# 科技部補助專題研究計畫報告

## 餐飲五感難忘體驗：量表建構並從角色理論觀點進行模式驗證

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本研究具有政策應用參考價值：□否　■是，建議提供機關交通部,經濟部
（勾選「是」者，請列舉建議可提供施政參考之業務主管機關）
本研究具影響公共利益之重大發現：■否　□是

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中 文 摘 要 ： 本研究以服務景觀和感官行銷為基礎，透過多元研究方法開發了五感難忘的用餐體驗量表（FSMDES）。在研究 1 中，透過文獻回顧對五個 FSMDES 構面進行了排序，然後進行了 14 次深度訪談。 從訪談中提取了總共436條陳述，然後在五個構面下縮減到67個項目。在研究 2 中，從八家餐廳收集了 783 份問卷，以驗證所提出的理論架構。 在研究 3 中，我們使用短版 FSMDES 透過從台灣八家米其林星級餐廳獲得的 430 份問卷。 結果發現五構面與口碑、重訪意圖和餐廳依戀具有校標關聯效度。為五種感官開發了一個五構面42 項 FSMDES：視覺、聽覺、觸覺、味覺和嗅覺。

中文關鍵詞 ： 難忘餐飲體驗、五感、感官行銷、量表發展

英 文 摘 要 ： Based on servicescape and sensory marketing, this study developed a Five-Senses Memorable Dining Experience Scale (FSMDES) through multi-study method. In Study 1, five FSMDES dimensions were sorted through literature review, followed by fourteen in-depth interviews. A total of 436 statements were extracted from interviews and were later narrowed down to 67 items under five dimensions. In Study 2, 783 responses were collected from eight restaurants to verify the proposed theoretical dimensions. In Study 3, we replicated our findings using short-version FSMDES through 430 responses obtained from eight Michelin-starred restaurants in Taiwan. Our results found appropriate fit statistics and criterion-related validity with word of mouth, revisit intention, and restaurant attachment. A five-dimensional 42-item FSMDES was developed for the five senses: visual, sound, touch, taste, and olfaction.

英文關鍵詞 ： memorable dining experience; five-senses; sensory marketing; scale development

# 行政院科技部補助專題研究計畫成果報告

## 餐飲五感難忘體驗：量表建構並從角色理論觀點進行模式驗證

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# Five-Senses Memorable Dining Experience:
## Conceptualization and Scale Development

**Abstract**

Based on servicescape and sensory marketing, this study developed a Five-Senses Memorable Dining Experience Scale (FSMDES) through multi-study method. In Study 1, five FSMDES dimensions were sorted through literature review, followed by fourteen in-depth interviews. A total of 436 statements were extracted from interviews and were later narrowed down to 67 items under five dimensions. In Study 2, 783 responses were collected from eight restaurants to verify the proposed theoretical dimensions. In Study 3, we replicated our findings using short-version FSMDES through 430 responses obtained from eight Michelin-starred restaurants in Taiwan. Our results found appropriate fit statistics and criterion-related validity with word of mouth, revisit intention, and restaurant attachment. A five-dimensional 42-item FSMDES was developed for the five senses: visual, sound, touch, taste, and olfaction.

**Keywords:** memorable dining experience; five-senses; sensory marketing; scale development

## 1. Introduction

Experiences, whether mundane or extraordinary, can be life-changing and act as a means of constructing reality (Carù & Cova, 2003). Consumers seek fantasies, feelings and pleasures (Holbrook & Hirschman, 1982), and enabling extraordinary experiences has become the nucleus of the tourism industry (Walls et al., 2011). As such, research on consumer's sensory experience is essential to help enhance the actual experience (Gilmore & Pine, 2002). From a managerial perspective, food can be explored as a multi-sensory experience and examined as a potential niche market (Daugstad, 2008).

Sensory marketing is an approach that influences consumers' perceptions, judgments and behaviors by appealing to their senses (Krishna, 2012). It uses the five senses—visual, sound, touch, taste and olfaction—to communicate with consumers and uses innovative, inspiring and imaginative ways to engage their feelings, thereby building brand awareness and long-term brand image (Hultén et al., 2009). Memorable experiences are based on an individual's assessment of subjective experiences and refer to the ability for an individual to easily recall events (Kim et al., 2012); enabling them represents a new standard that the tourism industry is gravitating towards. In the long run, memorable experiences may help contribute to a feeling of

excitement or a profound sense of enjoyment over time and become a flow of how life should be remembered (Csikszentmihalyi, 1990). As the tourism industry gains more profits from cashing in on consumer experience (Pine & Gilmore, 1999), hospitality providers should focus on consumer sensory strategies to maximize revenues through brand experience (Hulten, 2011). The concept of multi-sensory brand experience that best satisfies customers is the key marketing strategy for creating memorable experiences (Krishna & Schwarz, 2014). Therefore, the ability to create memorable multi-sensory dining experiences is considered important.

Lin and Mattila (2010) argue that the servicescape of a restaurant directly affects customer satisfaction and brings a memorable experience to customers (Namasivayam & Lin, 2008). Bitner (1992) first coined the term servicescape and defined it as the physical environment, including lighting, temperature, wall and floor color, music, restaurant theme, comfort conditions, smell, and the uniqueness of the restaurant's décor and design, that affects consumer perception (Lin & Mattila, 2010). Han and Ryu (2009) classified the elements of a restaurant's servicescape into three categories: ambient conditions, spatial layout and functionality, and décor and artifacts. In addition to the physical environment, non-physical servicescape like food quality is also an important factor that influences a customer's dining experience (Hyun & Kang, 2014). Social servicescape is based on aspects of the service environment related to people. In most service settings, customers share the consumption space with the service staff (Jani & Han, 2013), and in this consumption space, a customer's overall evaluation of the dining experience is influenced by the appearance, characteristics, and behavior of the service staff (Kim & Lee, 2012). Brocato et al. (2012) proposed factors such as perceived similarity, physical appearance, and suitable behavior in the servicescape to evaluate other people in the service setting. Location and personal surroundings have been described as multi-sensory, as they involve more than visual impressions, but are also associated with sounds, smells, tastes and touches (Bitner, 1992). However, there is still a lack of research into the five senses in restaurant settings in terms of memorable experiences.

A memorable dining experience brings customers a delightful, satisfying process. To achieve a memorable dining experience, customer needs must be met in terms of food, physical environment and social factors (Macht et.al., 2005). A memorable experience is generated through the five senses as the emotions and feelings are evoked by stimulation of the five sensing organs (e.g., eyes, nose, tongue. ears, and body) (Guzel & Dortyol, 2016). For instance, people create positive memories through visual stimulation. Elements such as decoration, interior

design, lighting, and color are most likely to trigger customers' attention and arouse interest, which in turn stimulate them to have a memorable experience (Guzel & Dortyol, 2016). Sounds are able to easily create emotions and feelings that bring memorable experience to consumers (Adhikari, 2019). Specific music jogs customers' memories and enhances their positive impression (Güzel, 2013; Hulten et al., 2009). On the other hand, the dining environment should be maintained at a comfortable temperature to create a good atmosphere and enable customers to have a positive tactile experience (Rodrigues et al., 2011). In addition, the flavors of food and beverages create taste sensation and food tastings can attract customers (Guzel & Dortyol, 2016). Furthermore, olfaction stimulation affects customers' emotions, where pleasant aromas, in particular, can create positive feelings (Slatten et al., 2011). This study is a conceptualization that uses servicescape to explore the five-senses memorable dining experience, which is defined here as "the positive affective response that can be aroused by the customer's five senses—visual, sound, touch, taste and olfaction—in restaurant servicescape."

Past studies on the five senses experience have mainly focused on the relationship between sensory cues and customer repurchase in fast-food restaurants (Ifeanyichukwu & Peter, 2018); and scent-related influences of restaurant wait staff on patron's dining experience and behavior (Singh, Beekman, & Seo, 2019). Less attention has been paid to the five-senses memorable dining experience. In view of the current demand of a Five-Senses Memorable Dining Experience Scale (FSMDES) considering the lack thereof, this study proposes a multi-dimension quantitative tool by constructing such a scale.

## 2. Literature Review
### 2.1. Sensory Marketing

Sense organs are tools used to gather information in the environment (Erenkol & Merve, 2015), and are an important part of human life as we learn about the world through the senses (Sayadi et al., 2015). Senses are the link between people and their memories and can stimulate emotions (Isacsson et al., 2009). When people make full use of their senses, they shape, remember and discover their inner thoughts (Randhir et al., 2016). In order to engage every sense of the customer and make an experience memorable, marketers must leverage sensory marketing (Dițoiu & Căruntu, 2014).

Sensory marketing is an approach that influences consumers' perceptions, judgments and behaviors by appealing to their senses (Krishna, 2012), using the sensations of sight, hearing,

smell, touch and taste to communicate with consumers. Since the five senses exert a great influence on the experience of consumer behavior (Hultén et al., 2009), consumers are often attracted to brands due to their sensory experiences (Lindstrom & Kotler, 2005). Therefore, through intentional design, sensory interactions can build a bond between consumers and the brand, thus creating a lasting emotional connection to reinforce brand loyalty (Kahn, 2007). New, inspiring and imaginative ways are used to engage consumer feelings, thereby building brand awareness and long-term brand image (Hultén et al., 2009). Considering the above, this study defines sensory marketing as a novel and creative marketing approach to stimulate consumer's senses to build a positive brand image and brand awareness, thereby prompting consumers to make repeated consumption.

Krishna (2012) notes that the senses can be divided into five facets: sight, sound, touch, smell, and taste. Visual sensation is considered to be the most influential of all senses and dominates sensory marketing (Hultén et al., 2009), as visual guidance is most likely to influence consumer behavior. Sound sensation helps people generate moods, which in turn trigger feelings and emotions. When visual and sound sensation disappear, touch becomes the principal way of identifying objects (Wolfe et al., 2006). The tactile perception of the texture, weight, and smoothness of objects can form the basis for product purchases (Randhir et al., 2016). Smell and taste are closely related, with human perception and memory of smell being higher than that of taste. This is why scent is often used in product promotions to increase sales (Isacsson et al., 2009). The five senses in this study are described as follows.

### 2.1.1. Visual

We live in a visual-based world, thus visual sensation is considered to be the most persuasive sense. People are most attracted to what they see (Lindstrom & Kotler, 2005). Visual sensation can be said to the dominant sense that brings the strongest feelings to consumers in sensory marketing (Saydi et al., 2015). Visual stimuli can include logos, names, packaging, and product design (Henderson et al., 2003). Graphic information makes brands more visible, which encourages consumer purchase intent (Kahn & Deng, 2010). Colors and shapes are the primary ways in which humans identify and differentiate between objects, so many brands have developed brand colors to make the brand easier to remember (Randhir et al., 2016). Messaris (1997) emphasizes that the purpose of visual stimuli is not only to attract consumers' attention, but also to elicit an emotional response to the product.

### 2.1.2. Sound

Sound evokes feelings and emotions, and subsequently moods (Lindström, 2005b). It is considered an important factor influencing consumers' emotions, behaviors, and preferences (Alpert et al., 2005), as well as people's consumption habits (Randhir et al., 2016). Music has a strong emotional effect, as listening to music induces the secretion of endorphins in the brain that leads to the feeling of pleasure (Gobé, 2001). That pleasant feeling helps establish a positive emotional connection between consumers and brands (Schmitt & Simonson, 1997). The volume, rhythm, style and genre of music all appeal to the ears and affect the consumer's feelings. For example, faster-paced music makes consumers feel energized and increases turnover rate (Erenkol & Merve, 2015). If consumers resonate with the music, they will have positive emotions towards the store, which increases their willingness to revisit (Saydi et al., 2015).

### 2.1.3. Touch

Touch is the most sensitive human sense (Montagu, 1986). Touch is used to acquire information and feelings to achieve interaction between consumers and products (Hultén et al., 2009). The tactile perception of the product texture, weight, and smoothness of objects may be used as the basis for purchases (Randhir et al., 2016). Especially when encountering an unfamiliar product or brand, touching is an important way to confirm quality (Gobé, 2001). Consumers believe that the quality of a product is reflected in its weight, so marketers make the product feel luxurious by making it weighty in the hand (Lindström, 2005b). The texture of the material also influences our perception and thus our purchase intention (Schmitt & Simonson, 1997). Some stores allow consumers to use touch screens to order food by engaging consumers in the purchase process through their sense of touch and reinforcing their emotional connection with the brand. It has been shown that providing tactile sensations creates higher customer satisfaction (Gobé, 2001).

### 2.1.4. Taste

Taste has the most specific function among all the senses, because food is closely tied to survival, and people can perceive tastes such as sour, sweet, bitter and salty (Randhir et al., 2016). Taste and smell are practically inseparable, and taste is also related to other senses. For instance, the close connection between taste and smell means their combination can create

flavors that can evoke consumer memories and past experiences. Visual sensation also affects taste, especially color, since the brightness of color enhances the intensity of taste (Erenkol & Merve, 2015). Gobé (2001) argues that eating is closely related to pleasure and positive memories, so marketers use bread or coffee sample tastings to highlight the value of the brand and help the brand create a pleasant atmosphere to attract customers to their doors.

### 2.1.5. Olfaction

We can close our eyes, cover our ears, avoid touching and refuse to taste, but we cannot shut off smell, because smell is tied to our breathing (Lindström, 2005a). Erenkol and Merve (2015) point out that 75% of the sensations every day are generated by smell. Meanwhile, humans can recognize up to 10,000 different scents (Buck & Axel, 1991). Even after a long period of time, humans can still identify scents they have smelled before and link the scent to a specific experience (Bell & Baron, 1977). Therefore, marketers use scents to influence consumer behavior and emotions (Lorig & Schwartz, 1988), and evoke memories of a brand through scent to strengthen the brand image (Schmitt & Simonson, 1997).

To sum up, restaurant managers use sensory marketing to add enhance visual, sound, touch, taste and olfaction to dining experiences or restaurant space design to stimulate consumers' five senses, evoking their feelings and emotions and motivating them to dine at restaurants.

### 2.2. Memorable Dining Experiences

An experience is only valuable when it is preserved in memory and can be continuously recalled (Clawson & Knetsch, 1966). Experience can arouse people's feelings and emotions, prompting them to think and act, thereby creating memorable memories (Schmitt, 1999). When visitors have a satisfying and positive dining experience, they will deeply and lastingly remember this wonderful experience (Hancfors & Mossberg, 2003). Lin and Mattila (2010) suggest that a restaurant's servicescape directly affects customer satisfaction, and it can bring about a memorable experience (Namasivayam & Lin, 2008). Bitner (1992) first coined the term servicescape and defined it as the physical environment, including lighting, temperature, wall and floor color, music, restaurant theme, comfort conditions, smell, and the uniqueness of the restaurant's décor and design, that affects consumer perception (Lin & Mattila, 2010).

According to Han and Ryu (2009), the elements of a restaurant's servicescape are classified into three categories: ambient conditions, spatial layout and functionality, and décor and artifacts. (1) Ambient conditions refer to the intangible features that affect the subconscious evaluation of the environment (Han & Ryu, 2009). The factors of ambient conditions include temperature, lighting, music, noise and scent, and they have an influence on the five senses experience (Bitner, 1992). (2) Spatial layout and functionality refer to the size and style of machines, equipment, and furniture, and the spatial relationship between their placement (Bitner, 1992). The shape, color, texture and size of furniture and objects reflect the uniqueness of the servicescape (Lin, 2004). Kim and Moon (2009) argue that an effective spatial layout can meet customer needs and bring comfort, which in turn improve customer satisfaction. Therefore, customer's positive perception of the spatial layout can bring comfort and a positive experience (Lin, 2004). (3) Décor and artifacts are important elements in attracting customers in the servicescape (Mattila & Wirtz, 2001). The materials used in the décor, the quality of the artwork, the display of photos and certificates on the wall or floor give rise to the overall aesthetic quality of the servicescape (Bitner, 1992). Customers evaluate a restaurant's environment pleasantness based on its décor, artwork, interior design and decorations (Han & Ryu, 2009).

In addition to the physical environment, non-physical servicescape like food quality is also an important factor that influences a customer's dining experience (Hyun & Kang, 2014). Namkung and Jang (2007) point out food quality is the most important element in the dining experience, and it has a positive correlation with customers' satisfaction with the restaurant. In particular, the taste of the food, the nutrition and the diversity of the menu are indicators for customers to measure the food quality that affects customer satisfaction (Kivela et al., 2000). Other studies have shown that food presentation, portion size, variety of choices, food service and menu design (Raajpoot, 2002), food freshness and temperature (Namkung & Jang, 2007) are also factors in the assessment of food quality. The common characteristics of food quality encompass the following elements: food presentation, taste, diversity of choices, healthy options, freshness and temperature (Peri, 2006). It has been suggested that restaurant managers should pay attention to the key elements of food quality, such as appropriate freshness, reasonable temperature, taste quality and attractive presentation, to improve customer satisfaction (Ahmad & Al-Tit, 2015). Based on the above, this study suggests that the taste, freshness, variety and temperature, as well as the nutrition and healthiness of the food, and the attractiveness of food presentation and the diversity of choices have an impact on making a memorable dining

experience. On the other hand, Tombs and McColl-Kennedy (2003) extend the concept of servicescape to what is called social servicescape. Social servicescape is based on aspects of a service environment related to people. In most service settings, customers share the consumption space with the service staff (Jani & Han, 2013), and in this consumption space, a customer's overall evaluation of the dining experience is influenced by the appearance, characteristics, and behavior of the service staff (Kim & Lee, 2012). When customers connect with others and the service space through shared consumption activities, it affects their satisfaction with the restaurant (Bitner, 1990; Kim & Lee, 2012). The impact of service staff on customer experience is greater than that of the physical servicescape.

## 2.3. Five-Senses Memorable Dining Experience

Sutton (2001) argues that food and beverages are important in creating memories, because the five senses are actively engaged when enjoying them. The five human senses play an important role in the creation of a memorable experience (Guzel & Dortyol, 2016). Stone et al. (2018) suggest that the dining experience is a multisensory experience that incorporates visual, olfaction, and taste sensations, and the experience process involves different aspects, including food type, food quality, dining environment and dining companions. The dining experience is a fusion of various sensory experiences that create a memorable feeling for customers. According to Wardono et al. (2010), the following elements are required to create a memorable experience: harmonizing positive cues surrounding the experience and eliminating negative cues, mixing in memorabilia and engaging the five senses in the experience. A memorable dining experience brings customers a delightful, satisfying process. To achieve a memorable dining experience, customer needs must be met in terms of food, physical environment and social factors (Macht et.al., 2005). A memorable experience is generated through the five senses as the emotions and feelings are evoked by stimulation of the five senses (Guzel & Dortyol, 2016). This study attempts to summarize the sensory sensations generated by the various aspects of the servicescape and explore the memorable dining experience generated through the five senses. They are described as follows.

## 2.3.1. Memorable Dining Experience with Visual

People create positive memories through visual stimuli, while elements such as decoration, interior design, lighting, and colors are most likely to attract customers' attention and

interest, which prompt customers to create a memorable experience (Guzel & Dortyol, 2016). Visuals are the most effective in triggering people's feelings about interior design. The complexity of space design is a visual focal point that affects customers' preferences of a restaurant. Architectural design, furniture, plants, and patterns on the floors, tables and chairs are major elements that create the complexity of space (Scott, 1993). Colors are vessels of experience. The presentation of color can convey aesthetic appeal and make customers produce visual feelings. The appropriate use of colors stimulates customers' perception and memory (Gobe, 2001). If the attire of the service staff matches the feelings brought by the design of the restaurant environment, it will visually stimulate the customers to produce a memorable experience. For example, in a restaurant where the interior design has forest elements, if the service staff wear matching animal-element attire, it will make customers feel like they are in the forest, thus allowing them to have an enriched dining experience visually, leading to a memorable experience (Adhikari, 2019). Shapes and styles impart objects with aesthetic and emotional meaning. This can be a logo embodying the identity of a brand to effectively attract customers and make it memorable (Gobe, 2001). As such, this study suggests the presentation of food can also highlight the brand features of a restaurant to make customers memorable of the restaurant through visual experience. The visual stimuli of memorable experiences are mainly identified by emotions and feelings, such as refreshed, relaxed, romantic, sexy, happy, fun, and fascinating feelings (Guzel & Dortyol, 2016). This study considers that ambient conditions, spatial layout and functionality, décor and artifacts, food presentation, placement, physical appearance (hairstyle, attire, style) in the servicescape are positive affective responses that enable customers to produce memorable dining experiences through visual stimulation.

### 2.3.2. Memorable Dining Experience with Sound

Sound can easily create emotions and feelings that bring consumers a memorable experience (Adhikari, 2019). Specific music jogs customers' memories and enhances their positive impression (Güzel, 2013; Hulten et al., 2009). Moreover, different voices present different emotions, meanings, and intonations, which affect the customer's perception of conversations in bringing about a memorable experience (Adhikari, 2019). Therefore, greetings of the service staff affect a customer's dining experience. When customers hear sounds or music that feel perfect, surprising, appealing and pleasant, it creates an auditory stimulation that leads to a memorable dining experience (Guzel & Dortyol, 2016). In summary, this study considers

music and sound, and cordial greetings of the service staff in the servicescape as positive affective responses that enable customers to produce memorable dining experiences through sound stimulation.

### 2.3.3. Memorable Dining Experience with Touch

Touch stimulation makes the customer's experience with the object more real and unique (Guzel & Dortyol, 2016), and leads to higher customer satisfaction (Gobé, 2001). Customers can feel the temperature of the dining environment through the touch of their hands or feet, and different textures of the furniture bring different temperature sensations to customers. Therefore, the dining environment must be maintained at a comfortable temperature in order to create a good atmosphere and enable customers to have a positive tactile experience (Rodrigues et al., 2011). If customers have a comfortable tactile experience, this touch stimulation leads to a memorable dining experience (Guzel & Dortyol, 2016). As such, this study considers the ambient temperature of a restaurant as a positive affective response that enables customers to produce memorable dining experiences through touch stimulation.

### 2.3.4. Memorable Dining Experience with Taste

The taste of food and beverages can create taste sensation and food tastings can attract customer attention (Guzel & Dortyol, 2016). Furthermore, eating is closely related to pleasure and positive memories (Gobé, 2001). The crispness, juiciness, and aroma of the food present the taste experience highlighting the freshness of the food, which affects the customer's satisfaction with the restaurant (Peneau et al., 2006). Meanwhile, the diversity of the menu enriches the taste sensations, leading to a positive experience (Mealey, 2013). When customers have a memorable dining experience through taste stimulation, they have delicious, pleasant, special, enjoyable, and impressive feelings (Guzel & Dortyol, 2016). As such, this study considers the freshness and diverse options of food as positive affective responses that enable customers to produce memorable dining experiences through taste stimulation.

### 2.3.5. Memorable Dining Experience with Olfaction

Olfaction stimulation affects customer emotions, especially pleasant aromas that generate positive feelings (Slatten et al., 2009). The olfaction experience can evoke specific memories (Lindström, 2005a). It has been suggested that a lower-concentration fragrance is more likely to

produce a positive feeling of freshness and comfort in a restaurant (Clifford, 1985). Aside from environmental fragrance, the aroma of food also attracts customers. People tend to remember pleasant and comfortable smells, so if a restaurant adds this familiar smell in the environment, it will make customers feel more at home (Malnar & Vodvarka, 2004). When customers are satisfied with the smell of the environment, they will have a memorable dining experience (Guzel & Dortyol, 2016). As such, this study considers environmental fragrance in a restaurant as a positive affective response that enables customers to produce memorable dining experiences through olfaction stimulation.

## 3. Developing the FSMDES

Based on Churchill (1979), the multi-study method was applied for developing FSMDES, which includes steps of item generation, purification of measures, and re-purification of measures. In Study 1, items for FSMDES were extracted via former literature and interviews. For measure purification, in Study 2, data was collected from 8 restaurants across different price segments, and was analyzed by explorative factor analysis (EFA). In Study 3, to confirm the measures identified from Study 2, we collected data from to eight Michelin-starred restaurants to run confirmatory factor analysis (CFA). We also examined criterion-related validity of FSMDES as well as its relationships with potential outcomes.

### 3.1. Study 1: Item Generation

Following Churchill (1979), this study explored dimensions of FSMDES through literature review, and then conducted in-depth interviews to generate items for FSMDES. Five dimensions for FSMDES emerged through literature review: visual, sound, touch, taste, and olfaction. To systematically complete the understanding and content of FSMDES, in depth interviews were then conducted to extract items. The number of interviewees was decided by information saturation, which exists when there is no new information regarding the same questions by adding one more interviewee. A total of fourteen interviewees (age, 22-59 years old) participated in this study. Four of them were experts in restaurants with related work or research experiences. Ten customers who have gone to the dining experiences at Michelin-starred restaurants in Taiwan. The interviewees include eight males and six females. One had high school degrees, seven had bachelor degrees, and six had graduate degrees. The length of the interviews ranged from 40 min to 80 min. After the in-depth interview with the fourteen

interviewee, no new information was found compared to the former thirteen interviews, representing information saturation of the information collection.

Each dimension of FSMDES was defined by literature review before in-depth interviews. In the beginning of in-depth interviews, interviewees read definitions of these five dimensions and the definition of five-senses dining memorable experience. Then, each participant answered the same semi-structured questions regarding each dimension of their dining experiences. These semi structured questions included: (1) based on your personal dining memorable experiences, please share how you perceive "visual" at restaurants; (2) based on your personal dining memorable experiences, please share how you perceive "sound" at restaurants ; (3) based on your personal dining memorable experiences, please share how you perceive "taste" at restaurants ; (4) based on your personal dining memorable, please share how you perceive "olfaction" at restaurants ; (5) based on your personal dining memorable experiences, please share how you perceive "Touch" at restaurants; and, (6) based on your personal dining memorable experiences, please share how you perceive dining memorable experiences at restaurants, especially the experiences not covered in the above five dimensions.

To collect rich experience sharing, interviewees were encouraged to give examples from their visited restaurants to answer these questions. All the interviews were recorded by a recording pen and transcribed into transcripts. Recorded responses were systematically categorized by content analysis (Kassarjian, 1977). One event researcher and one expert in content analysis worked as assessors and coded the transcripts independently into 450 statements. These two assessors read and classified items iteratively, reaching agreement of 436 statements. The 436 statements were then narrowed down by assessors into 67 statements under five dimensions. Inter-assessor reliability of these two assessors exceeded 0.96, showing high content validity in this classification (Davis & Cosenza, 1993).

Our Data in Brief shows results of this content analysis and sample statements for each item. The code is named by "number of the interviewee-number of the sorted dimension-number of the sorted item of the dimension." For example, A1-3-2 is a coded statement sorted into the second item of the third dimension from the first interviewee. Number of coded statements ranged from 59 to 142 in each dimension, and the number of coded statements ranged from 2 to 10 in each item. Finally, 67 statements for FSMDES were identified and categorized into five dimensions, including twenty-five statements for visual, ten statements for sound, twelve statements for taste, eleven statements for olfaction, and nine statements for touch.

### 3.2. Study 2: Purification of Measures

The 67 items generated from Study 1 were turned into a survey questionnaire and were rated by a 7-point Likert scale ranging from 1 (strongly disagree) to 7 (strongly agree). Through convenience sampling, the survey questionnaire was distributed at 8 restaurants across three different price segments (expensive/medium/cheap) in Taiwan. A total of 783 valid responses were collected. The subjects to item ratio was 11.68:1, passing the criteria of 5:1 suggested by Gorsuch (1974).

In accordance with our theoretical model, we have fourteen subdimensions nested within five senses. Due to complexity of the proposed theoretical model, instead of running exploratory data analysis, we conducted CFA to evaluate the item reliability and validity. The results of CFA showed unsatisfactory fit statistics ($\chi^2(df)$= 7713.39(2053) = 3.76; CFI= 0.892; TLI= 0.884; RMSEA = 0.056; SRMR = 0.05). Table 1 shows the CFA results with the all 67 items. However, the items loaded satisfactorily on each factor (standardized item loadings ranged from 0.62 to 0.93). This showed that the unsatisfactory is very likely to result from non-normal distribution, model complexity (fourteen factors), or high degree of freedom. After carrying out univariate/ multivariate normality tests using both Mardia and Henze-Zirkler, the Shapiro-Wilk tests showed that most items are negatively skewed. Non-normality distribution violated the assumption of structural equation modeling.

**<Please insert Table 1 here>**

Owing to sensitivity of degree of freedom in complex model structure, we considered two common practices to evaluate our model: parceling model and item reduction model. The formal model aggregated individual items into different parcels to formulate more normally distributed parameters. Prior studies have confirmed that item parceling is suitable for unidimensional structure (items do not load on more than one factor) for better model fits and less biased estimates of parameters (Bandalos, 2002). The latter reduced the number of items in each construct to minimize degree of freedom for a better model fit. We chose three items with higher loadings and precise wording from each subconstructs to generate a short version of FSMDES (four items for technology used were chosen because we developed an original construct).

For parceling model, we randomly created three parcels for each construct for one

hundred iterations to reduced biased item parcels. As showed in table 2, the results indicated appropriate fit statistics for both parceling model ($\chi^2$(*df*)= 2561.584(649) = 3.95; CFI= 0.947; TLI= 0.936; RMSEA = 0.058; SRMR = 0.039) and item reduction model ($\chi^2$(*df*)= 2397.916(769) = 3.12; CFI= 0.951; TLI= 0.943; RMSEA = 0.049; SRMR = 0.038). Either parceling model or item reduction model performed much better than baseline model. The results of parceling model indicated appropriate factor structure in the original long scale (67 items). Items are nested within their factor. Moreover, the results showed that the short version of FSMDES (43 items) indicated good reliability (Cronbach alpha = .80 to .95; composite reliability = .81 to .95) and convergent validity (standardized item loadings = .73 to .93; AVE = .59 to .84). As showed in Table 3, the squared roots of AVE for each construct are higher than bivariate correlation with any other construct, showing appropriate discriminant validity.

**<Please insert Table 2 here>**
**<Please insert Table 3 here>**

### 3.3. Study 3: Re-Purification of Measures
### 3.3.1. Confirmatory Factor Analysis

After generating items and evaluating the initial factor structure, Study 3 re-evaluate the factor structure of FSMDES using CFA, and examine its criterion-related validity in high-end restaurants. The CFA model is a first-order fourteen-factor oblique model. To increase the practicality of our scale and to avoid participants' fatigue, we chose short version of our scale (43-item FSMDES developed from Study 2). We used purposeful sampling method and screened eight restaurants with 2020 Michelin's selection (1 to 3 stars) in Taiwan. To ensure participants have actual experiences of visiting fancy restaurants, trained assistant researchers approached them using Instagram. We targeted customers who had checked in and posted photos of the selected eight restaurants by sending private messages. A total of 430 valid responses were received from 8 restaurants and the subjects to item ratio was 9.77:1, passing the criterion of 5:1 for sample size by Gorsuch (1974).

Using R with lavaan package, the CFA was performed with maximum likelihood. Based on Hair et al. (2014), one low-loading items (< 0.50; X26) in CFA was removed, resulting in 42 items under fourteen dimensions. The results of short version FSMDES showed appropriate fit statistics ($\chi^2$(*df*)= 1799.869(728) = 2.47; CFI= 0.93; TLI= 0.92; RMSEA = 0.059; SRMR =

0.058). All items were significant ($p < 0.01$) with factor loadings ranging from 0.68 to 0.96, all factor loadings are higher than 0.45, z-values of factor loading were significant ($p < 0.01$) in all items, all factors' composite reliabilities exceeded 0.6 (0.69 to 0.95), and all factors' average variance extracted exceeded 0.5 (0.53 to 0.91). The results show satisfactory adequate internal consistency (Hair et al., 2010). The correlation between two pairs of factors were lower than 0.76 and lower than the squared root of AVE of each factor, providing adequate discriminant validity (Fornell & Larcker, 1981; Hung & Petrick, 2012). For comparison, Table 4 shows the CFA Results of Study 2 (43 items) and Study 3 (42 items). Table 5 further shows the mean, SD, and correlations of the five sensations of the 42-item FSMDES using the 430 responses collected from Study 3.

**\<Please insert Table 4 here\>**
**\<Please insert Table 5 here\>**

### 3.3.2. FSMDES and Potential Outcomes

In this step, our purpose is to examine FSMDES with its potential restaurant-related outcome variables. We chose three representative variables in hospitality and tourism research to evaluate the predictive validity of FSMDES in terms of word of mouth (Jeong & Jang, 2011; Kim et al., 2011; Zhang et al., 2010), revisit intention (Casidy et al., 2018; Han & Hyun, 2017; Hwang & Hyun, 2013; Kim & Moon, 2009), and restaurant attachment (Hanks et al., 2020; Hernández et al., 2007; Line et al., 2018).

First, after customer had dining experiences in high-end restaurants, we argued that their unforgettable five-senses dining experiences are very likely to translate into cognitive and affective appraisal to the restaurant. Word-of-Mouth (WOM) refers to the informal communication between consumers over particular products or services (Jeong & Jang, 2011). Positive word of mouth can be seen as one positive source of customers' evaluation of the food and service quality. Previous studies have confirmed that food quality, service quality, and atmosphere contributed to positive word of mouth (Jeong & Jang, 2011). When customers are satisfied with the food and service experiences, they feel stronger self-enhanced and therefore are more likely to post positive reviews on review websites (e.g., Google Map and TripAdvisor) (Wu et al., 2016). Therefore, we postulated that when customers high in five-senses dining memorable experience, they are more likely to post positive word of mouth of the restaurant.

Second, revisit intention is an approach motivation toward a place, product or service. Revisit intension demonstrates customers' behavioral loyalty toward a place and services (Kim & Moon, 2009). Research showed that servicescape, perceived brand relationship, and stimulus of food, event, event, staff and environment increased customers' revisit intention through positive affect (Casidy et al., 2018; Hwang & Hyun, 2013; Kim & Moon, 2009). According to stimulus-organization-response framework (Mehrabian & Russell, 1974), environmental stimulus triggers' customers' emotional states, and therefore lead to approach or avoidance response. Aligned with this framework, customers' high evaluation of the restaurant experiences increases positive affect of the restaurant and therefore leads to higher revisit intension. Therefore, we argued that five-senses experiences of the restaurant will be positively related to revisit intention.

Third, restaurant attachment refers to strength of the bond connecting customers and a restaurant. Restaurant attachment is a way that customers showed the association between self and a restaurant. In high-end restaurants, restaurant attachment is a critical antecedent of customer loyalty (Hwang & Hyun, 2013). Research showed that restaurant attachment is the antecedent of place identity (Line et al., 2018). In view of the significant role of restaurant attachment, we chose it as the outcome variable of FSMDES by proposing that high sensory experiences will be positively linked with high restaurant attachment.

### 3.3.3. Criterion-Related Validity

We argued that the five-senses experiences increase customers' rating on positive word of mouth, revisit intention, and restaurant attachment. To evaluate criterion-related validity of FSMDES, the effects of FSMDES dimensions on three outcome variables. We adopted two items of positive word of mouth from Kim et al. (2009), two items of revisit intention from Kim et al. (2009), and three items of restaurant attachment from Alexandris et al. (2006). Shown in Table 6, we found that each dimension of FSMDES is significantly related to positive word of mouth, revisit intention, and restaurant attachment. Moreover, we also found that the five categories of sensory marketing significantly predicted positive word of mouth, revisit intention, and restaurant attachment. The results supported criterion-related validity of the 42-item FSMDES.

**<Please insert Table 6 here>**

### 3.3.4. Predicting word of mouth, revisit intention, and restaurant attachment

To imply practical implications of FSMDES, an ordinary least squares regression was conducted to understand how FSMDES affect outcome variables. In view of the effects of demographic data on the outcome variables, gender, family composition, education, and age were set as control variables in our regression model. To avoid model complexity, we aggregated different dimensions of FSMDES into five sensory categories (visual, sound, touch, taste, and olfaction) to evaluate the variances contributing from different five sensory. The results were shown in Table 7.

**<Please insert Table 7 here>**

First, we found that taste sensation was the most significant factor among the five sensation in fine dining experiences. Taste sensation positively predicted word of mouth (*Beta* = 0.48***), revisit intention (*Beta* = 0.38***), and restaurant attachment (*Beta* = 0.35***). In addition, touch sensation was a significant predictor of word of mouth (*Beta* = 0.16**), revisit intention (*Beta* = 0.21***), and restaurant attachment (*Beta* = 0.16**). Third, high-end restaurants could consider improving customer experience of olfaction sensation (*Beta* = 0.19***) (e.g. food aroma and ambient smell) if they are interested in increasing customers' revisit intention. Finally, our results found that visual sensation significantly predicted restaurant attachment (*Beta* = 0.16**). The above results implied that: even though the five sensations are significant factors for managing restaurant experiences, aspects of five sensations had different mappings with different outcome variables.

## 4. Discussion

Based on the theoretical support of servicescape and sensory marketing, this study conceptualized FSMDES and developed a systematic and comprehensive set of items for FSMDES. A five-dimensional 42-item FSMDES was developed, including dimensions of visual, sound, touch, taste, and olfaction. Moreover, we found three major insights on how these five dimensions of FSMDES enhance potential outcomes at restaurants. First, we found taste and touch of FSMDES can motivate customers' positive word-of-mouth for restaurants. The taste recalled the arguments from Ottenbacher and Harrington (2007) that chefs at Michelin-starred restaurants have their personal signature culinary styles. The touch confirmed the study of Guzel and Dortyol (2016) about the design of touch sensation to improve a memorable dining

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experience.

Second, we found taste, touch, and olfaction of FSMDES were significantly associated with customers' revisit intention. It implied that to enhance revisit intention, restaurant managers should plan dining experience specifically focusing on strategic experience design on integrating these senses (Guzel & Dortyol, 2016). Third, we found taste, touch, and visual of FSMDES improved customers' restaurant attachment. Therefore, to effectively building customers' restaurant attachment, restaurant managers should plan on multi-sense dining experience design to arouse customers' emotional attachments to restaurants (Adhikari, 2019; Messaris, 1997). Implications are addressed in the following sections.

## 4.1 Theoretical implications

First, this study enriches the knowledge of dining experience and high-end restaurant experience by proposing the concept and items of FSMDES. Previous restaurant experience studies focused on tangible and intangible features to evaluate memorable dining experience (Cao et al., 2019; Schmitt, 1999; Tsaur, & Lo, 2020). This study blazes a trail by leading a novel perspective through analyzing five senses in a restaurant dining experience. To the best of our knowledge, the 42-item FSMDES is the first scale developed in tourism and hospitality literature to evaluate memorable dining experience through five senses. The five-dimensional FSMDES also offers a new perspective on evaluating aspects of servicescape (Bitner, 1992; Hyun & Kang, 2014; Lin & Mattila, 2010). Following the trend of utilizing sensory marketing (Dițoiu & Căruntu, 2014; Saydi et al., 2015) in the tourism industry (e.g., Six Senses Hotels Resorts Spas), the FSMDES has great potential to lead further knowledge creation on sensory experience in tourism and hospitality academy.

Second, this study highlights rising the role of utilizing technological devices in dining experience design. During interviewing participants to generate items for FSMDES, some participants noted how technological devices have been applied by some high-end restaurants to showcase a storytelling dining experience (e.g., spatial augmented reality, dynamic graphics, and 3D animation). Although the factor of "applicability of technological devices" was later deleted because it's not applicable to most restaurant dining experience at the current stage, we still believe it is worth highlighting the effectiveness of technological-assisted design on creating a memorable dining experience at high-end restaurants (Bruijnes, Huisman, & Heylen, 2016). With another trend of adopting service robots in the restaurant industry (Lu, Cai, & Gursoy,

2019), we believe service robots may be designed to help improving sensory experiences at restaurants and therefore "applicability of technological devices" has potential to be added back to FSMDES in the future.

Third, we explored sensations of FSMDES on influencing customers' behavioral intentions, and found differences among the sensations. Such interesting findings recalled the previous work of Parasuraman, Berry, and Zeithaml (2002), in which they refined and reassessed the SERVQUAL scale by adding point-allocation questions to determine weights and relative importance among five dimensions of SERVQUAL. Similar to Parasuraman et al. (2002), we found dimensions of FSMDES exerted different effects on improving restaurant customers' word-of-mouth, revisit intention, and restaurant attachment. Such findings add valuable theoretical extension and application of FSMDES, implying that targeting different customer behavioral outcomes or based on different restaurant brand positioning, the relative importance among five senses of FSMDES should be emphasized and analyzed.

## 4.2 Practical implications

First, the FSMDES can serve as a practical tool for restaurant managers to systematically design, monitor, and evaluate the quality of sensory experience at their restaurants. Items of FSMDES provide direct instructions on creating a multi-sensory memorable dining experience. Restaurant managers, especially those at high-end restaurants, can follow the items of FSMDES on experience design, and then incorporate these items into customer surveys to understand the quality of their experience design at their restaurants. Moreover, based on strategic business goals and restaurant brand positioning, restaurant managers may further weight the five senses of FSMDES differently when applying the scale. Due to different business goals and positioning, the relative importance among visual, sound, touch, taste and olfaction varies, and therefore restaurant managers should evaluate how to invest limited resources on core sensations.

Second, the FSMDES should be utilized by restaurant managers to develop a branded, themed multi-sensory memorable dining experience. Although we explained and reviewed a lot on how each sensation can be aroused in a dining experience, different senses should be strategically integrated as a whole, rather than separate senses. Learning from our case restaurants where we collected our data and from interviewees' experience sharing, a memorable dining experience is like a successful storytelling experience, guiding customer to seamlessly enjoy a dining setting. Properties of a hotel luxury brand, Six Senses Hotels Resorts Spas,

demonstrates a great case. Focusing on offering high-quality sensory experience for hotel customers, each property under Six Senses reflects different features to tell a story of their local community. For example, Six Senses Qing Cheng Mountain spa resort in China provides extraordinary Chinese cultural offering with Taoism elements.

### 4.3. Limitations and suggestions for future research

Although the development of FSMDES contributes to several valuable implications, there are still some limitation worth to be considered in building future research. First, this study didn't incorporate all restaurant segments to test FSMDES, especially casual and quick-service restaurants. Therefore, we recommend future studies to examine the FSMDES through a cross-segment validation, and explore the relative importance of factors in FSMDES at different restaurant segments. Second, all survey responses were collected in Taiwan. For cross-cultural validation, we suggest future studies to examine FSMDES at other cultural settings. Third, this study focuses on scale development of FSMDES. To enrich our understanding and applications of FSMDES, future studies can propose research models of FSMDES to systematically examine its antecedents and outcomes.

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Table 1. Results of CFA (all items)

| Indicator | | | Mean | Standardized Beta | Z | p | alpha | CR | AVE |
|---|---|---|---|---|---|---|---|---|---|
| **Attractiveness of spatial layout** | | | | | | | 0.89 | 0.89 | 0.58 |
| | X1 | The exterior of the restaurant building is attractive, making people wanting to come in and have a meal. | 5.18 | 0.71 | | | | | |
| | X2 | The inside space is well thought-out. Visually it leads the customer into the thematic narrative of the restaurant step by step. | 5.04 | 0.80 | 22.6 | 0.00 | | | |
| | X3 | The ceiling decoration is in unison with the spatial design of the restaurant as a whole. | 5.15 | 0.81 | 22.85 | 0.00 | | | |
| | X4 | The wall decorations enrich the narrative of this restaurant's theme. | 5.05 | 0.83 | 23.55 | 0.00 | | | |
| | X5 | The lighting design here shows the brand character that this restaurant is going for. | 5.37 | 0.75 | 21.36 | 0.00 | | | |
| | X6 | The design of the restaurant's space inside makes me feel safe, that my privacy won't be intruded by the guest's next table. | 4.96 | 0.70 | 19.88 | 0.00 | | | |
| **Decorativeness of the dining environment** | | | | | | | 0.9 | 0.9 | 0.62 |
| | X7 | The paintings and art works displayed here show the quality of the restaurant itself. | 4.89 | 0.82 | | | | | |
| | X8 | The plant and floral decorations amplify the concept of the dining theme. | 4.82 | 0.82 | 28.62 | 0.00 | | | |
| | X9 | The utensils chosen and the layout match the narrative of the dining theme. | 5.16 | 0.77 | 26.4 | 0.00 | | | |
| | X10 | The tables and chairs match the dining theme visually. | 5.2 | 0.81 | 28.08 | 0.00 | | | |
| | X11 | Great uniformity in style across all decorations in the dining environment helps deepen the narrative of the dining theme visually. | 5.24 | 0.80 | 27.76 | 0.00 | | | |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| X12 | The visual design of the menu fits the quality of the restaurant's brand positioning. | 5.53 | 0.62 | 19.74 | 0.00 | | | |
| **Food presentation** | | | | | | 0.89 | 0.89 | 0.72 |
| X13 | Each course was tastefully arranged, making the meal seem like a work of art. | 5.16 | 0.82 | | | | | |
| X14 | The composition and color scheme of each course amplified the overall theme of the meal. | 5.09 | 0.86 | 30.49 | 0.00 | | | |
| X15 | The menu was attractive and laid out in an orderly fashion, so that it told a complete visual story. | 4.94 | 0.87 | 30.76 | 0.00 | | | |
| **Server's appearance** | | | | | | 0.85 | 0.85 | 0.66 |
| X16 | The server's demeanor and attitude fit in with the restaurant's brand character. | 5.46 | 0.80 | | | | | |
| X17 | The server's attire fit in with the restaurant's brand character. | 5.4 | 0.81 | 26.35 | 0.00 | | | |
| X18 | The server's hairstyle and accessories fit in with the restaurant's brand character. | 5.08 | 0.82 | 26.67 | 0.00 | | | |
| **The server's bearing and mannerisms** | | | | | | 0.89 | 0.89 | 0.73 |
| X19 | The server had an attractive smile. | 5.52 | 0.84 | | | | | |
| X20 | The server's mannerisms were smooth and graceful. | 5.44 | 0.85 | 31.53 | 0.00 | | | |
| X21 | The server's facial expression and manner of speaking felt sincere. | 5.43 | 0.87 | 32.52 | 0.00 | | | |
| **Applicability of technological devices** | | | | | | 0.95 | 0.95 | 0.84 |
| X22 | Through visual effects brought by the design of technological devices, customers can be led into the storyline of the cuisine. | 4.28 | 0.90 | | | | | |
| X23 | Through the tech design for the dining, the narrative stage of dining experience extends to the entire table. | 4.26 | 0.93 | 45.57 | 0.00 | | | |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| X24 | The visual entertaining effect brought by technological devices are very novel, allowing more sensory interactions between the dining storyline and me. | 4.3 | 0.93 | 45.78 | 0.00 | | | |
| X25 | The visual special effects blend well with the cuisine, making the dining experience more interesting, and leading me to anticipate the next course. | 4.28 | 0.91 | 43.02 | 0.00 | | | |
| **Background sound** | | | | | | 0.82 | 0.83 | 0.56 |
| X26 | The background music fit in with the overall theme of the restaurant. | 4.91 | 0.79 | | | | | |
| X27 | When required, the server turned down the volume so that we could speak to each other without shouting. | 5.17 | 0.76 | 25.07 | 0.00 | | | |
| X28 | The other customers were polite and courteous in their manner of communicating with the servers. | 5.43 | 0.69 | 21.95 | 0.00 | | | |
| X29 | The sound of the dishes cooked on the spot stimulated my appetite and had a dramatic effect. | 4.74 | 0.74 | 24.16 | 0.00 | | | |
| **Server's speech mannerisms** | | | | | | 0.94 | 0.94 | 0.72 |
| X30 | The server's greeting was friendly and inviting. | 5.36 | 0.83 | | | | | |
| X31 | The server announced each dish in a splendid tone of voice. | 5.27 | 0.86 | 31.6 | 0.00 | | | |
| X32 | The sever was well trained, as indicated in his detailed introductions for each dish. | 5.12 | 0.82 | 29.45 | 0.00 | | | |
| X33 | The server's vocal mannerisms were very cordial and friendly. | 5.5 | 0.88 | 33.19 | 0.00 | | | |
| X34 | The server's manner of speaking was courteous and respectful. | 5.52 | 0.85 | 31.47 | 0.00 | | | |
| X35 | While departing, the server bid us a congenial farewell. | 5.31 | 0.85 | 31.07 | 0.00 | | | |
| **The dining environment** | | | | | | 0.9 | 0.9 | 0.61 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| X36 | The seating was very comfortable. | 5.23 | 0.82 | | | | |
| X37 | The seating arrangement was properly thought out, so that I was seated at a comfortable distance from the table and the adjacent diners. | 5.29 | 0.78 | 26.75 | 0.00 | | |
| X38 | The tableware was well designed and easy to use. | 5.31 | 0.82 | 28.88 | 0.00 | | |
| X39 | The tablecloth and napkins were pleasing to touch. | 5.14 | 0.82 | 28.71 | 0.00 | | |
| X40 | Each dish was served at exactly the right temperature. | 5.47 | 0.73 | 24.68 | 0.00 | | |
| X41 | The temperature of the dining room was set at a comfortable level. | 5.41 | 0.67 | 21.92 | 0.00 | | |
| **Experiential dining** | | | | | | 0.86  0.86  0.51 | |
| X42 | I was given a chance to touch some of the raw ingredients. | 4.73 | 0.72 | | | | |
| X43 | I was given a chance to experience how the texture of the raw ingredients changes during different stages of the cooking process. | 4.91 | 0.78 | 22.85 | 0.00 | | |
| X44 | Touching the splendid vessel in which each dish was served amplified the restaurant's theme. | 5.19 | 0.79 | 23.26 | 0.00 | | |
| X45 | During the course of the meal, I experienced a wide range of textures, including crisp, crunchy, slippery, soft, and tender. | 5.37 | 0.75 | 22.01 | 0.00 | | |
| X46 | The server was good at attending to our needs (pouring water, bringing napkins, etc.) without having to be asked. | 5.34 | 0.69 | 20.16 | 0.00 | | |
| X47 | After the meal we were given a souvenir matching the theme of the restaurant. | 3.96 | 0.60 | 17.39 | 0.00 | | |
| **The taste of the cuisine** | | | | | | 0.93  0.93  0.62 | |
| X48 | Each dish had a rich depth of flavor. | 5.34 | 0.80 | | | | |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| X49 | The various ingredients of each dish were perfectly blended and harmonized. | 5.44 | 0.76 | 25 | 0.00 | | | |
| X50 | Each dish included a variety of condiments for adjusting the taste to suit your palate. | 5.39 | 0.67 | 21.49 | 0.00 | | | |
| X51 | In terms of flavor, this restaurant stands out from the crowd. | 5.32 | 0.78 | 26.04 | 0.00 | | | |
| X52 | From start to finish, the meal always had something new, so that I was constantly anticipating the next course. | 5.22 | 0.82 | 27.81 | 0.00 | | | |
| X53 | The chef readily made accommodations for dietary restrictions, and the results were fabulous. | 5.14 | 0.80 | 26.78 | 0.00 | | | |
| X54 | The chef has a unique way of preparing food, resulting in an unforgettable taste experience. | 4.95 | 0.81 | 27.25 | 0.00 | | | |
| X55 | The chef uses layering to give ordinary ingredients an extraordinary flavor. | 5.22 | 0.84 | 28.79 | 0.00 | | | |
| **The healthiness of the food** | | | | | | 0.86 | 0.86 | 0.67 |
| X56 | Each dish was healthy and wholesome. | 5.1 | 0.75 | | | | | |
| X57 | All of the ingredients were fresh and top grade. | 5.37 | 0.88 | 26.93 | 0.00 | | | |
| X58 | Each dish retained the original flavor of its respective ingredients. | 5.41 | 0.83 | 25.29 | 0.00 | | | |
| **Ambient smell** | | | | | | 0.89 | 0.91 | 0.67 |
| X59 | Every part of the restaurant had a pleasant smell. | 5.31 | 0.73 | | | | | |
| X60 | The restaurant has a distinctive fragrance which matches its theme. | 4.86 | 0.84 | 25.03 | 0.00 | | | |
| X61 | The restroom is pleasant smelling. | 5.26 | 0.69 | 20.25 | 0.00 | | | |
| X62 | Any fragrances given off by the tableware (napkins, etc.) went well with the restaurant's theme. | 4.67 | 0.87 | 26.03 | 0.00 | | | |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| X63 | The restaurant offers seasonal dishes matching the natural fragrances of the season. | 4.68 | 0.85 | 25.46 | 0.00 | | | |
| **Food aroma** | | | | | | 0.88 | 0.88 | 0.64 |
| X64 | Each dish had an attractive aroma. | 5.47 | 0.78 | | | | | |
| X65 | The various ingredients combined to create a novel aroma. | 5.34 | 0.83 | 26.64 | 0.00 | | | |
| X66 | Each dish retained the original aroma of its respective ingredients. | 5.32 | 0.80 | 25.32 | 0.00 | | | |
| X67 | Each dish was prepared and served in such a way that its aroma wafted out in all directions. | 5.21 | 0.80 | 25.35 | 0.00 | | | |

Table 2. Fit statistics of model comparison

| | Model 1 (baseline model) | Model 2[*] (parceling model) | Model 3 (item reduction model) |
|---|---|---|---|
| *chisq* | 7713.39 | 2561.584[*] | 2397.916 |
| *df* | 2053 | 649 | 769 |
| *pvalue* | 0 | 0 | 0 |
| *CFI* | 0.892 | 0.947[*] | 0.951 |
| *TLI* | 0.884 | 0.936[*] | 0.943 |
| *RMSEA* | 0.056 | 0.058[*] | 0.049 |
| *SRMR* | 0.05 | 0.039[*] | 0.038 |

Note: The values in model 2 are average of 100 iterative random parceling models.

Table 3. Results of CFA

| Latent Factor | Indicator | Study 2 (item reduction model) | | | | Study 3 | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Beta | alpha | CR | AVE | Beta | alpha | CR | AVE |
| Attractiveness of spatial layout (AS) | | | 0.86 | 0.86 | 0.67 | | 0.83 | 0.83 | 0.62 |
| | X2 | 0.79 | | | | 0.789 | | | |
| | X3 | 0.81 | | | | 0.767 | | | |
| | X4 | 0.86 | | | | 0.81 | | | |
| Decorativeness of the dining environment(DE) | | | 0.86 | 0.88 | 0.72 | | 0.82 | 0.82 | 0.6 |
| | X7 | 0.89 | | | | 0.796 | | | |
| | X8 | 0.88 | | | | 0.781 | | | |
| | X10 | 0.73 | | | | 0.751 | | | |
| Food presentation(FP) | | | 0.89 | 0.89 | 0.72 | | 0.85 | 0.86 | 0.67 |
| | X13 | 0.82 | | | | 0.778 | | | |
| | X14 | 0.86 | | | | 0.894 | | | |
| | X15 | 0.87 | | | | 0.788 | | | |
| Server's appearance(SA) | | | 0.85 | 0.85 | 0.66 | | 0.83 | 0.83 | 0.63 |
| | X16 | 0.80 | | | | 0.83 | | | |
| | X17 | 0.81 | | | | 0.836 | | | |
| | X18 | 0.82 | | | | 0.725 | | | |
| The server's bearing and mannerisms(BM) | | | 0.89 | 0.89 | 0.73 | | 0.93 | 0.93 | 0.82 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | X19 | 0.85 | | | | 0.904 | | | |
| | X20 | 0.85 | | | | 0.899 | | | |
| | X21 | 0.86 | | | | 0.907 | | | |
| Applicability of technological devices (TD) | | | 0.95 | 0.95 | 0.84 | | 0.97 | 0.97 | 0.91 |
| | X22 | 0.90 | | | | 0.942 | | | |
| | X23 | 0.93 | | | | 0.963 | | | |
| | X24 | 0.93 | | | | 0.961 | | | |
| | X25 | 0.91 | | | | 0.941 | | | |
| Background sound(BS) | | | 0.80 | 0.81 | 0.59 | | 0.68 | 0.69 | 0.53 |
| | X26 | 0.80 | | | | - | | | |
| | X27 | 0.74 | | | | 0.77 | | | |
| | X29 | 0.77 | | | | 0.677 | | | |
| Server's speech mannerisms (SM) | | | 0.90 | 0.9 | 0.75 | | 0.91 | 0.91 | 0.77 |
| | X31 | 0.84 | | | | 0.812 | | | |
| | X33 | 0.90 | | | | 0.931 | | | |
| | X34 | 0.86 | | | | 0.897 | | | |
| The dining environment (DE) | | | 0.86 | 0.86 | 0.68 | | 0.88 | 0.88 | 0.71 |
| | X36 | 0.81 | | | | 0.819 | | | |
| | X38 | 0.83 | | | | 0.876 | | | |
| | X39 | 0.84 | | | | 0.829 | | | |
| Experiential | | | 0.82 | 0.82 | 0.61 | | 0.77 | 0.77 | 0.53 |

dining(ED)

| | | Loading | | | | Loading | | | |
|---|---|---|---|---|---|---|---|---|---|
| | X43 | 0.75 | | | | 0.655 | | | |
| | X44 | 0.82 | | | | 0.799 | | | |
| | X45 | 0.79 | | | | 0.764 | | | |
| The taste of the cuisine(TC) | | | 0.88 | 0.88 | 0.71 | | 0.89 | 0.89 | 0.74 |
| | X52 | 0.81 | | | | 0.778 | | | |
| | X54 | 0.84 | | | | 0.883 | | | |
| | X55 | 0.87 | | | | 0.915 | | | |
| The healthiness of the food(HF) | | | 0.86 | 0.86 | 0.67 | | 0.86 | 0.86 | 0.68 |
| | X56 | 0.75 | | | | 0.734 | | | |
| | X57 | 0.88 | | | | 0.87 | | | |
| | X58 | 0.83 | | | | 0.885 | | | |
| Ambient smell(AS) | | | 0.90 | 0.9 | 0.76 | | 0.85 | 0.87 | 0.69 |
| | X60 | 0.84 | | | | 0.896 | | | |
| | X62 | 0.90 | | | | 0.905 | | | |
| | X63 | 0.88 | | | | 0.642 | | | |
| Food aroma(FA) | | | 0.84 | 0.85 | 0.65 | | 0.88 | 0.88 | 0.71 |
| | X65 | 0.81 | | | | 0.815 | | | |
| | X66 | 0.79 | | | | 0.836 | | | |
| | X67 | 0.81 | | | | 0.879 | | | |

Table 4. Correlations and squared roots of AVE (Stage 1)

| | M | SD | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 AS | 5.08 | 1.12 | *0.82* | | | | | | | | | | | | | |
| 2 DE | 4.97 | 1.20 | 0.77 | *0.85* | | | | | | | | | | | | |
| 3 FP | 5.06 | 1.20 | 0.69 | 0.73 | *0.85* | | | | | | | | | | | |
| 4 SA | 5.31 | 1.02 | 0.61 | 0.63 | 0.67 | *0.81* | | | | | | | | | | |
| 5 BM | 5.46 | 1.05 | 0.55 | 0.54 | 0.58 | 0.76 | *0.85* | | | | | | | | | |
| 6 TD | 5.71 | 1.91 | 0.44 | 0.5 | 0.53 | 0.38 | 0.32 | *0.92* | | | | | | | | |
| 7 BS | 4.94 | 1.19 | 0.68 | 0.72 | 0.71 | 0.65 | 0.64 | 0.61 | *0.77* | | | | | | | |
| 8 SM | 5.43 | 1.08 | 0.58 | 0.56 | 0.58 | 0.69 | 0.81 | 0.35 | 0.68 | *0.87* | | | | | | |
| 9 DE | 5.23 | 1.08 | 0.65 | 0.68 | 0.68 | 0.67 | 0.65 | 0.44 | 0.74 | 0.69 | *0.82* | | | | | |
| 10 ED | 5.16 | 1.15 | 0.64 | 0.67 | 0.70 | 0.66 | 0.61 | 0.48 | 0.74 | 0.64 | 0.73 | *0.78* | | | | |
| 11 TC | 5.13 | 1.20 | 0.61 | 0.63 | 0.66 | 0.59 | 0.60 | 0.50 | 0.70 | 0.63 | 0.69 | 0.73 | *0.84* | | | |
| 12 HF | 5.29 | 1.08 | 0.54 | 0.58 | 0.61 | 0.60 | 0.64 | 0.41 | 0.67 | 0.66 | 0.68 | 0.71 | 0.73 | *0.82* | | |
| 13 AS | 4.73 | 1.42 | 0.59 | 0.68 | 0.65 | 0.55 | 0.52 | 0.62 | 0.75 | 0.54 | 0.67 | 0.68 | 0.70 | 0.64 | *0.87* | |
| 14 FA | 5.29 | 1.06 | 0.59 | 0.59 | 0.64 | 0.61 | 0.58 | 0.44 | 0.66 | 0.65 | 0.68 | 0.69 | 0.77 | 0.71 | 0.68 | *0.81* |

*Note:*

1. The diagonal elements are the squared root of the average variance extracted.

2. The off-diagonal elements are the correlations between the constructs ($p < 0.05$)

Table 5. Mean, SD, and correlations of the five sensation (Stage 1)

| | Mean | SD | Visual Sensation | Auditory Sensation | Touch Sensation | Gustatory Sensation |
|---|---|---|---|---|---|---|
| Visual Sensation | 5.27 | 0.99 | -- | | | |
| Sound Sensation | 5.19 | 1.04 | 0.85$^{***}$ | -- | | |
| Touch Sensation | 5.19 | 1.04 | 0.82$^{***}$ | 0.83$^{***}$ | -- | |
| Taste Sensation | 5.21 | 1.06 | 0.77$^{***}$ | 0.78$^{***}$ | 0.81$^{***}$ | -- |
| Olfaction Sensation | 5.01 | 1.14 | 0.80$^{***}$ | 0.77$^{***}$ | 0.8$^{***}$ | 0.82$^{***}$ |

*Note:* $^{***}$ Correlation coefficients are significant at the 0.001

Table 6. Results of criterion-related validity (Stage 2)

| | Word of Mouth | Revisit Intention | Restaurant Attachment |
|---|---|---|---|
| N | 430 | 430 | 430 |
| space | 0.31*** | 0.29*** | 0.35*** |
| doc | 0.33*** | 0.31*** | 0.39*** |
| visual | 0.46*** | 0.42*** | 0.51*** |
| appearance | 0.47*** | 0.39*** | 0.49*** |
| behavior | 0.49*** | 0.40*** | 0.51*** |
| tech | 0.13*** | 0.16*** | 0.24*** |
| sound | 0.40*** | 0.37*** | 0.45*** |
| greeting | 0.54*** | 0.44*** | 0.52*** |
| comfort | 0.48*** | 0.45*** | 0.51*** |
| touch | 0.58*** | 0.54*** | 0.58*** |
| taste | 0.66*** | 0.61*** | 0.64*** |
| health | 0.59*** | 0.52*** | 0.51*** |
| odor | 0.37*** | 0.42*** | 0.45*** |
| smell | 0.61*** | 0.57*** | 0.57*** |
| Visual Sensation | 0.46*** | 0.43*** | 0.55*** |
| Sound Sensation | 0.52*** | 0.45*** | 0.54*** |
| Touch Sensation | 0.58*** | 0.54*** | 0.6*** |
| Taste Sensation | 0.67*** | 0.6*** | 0.62*** |
| Olfaction Sensation | 0.53*** | 0.54*** | 0.57*** |

*Note:* *** Correlation coefficients are significant at the 0.00 level

Table 7. Results of OLS (Stage 2)

| DV | Model 1: Word of Mouth | | Model 2: Revisit Intention | | Model 3: Restaurant Attachment | |
|---|---|---|---|---|---|---|
| | *Beta* | *S.E.* | *Beta* | *S.E.* | *Beta* | *S.E.* |
| (Intercept) | 0.00 | 0.49 | 0.00 | 0.63 | 0.00 | 0.55 |
| Gender | -0.05 | 0.11 | -0.03 | 0.14 | -0.03 | 0.12 |
| Family composition | -0.03 | 0.07 | -0.02 | 0.1 | -0.01 | 0.08 |
| Education | 0.03 | 0.1 | -0.02 | 0.13 | -0.03 | 0.11 |
| Age | 0.02 | 0.06 | 0.08 | 0.08 | 0.02 | 0.07 |
| Visual Sensation | 0.00 | 0.09 | -0.03 | 0.12 | $0.16^{**}$ | 0.1 |
| Sound Sensation | 0.07 | 0.08 | -0.03 | 0.1 | 0.02 | 0.09 |
| Touch Sensation | $0.16^{**}$ | 0.09 | $0.21^{***}$ | 0.12 | $0.16^{**}$ | 0.1 |
| Taste Sensation | $0.48^{***}$ | 0.07 | $0.38^{***}$ | 0.09 | $0.35^{***}$ | 0.08 |
| Olfaction Sensation | 0.07 | 0.07 | $0.19^{***}$ | 0.09 | 0.10 | 0.08 |
| F | $45.46^{***}$ | | $34.49^{***}$ | | $42.70^{***}$ | |
| Adj. $R^2$ | 0.48 | | 0.41 | | 0.47 | |

Note: The Beta is standardized coefficient

# 109年度專題研究計畫成果彙整表

| 計畫主持人：劉瓊如 | | | 計畫編號：109-2410-H-415-033- | | |
|---|---|---|---|---|---|
| 計畫名稱：餐飲五感難忘體驗：量表建構並從角色理論觀點進行模式驗證 | | | | | |

| 成果項目 | | | 量化 | 單位 | 質化<br>（說明：各成果項目請附佐證資料或細項說明，如期刊名稱、年份、卷期、起訖頁數、證號...等） |
|---|---|---|---|---|---|
| 國內 | 學術性論文 | 期刊論文 | 0 | 篇 | |
| | | 研討會論文 | 0 | | |
| | | 專書 | 0 | 本 | |
| | | 專書論文 | 0 | 章 | |
| | | 技術報告 | 0 | 篇 | |
| | | 其他 | 0 | 篇 | |
| 國外 | 學術性論文 | 期刊論文 | 0 | 篇 | |
| | | 研討會論文 | 0 | | |
| | | 專書 | 0 | 本 | |
| | | 專書論文 | 0 | 章 | |
| | | 技術報告 | 0 | 篇 | |
| | | 其他 | 1 | 篇 | 目前已將本計畫成果投稿至Journal of Business Research(SSCI),目前進入審稿中！ |
| 參與計畫人力 | 本國籍 | 大專生 | 0 | 人次 | |
| | | 碩士生 | 1 | | 訓練研究生具備餐飲五感難忘體驗及消費者行為等管理意涵之相關能力，包括：進行研究設計、資料調查等能力，以及解決實務上之管理問題的能力。 |
| | | 博士生 | 2 | | 訓練博士生具備餐飲五感難忘體驗及消費者行為等管理意涵之相關能力，包括：進行研究資料調查與分析能力，以及解決實務上之管理問題的能力與執行專案計畫之實務能力，進而充實經營管理知識與專業技能。 |
| | | 博士級研究人員 | 0 | | |
| | | 專任人員 | 0 | | |
| | 非本國籍 | 大專生 | 0 | | |
| | | 碩士生 | 0 | | |
| | | 博士生 | 0 | | |
| | | 博士級研究人員 | 0 | | |
| | | 專任人員 | 0 | | |
| 其他成果<br>（無法以量化表達之成果如辦理學術活動、獲得獎項、重要國際合作、研究成果國 | | | | | |

| 際影響力及其他協助產業技術發展之具體效益事項等，請以文字敘述填列。） | |