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Perceived hygiene attributes in the hotel industry: customer retention amid the COVID-19 crisis

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ABSTRACT

The COVID-19 pandemic has caused a crisis in the hotel industry worldwide, but few studies have suggested methods to retain customers. This study proposes hygiene management as a means to minimize the indirect damage from COVID-19 to the hotel industry. It identifies perceived hygiene attributes and explores their influence on hotel image, word of mouth, and revisit intentions. This study identifies and validates three types of perceived hygiene attributes through qualitative and quantitative methods. It uses structural equation modeling to validate hypotheses and concludes that there are significant relationships of influence between the proposed variables. This study provides important and meaningful insights into hotel image and customer behavior through perceived hygiene attributes.

1. Introduction

In today's globalized world, the rate and range of the spread of infectious diseases are rapidly accelerating due to developments in transportation, growing population, increasing number of travelers, and shared sphere of life of the entire world. Coronavirus disease (COVID-19), a new infectious disease, has spread rapidly from its first discovery in Wuhan, China in December 2019 to the designation of COVID-19 as a pandemic by the World Health Organization (WHO). The unexpected outbreak and rapid spread of COVID-19 has shocked the world, and has had a major impact on the health and economic well-being of individuals, as well as corporate performance. The impact of COVID-19 on the global economy and society is rapidly intensifying. The damage from COVID-19 is acute in the hotel industry. For example, French multinational hospitality group Accor reported that more than half of its hotel brand locations had ceased to operate worldwide, and that this number was expected to grow (Hotel Management, 2020). In addition, the American Hotel and Lodging Association (AHLA) reported that hotels in the United States had lost more than \$15 billion in room revenues since the beginning of the COVID-19 crisis, and expected occupancy rates of 20% or less in the coming months, with even further deterioration possible in the future (AHLA, 2020). Therefore, there is a need to investigate how the hotel and tourism industry must prepare for serious disaster situations such as the COVID-19 pandemic (Faulkner, 2001).

COVID-19 has restricted the activities of many people owing to limited movement in and between many countries, with no vaccines yet developed and no proven treatment methods. SARS-CoV-2, the virus that causes COVID-19 disease, is highly contagious and can be transmitted from person to person through direct and indirect contact. Specific transmission paths include coughing and sneezing, through the air in confined spaces, and through virus-containing surfaces of objects (CDC, 2020a). These characteristics of the coronavirus may lead to a strong desire to avoid direct contact with others (e.g., shaking hands) and indirect contact (e.g., using items that have been touched or used by others). Furthermore, the fear of contagion is likely to lead to distrust of facilities and spaces shared by different people, which is likely to lead to reluctance to use them. In particular, people may shun the use of shared facilities, such as hotels. Hotel customers come into contact with various people (e.g., hotel staff and other guests) and use a variety of spaces (e.g., rooms, restaurants, lobbies, washrooms, and elevators). Such contact and use may expose individuals to infectious diseases, such as the coronavirus. Therefore, hotels require thorough preparation to remove or minimize the risk of infection from viruses, such as the coronavirus.

A variety of methods to protect individuals and those they come into contact with have been proposed (WHO, 2020a). Hygiene is a common factor among the variety of methods proposed by different institutions to deal with the current COVID-19 crisis. In fact, it is being emphasized as the key precaution to reduce the risk of spreading the coronavirus, and is

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intrinsically related to clean living. The importance of hygiene has been emphasized for a long time, and the importance of hotel hygiene has been mentioned in many existing studies (Sifuentes et al., 2014; Vos et al., 2019). Many studies have shown the highly positive effects of good hygiene practices. Particularly, in cases of highly contagious diseases such as COVID-19, it has been revealed that personal hygiene (e.g., wearing masks, using hand sanitizer) reduces the spread of the virus (Leung et al., 2020). Specifically, a study by Chiu et al. (2020) examined the number of COVID-19 infections over fourteen weeks after the outbreak, finding that the number of COVID-19 patients decreased after the sixth week, when the importance of hygiene management such as wearing masks and hand hygiene promotion was emphasized. Thus, the effect of thorough personal hygiene management has been proven. However, the existing literature has largely focused on the hygiene of hotel staff and food preparation facilities; no studies have explored the attributes of hygiene related to new infectious diseases, such as COVID-19. Furthermore, it is important to identify the concept of hygiene and emphasize its necessity in special situations, such as the COVID-19 crisis. Through this, a competitive and advantageous stance to respond to negative events such as COVID-19 can be maintained, and it could be very useful for making important decisions (Faulkner, 2001). Given the current situation of the COVID-19 crisis, there is a strong need to identify the attributes of hygiene in hotels, which are used by many people. As such, this study utilizes qualitative and quantitative methods to explore the attributes of hotel hygiene as perceived by customers, and examines the relationship between the proposed attributes through qualitative methods. In addition, we examine the influential relationships between the perceived hygiene attributes, cognitive and affective image, word of mouth, and revisit intention. This study aims to develop a new theoretical framework for hotel hygiene. The results provide meaningful implications for the hotel industry, which is currently facing a novel and difficult situation as a result of the COVID-19 crisis.

2. Literature review

2.1. The COVID-19 crisis

Many disasters have occurred in recent decades, resulting in broader disaster areas and significant economic losses. As we live in an increasingly complex world, we are becoming vulnerable to numerous and diverse disasters (Faulkner, 2001). The continuous rise in disasters poses a threat to humans, the most recent of which is the emergence of a new type of virus called COVID-19 that has not yet been identified among mankind. COVID-19, caused by a new type of coronavirus (SARS-CoV-2), has spread throughout the world since its first appearance in Wuhan, China in December 2019 (WHO, 2020b). The WHO declared the outbreak of this new infectious disease a public health emergency of international concern on January 30, 2020, and on February 11, the WHO announced the name of the new coronavirus disease as COVID-19 (WHO, 2020c). COVID-19 continues to spread worldwide. As of April 29, a total of 3,024,059 individuals had been infected in 213 regions, with 208,112 deaths (WHO, 2020b). With the global spread of infections, the WHO proclaimed COVID-19 to be a pandemic, marking only the third time in its history that it declared a pandemic following the Hong Kong flu pandemic in 1968 and the swine flu pandemic in 2009 (CDC, 2020a).

COVID-19 is known to have a serious impact on public health (CDC, 2020a). There is little existing immunity to the new virus among humans. The symptoms of COVID-19 include fever, cough, dyspnea, and pneumonia after an incubation period of about 2–14 days, and asymptomatic cases are widely reported (CDC, 2020b). The interpersonal transmission paths of COVID-19 include direct infections from coughing and sneezing, as well as indirect infections through contact with nasal, oral, or ocular mucosa (Peng et al., 2020). No vaccines for the coronavirus or proven treatment methods for COVID-19 have been developed. Therefore, at present, the best method to prevent infection is to protect

oneself from contracting the virus. Specific ways of doing so include: 1) washing hands frequently with alcohol-based hand sanitizers or soap; 2) maintaining a distance of 1 m or more from others; 3) wearing a mask; 4) not going to crowded places; and 5) strictly adhering to respiratory hygiene, such as covering the mouth and nose with bent elbow or tissues when coughing or sneezing (WHO, 2020a). Thus, hygiene methods are the best way to prevent infection.

2.2. Hotel hygiene

Hygiene refers to protecting one's own safety from harm to life or well-being. It can also be regarded as preparation for and securing conditions to benefit health. Enhancing hygiene can significantly reduce the risk of infection from diseases that may endanger life. Inadequate hygiene management can lead to diseases, and on a large scale, present a global burden of disease (Delea et al., 2020). In particular, poor hygiene can cause respiratory diseases, such as pneumonia and influenza (Utsi et al., 2016). In addition, poor hygiene management can cause infectious diseases, such as gastrointestinal infections, trachoma, and worm infections (Brian et al., 2014). In other words, hygiene conditions can have positive effects, which prevent a variety of diseases, or negative effects, which cause such diseases. Therefore, many studies emphasize the necessity and importance of hygiene to maximize its positive effects and minimize the negative consequences (Brian, et al., 2014; Delea et al., 2020; Sifuentes et al., 2014).

Hygiene is especially important in the service environment where the customer's first impression of a firm has significant ramifications (Vilnai-Yavetz & Gilboa, 2010; Vos et al., 2019). In particular, hotel customers have brief experiences of a hotel's products and services and develop immediate reactions to these products and services. Therefore, it can be argued that the hygiene of hotel products and services is a key factor in determining hotel-centric customer behavior, such as customer satisfaction, perceived service quality, and revisit intention (Barber & Scarcelli, 2010; Moon et al., 2017; Pizam & Tasci, 2019). While using a hotel, customers can recognize its hygiene based on various factors. Specifically, customers are able to understand the overall hygiene of the hotel through the spaces used by customers (i.e., lobby, washrooms, rooms, and restaurants), personal hygiene of staff (e.g., uniform, hands, and head), and spaces used by staff (e.g., computers, desks, and chairs). As these hygiene conditions have a significant impact on customer behavior and decision-making, hygiene management is very important in service environments utilized by various customers, such as hotels. In particular, it is important to emphasize the overall hygiene of hotels and employee hygiene in public health crises, such as the present COVID-19 crisis. Identifying such characteristics of hygiene and emphasizing them clearly can provide an advantage when preparing future strategies for industries like the hotel and tourism industry which are impacted by disasters like COVID-19 (Faulkner, 2001).

2.3. Cognitive and affective image

Image has been known to be an important concept in consumer behavior research since the 1950s, and it remains important today in the field of marketing, where it draws much attention (Dirsehan & Kurtulus, 2018). When forming an overall concept of image, the focus is on previous knowledge, information, and enjoyment of products and services (Han & Hwang, 2018). Therefore, many researchers agree that the image of products and services directly affects a firm's success and profits by retaining existing customers and creating new customers (Han & Hyun, 2012; Lee et al., 2010). The formation of images by customers about the products and services of a hotel is based on the perception or knowledge formed based on the customers' experience, which forms the overall value of the hotel, whether positive or negative (Han, 2013; Suh et al., 2015). Furthermore, images about the cognitive factors and affective factors of hotel products and services are influenced by the formation of overall images of the hotel (Lee et al., 2010). Therefore, hotels

need to present strategies to improve hotel performance by forming positive images of hotel products and services.

Image differs structurally but comprises factors that are hierarchically related (e.g., cognitive and affective) (Stylidis et al., 2017; Tasci & Gartner, 2007). These distinctions can be regarded as a conceptual and methodological tool for easily examining the complex concepts of images (Chew & Jahari, 2014; Stylos et al., 2017). Cognitive images represent the individual's beliefs, attitudes, and ideas about the overall knowledge, information, and feelings associated with products and services (Baloglu & McCleary, 1999; Han et al., 2011). This can be explained as a process of judgment of products and services, which is created by comparing the memories, feelings, and experiences perceived by customers with their previous information and knowledge (Gracia et al., 2011). Affective image refers to emotional reactions and feelings based on the emotional judgment of customers, and is formed by various attitudes and emotions (i.e., likes or dislikes, positive or negative atmospheres, and satisfaction or dissatisfaction) (Gracia et al., 2011; Kim et al., 2019). In other words, images relating to products and services are based on differences in feelings and emotions that manifest before and after utilizing the products and services. Therefore, it is necessary to understand the process by which emotional images are created to better understand the customer's evaluation of the firm. Cognitive and affective images interact with each other; as such, they provide more detailed information on products and services, which is useful for developing marketing strategies. Therefore, it is appropriate to integrate cognitive and affective images when researching the image of a specific firm (Stylidis et al., 2017; Yuksel et al., 2010).

2.4. Word of mouth and revisit intention

Word of mouth refers to a bilateral flow of information and non-commercial communication between the information provider and recipient regarding firms, products, services, and brands (Harrison-Walker, 2001). Consumers tend to rely heavily on word of mouth, as they find what other people (i.e., family, friends, and socially influential people) say to be more credible than commercial advertising (Henning-Thurau et al., 2002). Furthermore, word of mouth plays a key role in the purchase of products and services, as consumers are likely to be influenced by information from people whom they trust and to whom they believe they are close (Fong & Burton, 2006). In other words, word of mouth can be regarded as a consumer-driven communication method that has the potential for stronger influence than firm-driven communication methods, such as commercial advertising. Therefore, word of mouth can be an important factor that can drive the success or failure of products and services of a firm, or can threaten the survival of the firm.

Today, the influence of word of mouth is different from that of the past. Many practitioners and researchers have long recognized the important role and influence of word of mouth in consumer behavior. In modern society, the development of social media and digital technology has led to an even more significant influence of word of mouth on consumers' purchasing decisions (Srinivasan et al., 2016). In particular, existing studies on word of mouth conducted in recent years show that the importance of word of mouth continues to be emphasized as the influence of digital word of mouth continues to grow (Babic et al., 2016; You et al., 2015). Furthermore, word of mouth is characterized by the need for interaction with competitors (Hewett et al., 2016). In other words, consumers use online communities to evaluate competing products and services, and compare them with the focal firm's products and services. These evaluations and comparisons can affect the firm's products and services, as well as those of its competitors. As such, it is necessary to further emphasize the importance of word of mouth, which involves an explanation of opinions that stem from consumer experience.

Retaining customers is directly related to a firm's performance and profits, and plays a key role in its survival and long-term success (Chua et al., 2017). The importance of customer retention requires further

emphasis in today's hyper-competitive environment. Retaining existing customers—or increasing revisits by customers—is more effective, because it saves the cost and time required to create new customers (Jones et al., 2000). Therefore, firms need to present a variety of methods to induce customer revisits, which could help them to maximize future successes and profits. The importance of revisits has long been emphasized, and much research has taken place to verify the effects of revisits (Han & Hyun, 2017; Kim et al., 2017). In particular, in the maturing hotel industry, there is a substantial body of research on customer revisits. However, there are very few studies that have researched factors that can induce revisits amid cases of national catastrophes, such as the COVID-19 pandemic. Therefore, this study proposes hygiene management as a method to induce customer revisits, a core element of hotel management, in the present COVID-19 crisis.

2.5. Relationships among study variables

The products and services provided by the hotels are used by many customers. Furthermore, hotel staff experience direct and indirect contact with many people, as they interact directly with customers at service contact points. These characteristics of hotels may expose individuals to viral infection, such as the coronavirus. As such, strict hygiene management is required for products and services offered by hotels. Many studies have shown that hygiene management perceived by customers plays an important role in explaining customers' decision-making process and purchasing behavior (Barber & Scarcelli, 2010; Moon et al., 2017; Vilnai-Yavetz & Gilboa, 2010). For example, Vilnai-Yavetz & Gilboa (2010) argued that a clean and tidy state of hygiene can provide customer enjoyment, and build trust and reputation. Barber & Scarcelli (2010) explained that cleanliness is an important clue for quality of the physical environment perceived by customers, and that it affects trust and revisit intention. Moon et al. (2017) found that among various physical environment variables, cleanliness had a positive influence on customer satisfaction; Barber et al. (2011) also found that hygiene was an important factor inducing customer satisfaction and loyalty intention. Summarizing the existing research on hygiene, this study finds the hygiene perceived by customers can change customers' evaluations of firms, and that it is a key factor in predicting customers' decision-making and purchasing behavior. Therefore, this study establishes the following hypotheses based on the existing research.

Hypothesis 1. Perceived hygiene attributes have a positive effect on cognition image.

Hypothesis 2. Perceived hygiene attributes have a positive effect on affective image.

Image has long been an important concept in consumer behavior in the hospitality industry (Su et al., 2017). According to empirical studies in the existing literature, image is a significant contributor to behavioral intention and repurchase behavior of customers (Chen et al., 2015; Durna et al., 2015). Chen et al. (2015) argued that image is formed through positive emotional experiences with customers, has a positive influence on evaluations of products and services, and plays an important role in increasing behavioral intentions in customers. Durna et al. (2015) explained that a positively formed image is a key predictor of future behavior and intentions of customers. Hallmann et al. (2015) classified images into cognitive image and affective image, and researched the relationships of influence associated with revisit intentions to tourist destinations. The results indicated that both cognitive and affective images have a positive effect on revisit intentions. Han et al. (2019) classified the images of Halal tourist destinations into affective and overall images, and found that both image types positively influence revisit intention and recommendation intention. Based on the results of multiple studies, we hypothesize that image is an important predictor of and a key factor in inducing customer behavior, as follows.

Hypothesis 3. Cognition image has a positive influence on word of

mouth.

Hypothesis 4. Cognition image has a positive effect on revisit intention.

Hypothesis 5. Affective image has a positive influence on word of mouth.

Hypothesis 6. Affective image has a positive effect on revisit intention.

2.6. Research model

The conceptual framework of this study includes a total of five theoretical structures consisting of the customer-perceived attributes of hotel hygiene, cognitive image, affective image, word of mouth, and revisit intention. The perceived hygiene attributes were divided into personal hygiene of staff, hygiene of workspaces, and hygiene of customer-use spaces. A total of six hypotheses presented in this study were included in the proposed theoretical framework. Fig. 1 shows the detailed research model.

3. Methods

3.1. Qualitative approach

In the current downturn of the global hotel industry due to the COVID-19 pandemic, this study emphasizes the importance of hotel hygiene as a method to overcome the crisis and aims to discover the specific attributes of hygiene through a qualitative method. Han et al. (2011) and Maxwell (2005) explained that reviewing existing literature and focus group interviews can be a good way to discover the properties and underlying factors of new attributes. Therefore, in this research the literature was examined to identify the perceived hygiene attributes in hotels. In addition, discussions were conducted with focus groups comprising customers who had experience using hotels during the COVID-19 outbreak, hotel employees, and university professors who specialized in the hotel and tourism field. Specifically, in-depth interviews were conducted with focus group members, and various opinions and ideas identified in the in-depth interviews were improved and developed through focus group discussions. For the in-depth interviews, potential participants were provided with explanations of the purpose of the study and the importance of hygiene. Through this exercise, this study conducted in-depth interviews with 11 voluntary participants (i.e., 5 hotel customers, 4 hotel staff members, and 2 college professors). It was designed so that the participants in the in-depth

interviews could determine the range of knowledge regarding the subject area of this research before selecting an appropriate target. Prior to the full discussion on the topic of this study, the participants were given data related to hygiene (i.e., articles, journals, and websites with information on COVID-19 and hygiene), and were requested to review the data meticulously. This process was conducted to improve the qualitative level of the in-depth interviews, and the in-depth interviews were conducted after the data were reviewed. Through the in-depth interviews, the personal thoughts and opinions of the expert group regarding the subject of this research, the characteristics of the provided material, and various ideas were gained. The thoughts, knowledge, and opinions of the expert groups on the subject that were obtained in this way were shared freely. Discussions were held to improve the opinions and ideas of the participants, resolving differences in opinion in the process. Through this process, this study arrived at a list of perceived hygiene attributes agreed on by all of the participants. The list of attributes contained a total of 21 attributes, of which 4 with duplicate or irrelevant meanings for this research were removed. As such, a total of 17 attributes were identified. Lastly, in accordance with the qualitative method suggested by Spigglie (1994), the perceived hygiene attributes identified in this study were classified into three categories (i.e., hygiene in customer-use spaces, personal hygiene of staff, and workspace hygiene). Through this process, this study developed a tool that fully reflects the 17 identified attributes (Fig. 2)

3.2. Measurement tools for other constructs

To measure variables other than the perceived hygiene attributes, this study utilized measurement tools that were confirmed for validity and reliability in existing research. Specifically, a total of six questions were derived to measure cognitive image and affective image—3 questions each—based on studies by Baloglu & McCleary (1999), Han (2013), and Han et al. (2011) (e.g., “This hotel provides good value for money” and “I am pleased with my decision to stay at this hotel”). To measure word of mouth, this study utilized three questions based on Ok et al. (2005) and Ryu & Han (2010) (e.g., “I will speak positively about this hotel”). Lastly, this study measured three questions (e.g., “I will continue to use this hotel in the future”) based on research by Henning-Thuray (2004) to measure revisit intention. All survey questions were measured using a 7-point Likert scale, ranging from 1 (strongly disagree) to 7 (strongly agree), and multi-items were used to evaluate the composition of this study. The first questionnaire developed in this study was subject to pretests with three groups, composed of hotel staff, graduate students of the hotel industry, and professors researching hotel and tourism industries. Through a pre-test, the context, grammar,

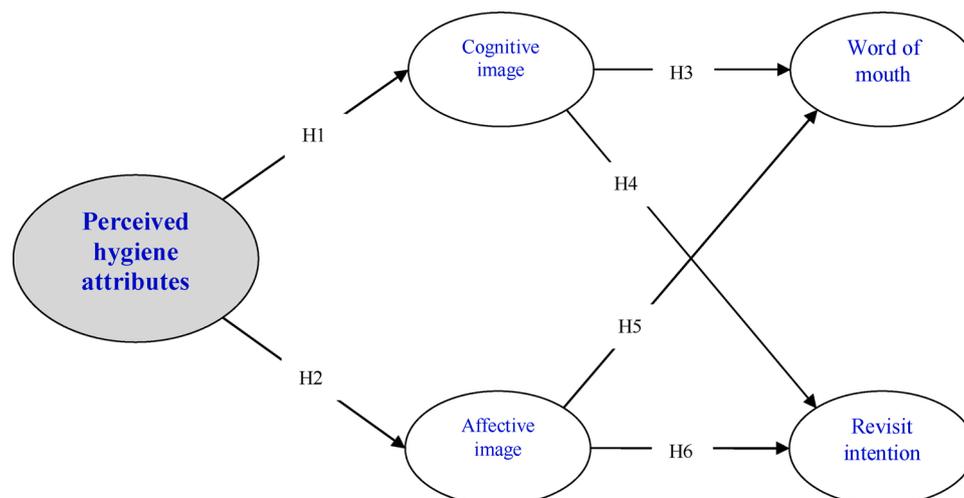


Fig. 1. The proposed conceptual model.

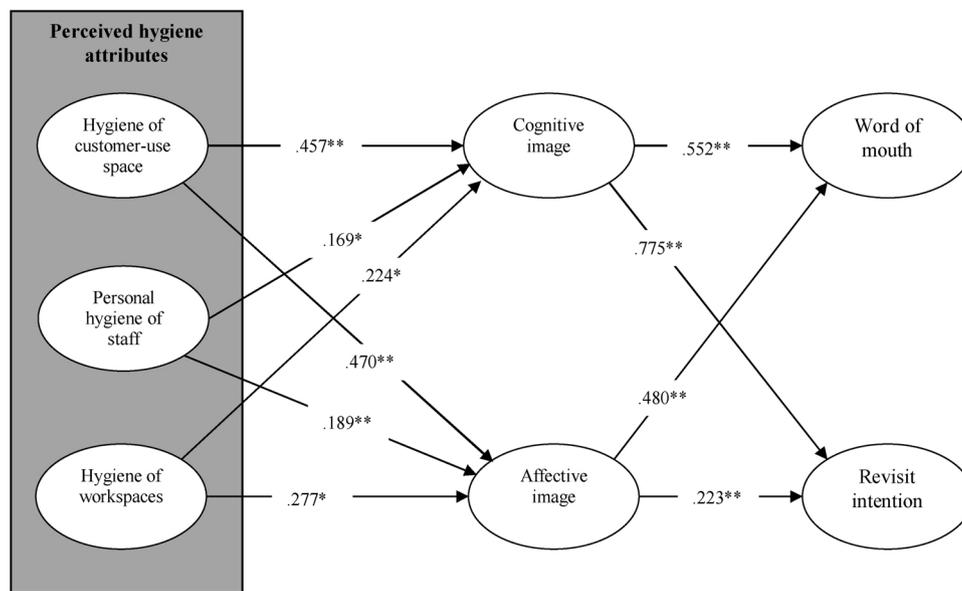


Fig. 2. The structural model estimation.

vocabulary, etc. of the measurement items were revised and supplemented to allow the survey respondents to clearly understand the content of the survey.

3.3. Data collection and sample characteristics

A web-based system from an internet research institution was used to collect the data for the empirical analysis of this study. The survey respondents were randomly selected based on emails from the database of the internet research institution, and the surveys were designed to ensure that the participants could click on the URL provided to clearly understand and respond to the survey. The survey respondents were limited to those who had stayed at a hotel during the COVID-19 outbreak. In other words, the survey was designed to contain a screening question, asking if the respondent had experience of utilizing a 5 golden national star-rated hotel from January 1, 2020 to April 30, 2020; the respondent was asked to respond to the next question if he or she had utilized such a hotel, and stopped if the respondent did not have this experience. Prior to conducting the survey, this study provided clear explanations on the purpose of this study to the respondents, who were also told that the data collected would not be used for any purposes other than that stated. In addition, the survey respondents were told that their personal information would be kept confidential. A total of 321 samples were collected during the 11-day survey period, of which 7 were excluded, as they were determined to be unusable for the empirical analysis. As such, a total of 314 samples were used for the empirical analysis. Therefore, in this study, a total of 314 samples were used for empirical analysis, which is appropriate considering that Hair et al. (2011) state that the sample size should be greater than 10 times the number of links in the internal or external model that indicate the potential variable.

Demographic analysis was conducted to confirm the sample characteristics. Of the respondents, 49% were men and 51% were women. Meanwhile, 36% were in their 20 s, 39% in their 30 s, 16% in their 40 s, and 9% in their 50 s, showing that respondents in their 20 s and 30 s made up the largest population among those surveyed. Next, in terms of education levels, 10% of the respondents had graduated from a professional college, 65% had graduated from university, and 25% were graduate school or higher. The annual income of the survey respondents, when converted to US dollars, was as follows: 27% had income below \$40,000, 38% between \$40,000 and \$50,000, 22% between \$50,000 and \$70,000, and 13% over \$70,000.

4. Results

4.1. Quantitative procedures

4.1.1. Exploratory factor analytic approach

This study utilized principal factor analysis and the Varimax orthogonal rotation method to conduct an exploratory factor analysis (EFA) to determine the perceived hygiene attributes. Principal factor analysis was used for factor extraction (Hair et al., 1998). The Kaiser–Meyer–Olkin value was .944, and the Bartlett value was statistically significant ($p < .001$). This indicates that the selection of variables was appropriate. The EFA indicated a total of three variables with eigenvalues of 1 or more, and the total variance of the three derived factors was 73.63%. The first factor was the “hygiene of customer-use spaces,” composed of a total of seven items with a variance of 56.47%. The second factor was “personal hygiene of staff,” composed of six items and with variance of 11.18%. The third factor was “workspace hygiene,” composed of six items and with variance of 5.98%. Next, this study conducted a reliability analysis to verify internal consistency. One can assume that there are no issues with internal consistency if the value is over .7 (Hair et al., 1998). The results indicated that the value for “hygiene of customer-use spaces” was .932, the value for “personal hygiene of staff” was .928, and the value for “hygiene of workspaces” was .853. Therefore, this study concluded that there are no issues with internal consistency for any of the three perceived hygiene attributes. Furthermore, the factor loading values of all measurement items were more than .5. As such, all three perceived hygiene attributes derived in this study can be regarded as statistically appropriate. Table 1 contains the detailed results of the EFA.

4.1.2. Measurement model results

The next step involved conducting a confirmatory factor analysis (CFA) using the maximum likelihood estimation method. The CFA is the most useful analysis method for verifying the unidimensionality of the scales, and the reliability and validity of the measurement model (Anderson & Gerbing, 1988). The analysis results are as follows. First, the analysis indicates that the goodness of fit of the measurement model was $\chi^2 = 839.921$, $df = 354$, $p < .001$, $\chi^2 / df = 2.373$, RMSEA = .066, CFI = .941, TLI = .933, indicating that the model was statistically acceptable. Next, this study evaluated the standardized regression weight to confirm the reliability of all measurement items presented in this study; the results indicated that the values for all of the items ranged

Table 1
Exploratory factor analysis results

Factors	% of variance	Factor loadings	Cronbach's alpha
Factor 1: Hygiene of customer-use spaces			.932
1. This hotel cleans areas where water is congested inside rooms (i.e., sinks, toilets, and washroom floors) using disinfectants.		.687	
2. This hotel washes its laundry using antibacterial products and practices (i.e., towels, bed covers, blankets, and pillows).		.750	
3. The hotel is regularly fumigated to prevent pests and cockroaches		.763	
4. This hotel cleans in-room facilities (i.e., desks, chairs, sofas, beds, mirrors, and closets) using disinfectants.	56.470	.777	
5. The rooms in this hotel are equipped with special air cleaners to prevent aerosol infections.		.807	
6. This hotel conducts hot water sterilization (heating for more than 30 seconds in boiling water) of utensils used in its restaurants (i.e., cutlery, crockery, and cutting boards).		.796	
7. This hotel cleans restaurant facilities (i.e., tables and chairs) using disinfectants.		.722	
Factor 2: Personal hygiene of staff			.928
1. The hotel staff each receive at least one health check-up per year.		.870	
2. The hotel staff are meticulous in their hand-washing and disinfecting.		.845	
3. The hotel staff refrain from visiting crowded areas.		.827	
4. The hotel staff wear masks at all times while on duty.	11.175	.827	
5. The hotel staff cover their mouths and noses with bent elbows when coughing or sneezing.		.665	
6. The hotel staff always check their body temperature upon arrival at work.		.623	
Factor 3: Hygiene of workspaces			.853
1. This hotel cleans the surfaces of the work areas of staff (i.e., desks and tables) using disinfectants.		.765	
2. This hotel cleans the work equipment of staff (i.e., phones, keyboards, and printers) using disinfectants.	5.985	.787	
3. The hotel staff maintain a distance of more than 1 m from their fellow staff members while at work.		.622	
4. The workspaces and lounges used by staff in this hotel are subject to regular management by professional hygiene companies.		.518	

Total variance explained: 73.630, KMO measure of sampling adequacy: .944
Bartlett's test of sphericity ($p < .01$)

between .679 and .902. The values were all higher than the standardized regression weight criterion of .5, thereby confirming the reliability of all measurement items. This study also examined average variance extracted (AVE) and composite reliability (CR) to confirm the convergent validity and internal consistency. As the AVE values were higher than .5 and the CR values were higher than .7, the internal consistency and convergent validity of the measurement variables were valid (Fornell & Larcker, 1981). This study's AVE values ranged from .587 to .749, and the CR values ranged from .840 to .917. Therefore, there were no issues with convergent validity and internal consistency of the

measurement variables. Lastly, this study verified the discriminant validity to confirm the discrimination between the constructs. If the AVE value is larger than the square of the correlation coefficient between potential variables, there are no issues with discriminant validity (Fornell & Larcker, 1981). The analysis results indicated that the AVE values were larger than the square of correlation coefficients between the variables. Therefore, discriminant validity between the variables in this study was confirmed (Tables 2 and 3)

4.1.3. Structural equation modeling

This study conducted structural equation modeling utilizing the maximum likelihood method to evaluate the conceptual framework presented in this study and validate its hypotheses. The analysis results showed that the model fit of the structural model was $\chi^2 = 924.177$, $df = 362$, $p < .001$, $\chi^2 / df = 2.553$, $RMSEA = .070$, $CFI = .932$, $TLI = .923$, which is acceptable. This subsection presents the validation results of the six hypotheses and the standardized coefficients posited in this study. To verify Hypothesis 1, this study examined the influence of hygiene of the customer-use space, personal hygiene of staff, and workspace hygiene as perceived hygiene attributes on cognitive image. According to the results, all of Hypotheses 1 had significant influences on cognitive image (β hygiene of customer-use space - cognitive image = .457 / β personal hygiene of staff - cognitive image = .224 / β hygiene of workplace - cognitive image = .169, $p < .05$). To verify Hypothesis 2, this study examined the influence of hygiene of customer-use spaces, personal hygiene of staff, and workspace hygiene as perceived hygiene attributes on affective image. According to the results, all of Hypotheses 2 had significant influences on affective image (β hygiene of customer-use space - affective image = .470 / β personal hygiene of staff - affective image = .277 / β hygiene of workplace - affective image = .189, $p < .05$). To verify Hypotheses 3, 4, 5, and 6, this study examined the influence of cognitive image and affective image on word of mouth and revisit intention. The analysis indicated that cognitive image had significant influence on word of mouth ($\beta = .522$, $p < .01$) and revisit intention ($\beta = .480$, $p < .01$), and affective image had significant influence on word of mouth ($\beta = .775$, $p < .01$) and revisit intention ($\beta = .223$, $p < .01$).

The use of a mediating framework within a theoretical model is a very desirable method to understand the complex relationships in the research structure (Han & Ryu, 2009). Therefore, this study utilized bootstrapping to verify the indirect effects to aid understanding of the complex relationships between the variables of this study. The indirect analysis indicated that, among the attributes of perceived hygiene, the hygiene of customer-use spaces had significant indirect effects on word of mouth ($\beta = .478$, $p < .05$) and revisit intentions ($\beta = .459$, $p < .05$), and personal hygiene of staff had a significant indirect effect on word of mouth ($\beta = .184$, $p < .05$), but no significant indirect effect on revisit intention ($\beta = .174$, $p > .05$). In addition, workspace hygiene had no significant indirect effect on either word of mouth ($\beta = .257$, $p > .05$) or revisit intention ($\beta = .236$, $p > .05$). This indicates that the mediating role of the mediating variable was partially proven within the theoretical framework presented in this study. Therefore, within the theoretical framework presented in this study, the role of the mediator between the affective and cognitive image parameters has been partially demonstrated.

5. Discussion

This study classified the perceived hygiene attributes into three types to understand how hygiene management in hotels influences customer retention and revisit intention in a pandemic situation, such as that of COVID-19. The empirical research identified the influence of the presented attributes on hotel image and customer behavior. To achieve these objectives, qualitative and quantitative methods were used, composed of in-depth interviews with focus groups and empirical analyses. The measurement items on perceived hygiene in hotels, derived from in-depth interviews with focus groups, were found to have

Table 2
Measurement model assessment and correlations

	1	2	3	4	5	6	7	
Hygiene of customer-use spaces	1.000							
Personal hygiene of staff	.677 ^a (.458) ^b	1.000						
Hygiene of workspaces	.721 (.519)	.630 (.396)		1.000				
Cognitive image	.736 (.541)	.600 (.360)		.612 (.374)	1.000			
Affective image	.711 (.505)	.659 (.434)		.685 (.469)	.679 (.461)	1.000		
Word of mouth	.712 (.506)	.699 (.488)		.658 (.432)	.718 (.515)	.762 (.580)	1.000	
Revisit intention	.701 (.491)	.631 (.398)		.621 (.385)	.707 (.499)	.660 (.435)	.734 (.538)	1.000
Mean	4.897	4.854		4.703	5.013	5.064	4.993	4.976
SD	.988	1.022		.990	1.060	.975	.995	.980
CR	.917	.911		.849	.898	.852	.894	.840
AVE	.613	.597		.587	.749	.659	.738	.640

Note. Goodness-of-fit statistics for the measurement model: $\chi^2 = 839.921$, $df = 354$, $p < .001$, $\chi^2/df = 2.373$, RMSEA = .066, CFI = .941, TLI = .932

^a Correlations between the variables are below the diagonal.
^b The squared correlations between the variables are within the parentheses.

Table 3
The structural model estimation

Hypothesized paths		Coefficients	t-values
<i>Hypothesis 1:</i>			
Hygiene of customer-use spaces	→ Cognitive image	.457	4.215**
Personal hygiene of staff	→ Cognitive image	.224	2.897*
<i>Hypothesis 2:</i>			
Hygiene of workspaces	→ Cognitive image	.169	2.858*
Hygiene of customer-use spaces	→ Affective image	.470	4.661**
Personal hygiene of staff	→ Affective image	.277	3.499**
Hygiene of workspaces	→ Affective image	.189	2.149*
<i>Hypothesis 3:</i>			
Cognitive image	→ Word of mouth	.552	11.061**
<i>Hypothesis 4:</i>			
Cognitive image	→ Revisit intention	.775	11.211**
<i>Hypothesis 5:</i>			
Affective image	→ Word of mouth	.480	9.492**
<i>Hypothesis 6:</i>			
Affective image	→ Revisit intention	.223	4.422**
Indirect effect:		Explained variance:	
β hygiene of customer-use space → cognitive & affective image → word of mouth = .478*		R^2 (Cognitive image) = .618	
β hygiene of customer-use space → cognitive & affective image → revisit intention = .459*		R^2 (Affective image) = .745	
β personal hygiene of staff → cognitive & affective image → word of mouth = .184*		R^2 (Word of mouth) = .894	
β personal hygiene of staff → cognitive & affective image → revisit intention = .174		R^2 (Revisit intention) = .885	
β hygiene of workspaces → cognitive & affective image → word of mouth = .257			
β hygiene of workspaces → cognitive & affective image → revisit intention = .236			

Note. Goodness-of-fit statistics for the structural model: $\chi^2 = 924.177$, $df = 362$, $p < .001$, $\chi^2/df = 2.553$, RMSEA = .070, CFI = .932, TLI = .923

* $p < .05$
** $p < .01$

appropriate validity and reliability; variables other than the perceived hygiene attributes also had acceptable levels of reliability and validity. Furthermore, the theoretical framework presented in this study provided satisfactory explanations for the relationships between the variables presented. Therefore, the results of this study confirmed that hygiene management in hotels amid the COVID-19 crisis has a very positive influence on hotel image and customer behavior, and demonstrated that stronger hygiene management is necessary.

The analysis results indicated that the perceived hygiene attributes or hygiene in customer-use spaces ($\beta = .457 / 470$, $p < .01$), personal hygiene of staff ($\beta = .224 / 277$, $p < .05 / p < .01$), and workspace

hygiene ($\beta = .169 / 189$, $p < .05$) had positive effects on cognitive image and affective image. These results are in line with previous studies, which have shown that hygiene management perceived by customers plays an important role in explaining customers' decision-making process and purchasing behavior (Barber & Scarcelli, 2010; Moon et al., 2017; Vilnai-Yavetz & Gilboa, 2010). That is, if there were no issues regarding the hygiene environment (e.g., spaces used by the customer, personal hygiene of employees, and hygiene of the workspace) perceived by hotel customers, and furthermore, if hygiene management from a specialized hygiene company is employed, customers may form a very positive image regarding the hotel. Based on existing studies on the importance of image, hotels need to engage in professional, thorough hygiene management in not only the spaces used by customers, but also the hygiene of individual staff and their workspaces.

Next, this study analyzed the influence of cognitive image and affective image on word of mouth and revisit intention. The analysis indicated that cognitive image had significant influences on word of mouth ($\beta = .522$, $p < .01$) and revisit intention ($\beta = .775$, $p < .01$), and affective image had significant influences on word of mouth ($\beta = .480$, $p < .01$) and revisit intention ($\beta = .223$, $p < .01$). These results are in line with existing studies, showing that the overall image of the firm improves customer behavior and revisit intention (Chen et al., 2015; Durna et al., 2015; Su et al., 2017). Ultimately, to retain hotel guests and induce revisits, it is essential to form a positive image as perceived by customers. Therefore, hotels need to present a variety of methods to form a positive image.

This study presented theoretical and practical implications based on in-depth interviews with focus groups and empirical analyses. The theoretical implications are as follows. Many existing studies have emphasized hygiene. However, the majority of the studies has focused on overall food hygiene, such as hygiene of food storage and cooking processes; there are some studies on the hygiene of hotel rooms, albeit limited. However, there are very few studies that have explored the attributes of overall hygiene of hotels as perceived by customers while they are guests of the hotels. Therefore, this study sought to emphasize the importance of overall hygiene in hotels to retain customers and induce revisits amid the COVID-19 pandemic. The perceived hygiene attributes presented in this study were developed and specified using qualitative methods, and the elements of the attributes were generated through quantitative methods. This study is significant as it explored the attributes of hygiene (hygiene of customer-use spaces, personal hygiene of staff, and workspace hygiene) that customers perceived and believed to be important in special circumstances, such as the COVID-19 pandemic. Specifically, this study revealed very important and practical facts on how perceived hygiene attributes include theoretical validity, and that they are excellent predictors of the hotel's overall image, including cognitive and affective image, as well as customer behavior, such as word of mouth and revisit intention. These results provide significant implications for research relating to hygiene in the hotel

industry, and research on consumer behavior. In particular, it is very significant that this study revealed that customers emphasized not only the hygiene of the spaces they use, but also the hygiene of hotel staff and the spaces designated for staff. Therefore, the perceived hygiene attributes identified in this study are very significant, as they were theorized in a clear way for researchers studying the hotel and service industries.

The practical implications are as follows. First, hotel managers should present a variety of strategies for hygiene management in hotels. This is especially true in the COVID-19 pandemic. Specifically, it is necessary to conduct training for thorough hygiene in spaces used by customers (i.e., facilities and laundry in the guestrooms, and facilities and houseware in restaurants), and to set up specialized departments for hygiene management. These departments should disinfect areas where water is congested inside rooms (i.e., sinks, toilets, and washroom floors) using disinfectants, and wash laundry using antibacterial products and practices (i.e., towels, bed covers, and blankets). Furthermore, antibacterial products should be used to clean in-room facilities (i.e., desks, chairs, sofas, beds, and closets), and install special air purifiers to prevent aerosol infections. The cutlery and crockery used in restaurants should be disinfected in boiling water for at least 30 seconds, and the restaurant facilities (i.e., tables and chairs) should be cleaned using antibacterial products. Hotel managers should also thoroughly manage the personal hygiene of staff. Specifically, staff should be subject to health check-ups at least once a year, and disinfect their hands using alcohol-based hand sanitizers. Furthermore, staff should be mandated to wear masks during work hours and be instructed to refrain from visiting places with large crowds of people outside of work hours. They should be checked for body temperature as they come to work and should be provided with thorough examinations and time off when they have any illness or fever. As such, the hotel manager must remind staff of the importance of hygiene management during the COVID-19 pandemic to successfully retain their customers and draw revisits.

This study has some limitations. First, as this study explored and studied the properties of hotel hygiene during the COVID-19 pandemic, care must be exercised in applying the theoretical framework to other environments. Second, this study analyzed customers who had stayed in 5 golden national star-rated hotels after the COVID-19 outbreak began; follow-up studies are necessary to cover normal non-COVID-19 situations, as well as the hygiene attributes perceived by guests of hotels with lower ratings. Lastly, this study engaged in empirical analysis without considering demographic characteristics. Therefore, it would be very meaningful for future studies to consider demographic characteristics, such as gender, age, occupation, education, and income, to study hotel hygiene and customer behavior.

6. Conclusion

COVID-19 is a newly discovered infectious disease, with no proven methods of treatment or prevention. The prevalence of COVID-19 has significantly reduced the use and visits of hotels, which are utilized by large numbers of people. It is necessary to manage hygiene thoroughly to prevent infections of hotel guests and staff. However, there is no research on hotel hygiene amid the COVID-19 pandemic. Thus, this study explored perceived hygiene attributes and investigated their influence on hotel image and customer behavior. This study determined the influence of three attributes, namely, hygiene of customer-use spaces, personal hygiene of staff, and workspace hygiene. The empirical analysis found that the perceived hygiene attributes influenced hotel image, word of mouth, and revisit intention. Furthermore, this study confirmed the partial mediating roles of cognitive image and affective image in the proposed theoretical framework.

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