0.155**
	(0.023)	(0.027)	(0.023)
City (New York)	0.007	0.006	-0.001
	(0.897)	(0.916)	(0.982)
City (San Francisco)	-0.053	-0.058	-0.068
	(0.425)	(0.386)	(0.305)
Free Cancellation	0.012	0.011	0.013
	(0.817)	(0.833)	(0.767)
Reservation Promotion	0.064	0.064	0.059
	(0.243)	(0.245)	(0.243)
Number of Reviews	0.000	0.000	0.000
	(0.436)	(0.410)	(0.329)
Number of Rooms	-0.000*	-0.000*	-0.000*
	(0.020)	(0.020)	(0.011)
Constant	4.151***	4.186***	4.211***
	(0.000)	(0.000)	(0.000)
Observations	1,117	1,117	1,117
R-squared	0.189	0.193	0.202

Robust pval in parentheses

\*\*\* p&lt;0.001, \*\* p&lt;0.01, \* p&lt;0.05, † p&lt;0.1

The results indicate that response speed, response rate, and review–response similarity positively correlate with customer satisfaction, supporting existing literature on the influence of management responses (Gu & Ye, 2014; Sparks et al., 2016; Wang & Chaudhry, 2018). The independent variables and moderating terms consistently show a positive impact on customer satisfaction across all three variables. While the regression analysis reveals no change in the relationship between response speed and customer satisfaction due to COVID-19, it shows that response rate

and review-response similarity significantly mitigate the pandemic's negative impact on customer satisfaction. This suggests consumers are increasingly valuing thorough responses over quick ones during the pandemic, likely because they seek more information in uncertain times (Adam, 2015).

## 5. Conclusions

This study recounted the association between customer satisfaction and management response while addressing changes during the COVID-19 period using topic modeling and regression analysis. The results from the LDA model implied that consumer experience is affected by COVID-19. Specifically, the topic composition for the documents and the word distribution for the topics have changed during the COVID-19 period. The regression analysis provides evidence that customer satisfaction is negatively affected by the presence of COVID-19. While the relation between customer satisfaction and response features is inline with previous studies, response rate, and review-response similarity showed a moderation effect that mitigates the negative impact of COVID-19 on customer satisfaction. (Wei et al., 2013; Gu & Ye, 2014; Xie et al., 2014; Sparks et al., 2016; Li et al., 2017; Wang & Chaudhry, 2018; Chen et al., 2019; Zhang et al., 2019).

Based on the findings from this paper, various implications can be highlighted. In terms of the literature on online reviews and consumer behavior, this study identified the relationship between management response and customer satisfaction in a new context. In other words, despite the fact that there is an external factor that causes extensive damage to the industry, online consumer behavior agrees with literature asserting the importance of management response (Wei et al., 2013; Gu & Ye, 2014; Sparks et al., 2016; Wang & Chaudhry, 2018; Chen et al., 2019; Zhang et al., 2019). Nonetheless, this study develops the existing literature by confirming the effect of the influence of COVID-19 on the association between management response and customer satisfaction.

In addition, from the perspective of the crisis management literature, the contribution lies in the consideration of the unprecedented crisis due to COVID-19 in identifying online consumer behavior and management response. Previous studies related to crises in the hospitality and tourism industry have paid attention to the overall countermeasures by countries and businesses and the economic impact on the industry, whereas this paper focuses on consumers and hotel businesses by studying online communication. Moreover, as the impact of COVID-19 continues, this research on COVID-19 provides insight into upcoming studies on the behavior of consumers and hotel

managers given that it conducted an empirical analysis through data collection under a time-sensitive theme.

This study presents a strategic suggestion for the management response on online platforms for hotel business managers. Digital transformation has boosted consumers' information power, and word of mouth is spreading online, not through person-to-person communication. The fact that online review platforms are the most popular platform for consumers to obtain blunt information about their tourism destination or hospitality business—and that shared consumer experience bears an external effect on other consumers—makes managers feel the need to manage their online reviews. In particular, the direction of the management response strategy for online reviews under the context of COVID-19 is presented by analyzing various properties of management response. In addition, although the incident caused by COVID-19 is adversely affecting customer satisfaction, it suggests that there is room for recovery through strategic changes.

This study highlights the imperative for hotel managers to adapt their online review management strategies in light of digital transformation and the prolonged challenges posed by COVID-19, which continues to threaten industries reliant on physical mobility (WHO, 2020b; Richter, 2003). The integration of advanced technologies such as metaverse and digital twin, as discussed by Chung, et al. (2022), offers new opportunities for enhancing customer engagement through virtual and augmented realities, redefining consumer experiences in hospitality. As the pandemic's impact is expected to be long-lasting (McKinsey & Company, 2020), future research should explore its long-term effects on the industry and consider factors such as cultural differences, regional health statistics, and local policies (Zenker & Kock, 2020), to develop refined management strategies that leverage these technological advancements

## References

- Adam, I. (2015). Backpackers' risk perceptions and risk reduction strategies in Ghana. *Tourism Management, 49*, 99-108.
- Alan, C. B., So, S., & Sin, L. (2006). Crisis management and recovery: how restaurants in Hong Kong responded to SARS. *International Journal of Hospitality Management, 25*(1), 3-11.
- Alonso, A. D., Kok, S. K., Bressan, A., O'Shea, M., Sakellarios, N., Koresis, A., Solis, M. A. B. & Santoni, L. J. (2020). COVID-19, aftermath, impacts, and hospitality firms: An international perspective. *International journal of hospitality management, 102*654.
- Baum, T., & Hai, N. T. T. (2020). Hospitality, tourism, human rights and the impact of COVID-19. *International Journal of Contemporary Hospitality Management, 32*(7), 2397-2407.
- Bhati, A. S., Mohammadi, Z., Agarwal, M., Kamble, Z., & Donough-Tan, G. (2020). Motivating or manipulating: the influence of health-protective behaviour and media engagement on post-COVID-19 travel. *Current Issues in Tourism, 1*-5.
- Blei, D. M., Ng, A. Y., & Jordan, M. I. (2003). Latent dirichlet allocation. *Journal of machine Learning research, 3*(Jan), 993-1022.
- Chen, M. H., Jang, S. S., & Kim, W. G. (2007). The impact of the SARS outbreak on Taiwanese hotel stock performance: an event-study approach. *International Journal of Hospitality Management, 26*(1), 200-212.
- Chen, W., Gu, B., Ye, Q., & Zhu, K. X. (2019). Measuring and managing the externality of managerial responses to online customer reviews. *Information Systems Research, 30*(1), 81-96.
- Donnelly, C. A., Malik, M. R., Elkholy, A., Cauchemez, S., & Van Kerkhove, M. D. (2019). Worldwide reduction in MERS cases and deaths since 2016. *Emerging infectious diseases, 25*(9), 1758.
- Donohoe, H., Pennington-Gray, L., & Omodior, O. (2015). Lyme disease: Current issues, implications, and recommendations for tourism management. *Tourism Management, 46*, 408-418.
- Dube, K., Nhamo, G., & Chikodzi, D. (2020). COVID-19 cripples global restaurant and hospitality industry. *Current Issues in Tourism, 1*-4.
- Elston, D. M. (2005). New and emerging infectious diseases. *Journal of the American Academy of Dermatology, 52*(6), 1062-1068.
- Engler, T. H., Winter, P., & Schulz, M. (2015). Understanding online product ratings: A customer satisfaction model. *Journal of Retailing and Consumer Services, 27*, 113-120.
- Farzanegan, M. R., Gholipour, H. F., Feizi, M., Nunkoo, R., & Andargoli, A. E. (2021). International Tourism and Outbreak of Coronavirus (COVID-19): A Cross-Country Analysis. *Journal of Travel Research, 60*(3), 687-692.
- Foroudi, P., Tabaghdehi, S. A. H., & Marvi, R. (2020). The gloom of the COVID-19 shock in the hospitality industry: A study of consumer risk perception and adaptive belief in the dark cloud of a pandemic. *International Journal of Hospitality Management, 92*, 102717.
- Goh, C. (2012). Exploring impact of climate on tourism demand. *Annals of tourism research, 39*(4), 1859-1883.
- Gössling, S., Scott, D., & Hall, C. M. (2020). Pandemics, tourism and global change: a rapid assessment of COVID-19. *Journal of Sustainable Tourism, 1*-20.
- Gu, B., & Ye, Q. (2014). First step in social media: Measuring the influence of online management responses on customer satisfaction. *Production and Operations Management, 23*(4), 570-582.
- Gursoy, D. & Chi, C.G. (2020). Effects of COVID-19 pandemic on hospitality industry: Review of the current situation and a research agenda. *Journal of Hospitality Marketing & Management, 29*(5), 527-529.
- Hall, C. M. (2010). Crisis events in tourism: subjects of crisis in tourism. *Current issues in Tourism, 13*(5), 401-417.
- Hao, F., Xiao, Q., & Chon, K. (2020). COVID-19 and China's Hotel Industry: Impacts, a Disaster Management Framework, and Post-Pandemic Agenda. *International Journal of Hospitality Management, 90*, 102636.
- He, H., & Harris, L. (2020). The Impact of Covid-19 Pandemic on Corporate Social Responsibility and Marketing Philosophy. *Journal of Business Research, 116*, 176-182.

- Israeli, A. A., & Reichel, A. (2003). Hospitality crisis management practices: the Israeli case. *International Journal of Hospitality Management*, 22(4), 353-372.
- Kusner, M. J., Sun, Y., Kolkin, N. I., & Weinberger, K. Q. (2015). *From Word Embeddings To Document Distances*. In Proc. ICML'15, pp. 957-966.
- Lee, C. C., & Chen, C. J. (2011). The reaction of elderly Asian tourists to avian influenza and SARS. *Tourism Management*, 32(6), 1421-1422.
- Lee, C. K., Song, H. J., Bendle, L. J., Kim, M. J., & Han, H. (2012). The impact of non-pharmaceutical interventions for 2009 H1N1 influenza on travel intentions: A model of goal-directed behavior. *Tourism Management*, 33(1), 89-99.
- Li, C., Cui, G., & Peng, L. (2017). The signaling effect of management response in engaging customers: A study of the hotel industry. *Tourism Management*, 62, 42-53.
- Mariolis, T., Rodousakis, N., & Soklis, G. (2020). The COVID-19 multiplier effects of tourism on the Greek economy. *Tourism Economics*, 1-8.
- McKinsey and Company. (2020). "Hospitality and COVID-19: How long until 'no vacancy' for US hotels?", Available at: <https://www.mckinsey.com/industries/travel-logistics-and-transport-infrastructure/our-insights/hospitality-and-covid-19-how-long-until-no-vacancy-for-us-hotels> (accessed 27 Sep 2020)
- Min, H., Lim, Y., & Magnini, V. P. (2015). Factors affecting customer satisfaction in responses to negative online hotel reviews: The impact of empathy, paraphrasing, and speed. *Cornell Hospitality Quarterly*, 56(2), 223-231.
- Mizrachi, I., & Fuchs, G. (2016). Should we cancel? An examination of risk handling in travel social media before visiting ebola-free destinations. *Journal of Hospitality and Tourism Management*, 28, 59-65.
- Monterrubio, J. C. (2010). Short-term economic impacts of influenza A (H1N1) and government reaction on the Mexican tourism industry: an analysis of the media. *International Journal of Tourism Policy*, 3(1), 1-15.
- Nicola, M., Alsafi, Z., Sohrabi, C., Kerwan, A., Al-Jabir, A., Iosifidis, C., Agha, M., & Agha, R. (2020). The socio-economic implications of the coronavirus pandemic (COVID-19): A review. *International journal of surgery*, 78, 185-193.
- Nunkoo, R., Teeroovengadum, V., Ringle, C. M., & Sunnassee, V. (2019). Service quality and customer satisfaction: The moderating effects of hotel star rating. *International Journal of Hospitality Management*, 102414.
- Oliver, R. L. (1981). Measurement and evaluation of satisfaction processes in retail settings. *Journal of retailing*, 57(3), 25-48
- Page, S., Yeoman, I., Munro, C., Connell, J., & Walker, L. (2006). A case study of best practice—Visit Scotland's prepared response to an influenza pandemic. *Tourism Management*, 27(3), 361-393.
- Paraskevas, A., Altinay, L., McLean, J., & Cooper, C. (2013). Crisis knowledge in tourism: Types, flows and governance. *Annals of Tourism Research*, 41, 130-152.
- Park, J. Y., & Jang, S. S. (2014). Sunk costs and travel cancellation: Focusing on temporal cost. *Tourism Management*, 40, 425-435.
- Racherla, P., & Hu, C. (2009). A framework for knowledge-based crisis management in the hospitality and tourism industry. *Cornell Hospitality Quarterly*, 50(4), 561-577.
- Radojevic, T., Stanic, N., & Stanic, N. (2015). Ensuring positive feedback: Factors that influence customer satisfaction in the contemporary hospitality industry. *Tourism Management*, 51, 13-21.
- Ramanathan, U., & Ramanathan, R. (2011). Guests' perceptions on factors influencing customer loyalty. *International Journal of Contemporary Hospitality Management*, 23(1), 7-25.
- Richter, L. K. (2003). International tourism and its global public health consequences. *Journal of Travel Research*, 41(4), 340-347.
- Rivera, M. (2020). Hitting the reset button for hospitality research in times of crisis: Covid19 and beyond. *International Journal of Hospitality Management*, 87, 102528
- Rosselló, J., Santana-Gallego, M., & Awan, W. (2017). Infectious disease risk and international tourism demand. *Health Policy and Planning*, 32(4), 538-548.
- Schamari, J., & Schaefer, T. (2015). Leaving the home turf: How brands can use webcare on consumer-generated platforms to increase positive consumer engagement. *Journal of Interactive Marketing*, 30, 20-33.
- Schuckert, M., Liu, X., & Law, R. (2015). Hospitality and tourism online reviews: Recent trends and future directions. *Journal of Travel & Tourism Marketing*, 32(5), 608-621.
- Senge, P. M. (1990). (1990b). The leader's new work: Building learning organizations. *Sloan Management Review*, 32(1), 7-23.
- Sheng, J. (2019). Being active in online communications: firm responsiveness and customer engagement behaviour. *Journal of Interactive Marketing*, 46, 40-51.
- Shin, H., & Kang, J. (2020). Reducing perceived health risk to attract hotel customers in the COVID-19 pandemic era: Focused on technology innovation for social distancing and cleanliness. *International Journal of Hospitality Management*, 91, 102664.
- Sönmez, S., Apostolopoulos, Y., Lemke, M. K., & Hsieh, Y. C. J. (2020). Understanding the effects of COVID-19 on the health and safety of immigrant hospitality workers in the United States. *Tourism Management Perspectives*, 35, 100717.
- Sparks, B. A., So, K. K. F., & Bradley, G. L. (2016). Responding to negative online reviews: The effects of hotel responses on customer inferences of trust and concern. *Tourism Management*, 53, 74-85.
- Stern, A. M., & Markel, H. (2009). What Mexico taught the world about pandemic influenza preparedness and community mitigation strategies. *Jama*, 302(11), 1221-1222.
- Tavitiyaman, P., & Qu, H. (2013). Destination image and behavior intention of travelers to Thailand: The moderating effect of perceived risk. *Journal of Travel & Tourism Marketing*, 30(3), 169-185.
- Volo, S. (2013). Communicating tourism crises through destination websites. In *Safety and Security in Tourism* (pp. 83-93). Routledge.
- Wang, Y., & Chaudhry, A. (2018). When and how managers' responses to online reviews affect subsequent reviews. *Journal of Marketing Research*, 55(2), 163-177.
- Wei, W., Miao, L., & Huang, Z. J. (2013). Customer engagement behaviors and hotel responses. *International Journal of Hospitality Management*, 33, 316-330.



- World Health Organization. (2020a). Coronavirus disease (COVID-19): situation report, 182.
- World Health Organization. (2020b). 'WHO Director-General's opening remarks at the media briefing on COVID-19', available at: <https://www.who.int/director-general/speeches/detail/who-director-general-s-opening-remarks-at-the-media-briefing-on-covid-19---20-november-2020> (accessed 25 November 25 2020)
- World Tourism Organization. (1998). Handbook on natural disaster reduction in tourism areas.
- World Tourism Organization (2020), 'UNWTO Launches Global Guidelines to Restart Tourism', available at: <https://www.unwto.org/news/unwto-launches-global-guidelines-to-restart-tourism> (accessed 14 October 2020)
- 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.
- Chung, Myung-Ae, Kim, Kyung-A, Kang, Min-Soo. (2022). The status of metaverse and digital twin technology development. *Korean Journal of Artificial Intelligence*, 10(2), 19-24.
- Yu, M., Li, Z., Yu, Z., He, J., & Zhou, J. (2020). Communication related health crisis on social media: a case of COVID-19 outbreak. *Current Issues in Tourism*, 1-7.
- Zenker, S., & Kock, F. (2020). The coronavirus pandemic—A critical discussion of a tourism research agenda. *Tourism Management*, 81, 104164.
- Zhang, Z., Li, H., Meng, F., & Li, Y. (2019). The effect of management response similarity on online hotel booking. *International Journal of Contemporary Hospitality Management*, 31(7), 2739-2758