The impact of sensory cues and demographic characteristics on consumers' online food shopping behavior

Nur Alya Nasuha Sakri[a*], Aslinda Mohd Shahril[b], Chemah Tamby Chik[c], & Melyani Tuti[d]

[a, b, c]*Faculty of Hospitality and Tourism Management, Universiti Teknologi MARA Puncak Alam, Malaysia*
[d]*Department of Management, Universitas Asa, Indonesia*

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ABSTRACT

In Malaysia, meal delivery systems have proliferated after the COVID-19 outbreak. There is a growing trend among consumers to transition from purchasing food in-store at restaurants to placing orders online via food applications. Notwithstanding the surge in digital food sales, internet consumers continue to desire the tactile encounter offered by eateries. The transition from dining in restaurants to purchasing food online presents considerable challenges for food companies attempting to comprehend consumer behaviour about online food purchases. Thus, the effect of sensory cues on online food purchases is investigated in this study. Furthermore, this study explores the association between online food consumption and sensory cues, in addition to investigating the relationship between consumer behaviour and demographic variables such as age, gender, income, and employment status. A quantitative survey of 359 online food purchasers from the Klang Valley was undertaken. SPSS was employed to perform an empirical analysis of the correlations that were identified. Analysis using linear regression revealed that sensory cues impact the purchasing decisions of consumers. Additionally, age and wealth were found to have an impact on consumer purchasing behaviour, but gender and employment were found to have a negative influence. The insights derived from these studies have the potential to aid food producers in the formulation of effective marketing strategies that are tailored to individual customer profiles and sensory preferences. As a result, this could enable them to meet the evolving needs of online food consumers.

* Corresponding author. *E-mail address*: 2021632746@student.uitm.edu.my

1. Introduction

Malaysia, among numerous nations, enforced the Movement Control Order (MCO) on March 18, 2020, in response to the COVID-19 pandemic (The Asean Post, 2022). Malaysians' reliance on mobile applications to place restaurant orders for food constituted a substantial paradigm shift in response to the epidemic (Tam & Chiew, 2022). The notion of leveraging the Internet to expand and maintain their operations was embraced by nearly all food operators, including major chains such as McDonald's and Kentucky Fried Chicken (KFC), in addition to smaller establishments (Ayamany, 2021). Consumer interest and demand for online purchases have increased substantially as a result of the COVID-19 pandemic. According to Grab (2023), despite the end of the pandemic, there remains an unyielding surge in the demand for food purchased through online platforms (Durai, 2023).

Nevertheless, akin to their in-store counterparts, online consumers continue to desire a pleasant shopping environment that incorporates the sensory experience of foods. Online shopping is a relatively recent phenomenon when compared to conventional shopping. Numerous clients continue to perceive it as a venture fraught with danger (Dash et al., 2021). Online consumers have reported greater scepticism regarding the quality of the food displayed on the screen, in contrast to their in-store counterparts who necessitate assistance in virtually accessing and evaluating the products (Kumar et al., 2020). As a result, in order to attract and retain customers, as well as to cater to the expanding trend of online food shopping, online food enterprises have adopted sensory marketing tactics.

Food online marketers have implemented appealing food pictures on websites such as FoodPanda, ShopeeFood, and Grab to deliver food perception among consumers on screen. Similarly, The Edge Malaysia reported that visual or food images could elicit tastiness and temptation towards the food, especially when browsing food from food apps (Izzuddin, 2021). Thus, in the virtual context, sensory cues act as a supporting aid in delivering maximum product information to customers (Ifeanyichukwu & Peter, 2018; Hussain, 2018) and in fostering positive interaction and perception of the goods (Elder & Krishna, 2010). Sensory cue has been found to be a crucial factor that affects online customer purchase behaviour and has been highlighted as an essential factor in online business by academics and industry experts (Biswas, 2019; Girard et al., 2019; Huang & Labroo, 2020; Zha et al., 2022). Thus, this study would like to evaluate how sensory cues play a role in influencing consumers to purchase food online using food apps among Malaysian people in the Klang Valley area.

On the other hand, regardless of the importance of implying sensory cues as a marketing strategy to grasp attention and deliver food perception on screen, consumers' characteristics are another factor that influences consumer purchase behaviour using food apps. Several studies have been done to evaluate the effect of socio-demographic variables on online food purchase behaviour in different countries, such as Great Britain (Hood et al., 2020), Italy (Finotto et al., 2020), China (Beijing, Shanghai, and Shenzhen) (Wang & Somogyi, 2019), Australia, Canada, Mexico, the United Kingdom and the United States (Keeble et al., 2020) and others. Previously, a study was conducted among university students in Malaysia to evaluate their food choices and purchase behaviour using food apps (Eu & Sameeha, 2021; Hooi et al., 2021). Meanwhile, in their paper, Pitchay et al. (2022) have only evaluated the age factor as a moderator to evaluate consumer online purchase intention. However, studies on the influence of socio-demographics in Malaysia, specifically in Klang Valley, still need to be made available. Therefore, this paper aims to study how socio-demographic factors, such as age, gender, income, and type of employment, can influence consumer online purchase behavior.

The proliferation of online food apps in Malaysia, such as FoodPanda, Grab, and ShopeeFood, has resulted in a positive reception among Malaysian people (Durai, 2023). However, there needs to be more discussion regarding the effect of sensory cue use in food apps and socio-demographic factors' effect on consumers purchasing food online, particularly in Klang Valley, Malaysia. Thus, this study would like to explain the role of sensory cues, which are food images on the food apps' interface, that could deliver food perception and influence their food purchase behaviour on screen. Furthermore, the study underlined that the Stimulus Organism Response (S-O-R) model helps explain consumer purchase behaviour by

determining the efficacy of sensory marketing in online purchasing and how customers perceive products virtually. The SOR model is well-regarded for studying the impact of external factors on individual internal responses (Lee & Min, 2021). This SOR explains consumer purchase behaviour and also their characteristics measured in demographics, which can be seen in Figure 1. In addition, demographic segmentation plays a crucial role in meeting the wants and demands of the target market for the company's persuasive efforts to influence and encourage the choice to buy. By using demographic variables, including age, gender, as well as income, and occupation, numerous market segments are divided into groupings. Additionally, online food marketers can profit from a more profound understanding of their target market and develop suitable strategies to increase sales from online transactions.

2.   Literature review

2.1 Sensory cues

Sensory cues are used in marketing strategies in many industries, such as apparel retailing, hotel and accommodation, food and beverage, and travel agencies. This technique uses human senses such as sight, sound, touch, smell, and taste to deliver product perception and manipulate consumers' emotions to influence them to purchase the product offered (Erenkol & Merve, 2015; Krishna, 2012). Besides, sensory cues (food image) were found to foster interaction between the products and customers, especially in the online food context (Izzuddin, 2021), where the consumer has limitations in experiencing the food on screen. The use of sensory features in marketing strategies may influence customers' purchasing behaviour when selecting desired products (Kumar & Kumar, 2017). Krishna (2012) reported sensory elements in marketing as a complex combination made by sellers to promote and gain customer trust for their products.

In the physical store, customers can directly encounter the sensory cues that may aid in their physical evaluation of the goods (Ringler et al., 2019; Spence et al., 2016). Nevertheless, it runs counter to the experience that an online purchaser can have with the product because they are limited to physically examining some components of the product on a screen (Dzyabura et al., 2019). Therefore, online food retailers need to offer a sensory approach close to physical stores to stimulate the absent senses. Helmefalk and Hultén (2017) stated that at the pre-purchase stage, consumers solely depend on sensory elements to help them judge the product and decide to purchase it. In line with this statement, Khare et al. (2012) stated that consumers struggle to fulfil their online orders due to the limitations of directly engaging with the products, particularly the tactile, olfactory, and gustatory ones. Therefore, to fill the virtual gaps that consumers encounter, online food marketers need to offer an effective marketing strategy by implementing sensory elements in the advertising approach (Biswas, 2019).

Therefore, according to the above argument, this study claims that sensory cues have a positive relationship with consumer online purchase behavior, which leads to the first hypothesis of the study:

Hypothesis 1: Sensory cues used in food online marketing has an influence on consumer purchase behavior.

2.2 Demographics

Research has shown that consumers' online shopping behaviour can be influenced by their demographic characteristics, including gender, education, age, and income (Brashear et al., 2009; Dai et al., 2019; Hou, 2020; Rodgers & Harris, 2003). Historically, gender has been seen as a reliable indicator of customers' online shopping behaviour (Dai et al., 2019; Hansen & Jensen, 2009; Hernández et al., 2011). Research findings frequently indicate that the way products are presented online has a greater impact on the intention to make a purchase for males compared to females (Lin et al., 2019). Contrary to the prevailing perception that men are more motivated to make online purchases, Pascual-Miguel et al. (2015) and Hood et al. (2020)

found that female consumers show a preference for online shopping. This contradicts the findings of previous studies.

Rambi et al. (2014) discovered that age has a substantial impact on the behaviour of consumers when purchasing online. Research has shown that there is a correlation between age and online purchasing behaviour, with younger individuals being more likely to engage in online shopping (Hou, 2020; Joines et al., 2003). Dharmesti et al. (2021) found that being familiar with the online shopping procedure enhances individuals' satisfaction while making purchases on the Internet. For older adults with higher computer anxiety and less information technology knowledge, online shopping is less acceptable (Dholakia & Uusitalo, 2002).

Research has shown that online buyers generally have greater income levels compared to offline customers. This suggests that the ability to spend money is not a limiting factor when making online purchases (Punj, 2012). Income is positively correlated with consumers' motivation and interest in purchasing online (Nagra & Gopal, 2013). In addition, those with higher incomes and hectic schedules exhibit a greater propensity to engage in online shopping, primarily due to time constraints that hinder their ability to visit brick-and-mortar establishments (Hou, 2020; Tham et al., 2019).

In reference to the nature of work, Wang and Somogyi (2018) reported that individuals with high-level positions and steady employment exhibit favourable online food shopping behaviours across all food categories. Consistent with the assertion, Hood et al. (2020) discovered that those with stable employment are inclined to engage in online food shopping as a result of time constraints in food preparation, with financial considerations being of little concern. In contrast to the findings of Hamad and Schmitz (2019), it was determined that occupation does not influence customer purchase behaviour. Consequently, based on the preceding argument, the subsequent hypotheses are put forth:

Hypothesis 2: Gender has an influence on consumer purchase behavior.
Hypothesis 3: Age has an influence on consumer purchase behavior.
Hypothesis 4: Income has an influence on consumer purchase behavior.
Hypothesis 5: Type of employment has an influence on consumer purchase behavior.

Based on the above hypotheses, Figure 1 below represents the study's framework.
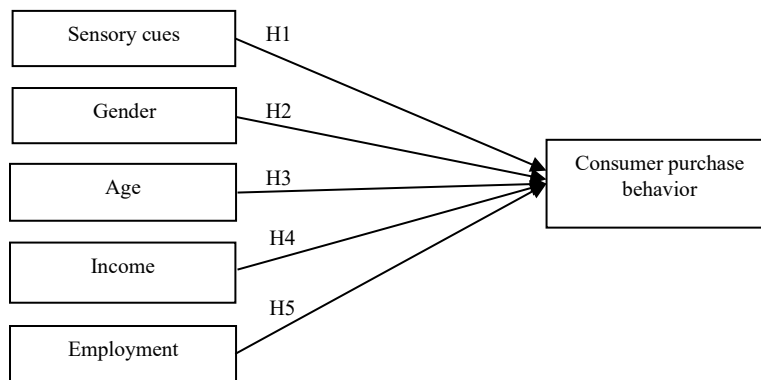

Fig 1. Research framework.

3.   Methodology

The research paradigm for this study was based on quantitative methods, with the implementation of a structured questionnaire as the research instrument to gather primary data. The quantitative approach was chosen as the most suitable approach for this study because it would be easier for the researcher to make comparisons and statistical aggregation by surveying a greater number of people using a rigid, predetermined set of variables. The Likert scale approach used in this questionnaire uses a scale from 1 to 5, with 5 denoting strong agreement. The design of surveys was created and adjusted from multiple findings of prior research, notably Brewer and Sebby (2021) and Kim et al. (2023), with a focus on sensory cues. Simultaneously, questions pertaining to consumer purchase behaviour were adapted and modified according to the findings of Miah et al. (2022). Convenience sampling was used in this survey to gather data from online food shoppers in the Klang Valley area.

3.1   Sampling and data collection

Three distributions were utilised to collect data among online food purchases in Klang Valley via Google Forms, printed questionnaires, and QR codes using a convenient sampling method. The range of approaches was chosen to accommodate respondents' different levels of internet connection and response time. At the beginning of the questionnaire, all respondents were asked for their consent to answer the questions, followed by four filter questions: Have you ever used any online platform to purchase food from restaurants, fast food restaurants, or food stalls? (Food Panda, GrabFood, and ShopeeFood) Are you 18 years old or older? Are you currently staying in or working in the Klang Valley area? Do you purchase food online from restaurants, fast food restaurants, or stalls (via Food Panda, GrabFood, and ShopeeFood) at least once a month?

The purpose of screening questions is to avoid bias during data collection. This questionnaire is divided into two parts: Part A and Part B. Part A discusses the variables that will be tested in this study, whereas Part B discusses the respondents' demographics. This questionnaire employed a Likert scale approach, with a scale of 1 to 5, with 5 indicating strong agreement. The questions were written in both English and Malay using bilingual questionnaires to aid in gathering strong responses from respondents. To obtain data, the researcher distributed an online survey via Google Forms using social media platforms such as Facebook, Instagram, Twitter, and Telegram. In contrast, printed questionnaires and QR codes were physically collected in restaurants, malls, and food outlets. In determining the number of respondents, this study used a sample-to-variable ratio to determine the sample size, using a 5:1 ratio to find the minimum number of respondents (Hair et al., 2018).

The number of respondents was determined using this method by the number of items in a study, which is 150 respondents from a total of 30 items multiplied by 5. Thus, the minimum number of respondents was 150 and must not exceed 500 respondents (Roscoe, 1975). A combined total of 359 usable responses (74 online and 285 through the offline survey) In the case of an online survey, 119 people opened the link. However, 30 people are not staying or working in Klang Valley, and another 12 people have no experience purchasing food online at least once a month. So, the remaining 74 usable questionnaires from the online survey were used for analysis. In an offline survey, the questionnaires were administered to over 314 individuals; 19 respondents did not complete the survey. Other than that, 19 questionnaires were rejected because the respondents left the question blank, and after checking the outliers, 10 cases were removed from the data. After the data cleaning process, all 359 questionnaires were prepared for data analysis. This study used SPSS to analyse the data.

4.   Findings and discussion

Table 1 illustrates the demographic characteristics of the 359 participants who took part in the study. The demographic composition of this sample enables a clear explanation of the analysis procedure for this study. Upon comprehensive analysis of potential deviations, the overall sample size for those who purchase food online in the Klang Valley area was 359. Within this set of samples, 31.5% were identified as male, while 68.5% were identified as female.

The data shown in Table 1 indicates that individuals between the ages of 18 and 27 represented the majority of the sample, making up 75.5%. The majority of the participants were employed individuals, representing over half of the total study sample, specifically 75.2%. Furthermore, the student population ranked second in terms of participation in this survey, which was 20.1%. Among the respondents, 3.3% were self-employed individuals, while those who owned their own businesses had the lowest participation rate, resulting in only 1.4% of the total number of respondents. The majority of respondents recorded an income ranging from RM1500 to RM2500, according to the findings. The highest income, ranging from RM1500 to RM2500, represented 39.3% of the total. The second highest income was below RM1500, which contributed to 35.7%.

Table 1. Respondents' profile (N=359)

Category	Frequency	Percent (%)
Gender		
Male	113	31.5%
Female	246	68.5%
Total	359	100
Age		
18–27	271	75.5%
28–37	75	20.9%
38–47	10	2.8%
>48	3	.8%
Total	359	100
Income		
<RM1500	128	35.7
RM1501–RM2500	141	39.3%
RM2501–RM3500	55	15.3%
RM3501–RM4500	14	3.9%
RM4501–RM5500	7	1.9%
>RM5501	14	3.9%
Total	359	100
Employment		
Student	72	20.1%
Working	270	75.2%
Self-employ	12	3.3%
Own business	5	1.4%
Total	359	100

Source: Authors' calculations

4.1 Reliability analysis

The reliability test was performed to provide accurate and consistent results from the information collected from the respondents. In this study, the results show that the alpha coefficient for sensory cues is 0.879. Meanwhile, the dependent variable's coefficient value for consumer purchase behaviour is 0.851. Thus, it shows all the values in the measurement range from 0.851 to 0.879, which exceeds the minimum acceptability coefficient. The summary of the results can be seen in Table 2 below.

Table 2: Cronbach's Alpha coefficient for sensory cues and consumer purchase behavior

Variables	Alpha coefficient (α)
Sensory cues	0.879
Consumer purchase behavior	0.851

4.2 Regression analysis

Subsequently, the study employed regression analysis to examine the relationship between variables and elucidate the impact of independent variables, such as sensory cues, gender, age, income, and employment, on consumer purchase behaviour, the dependent variable. The researcher employed dummy coding in SPSS to analyse the data on gender and employment, given that these variables are nominal indicators. The value 1 corresponds to males, whereas the value 2 corresponds to females in terms of gender. The employment categories are as follows: value 1 corresponds to students, value 2 corresponds to individuals who are currently employed, value 3 corresponds to those who are self-employed, and value 4 corresponds to individuals who own their own business.

Table 3: Model summary for sensory cues and demographic factor towards consumer purchase behavior

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.571	.326	.316	.469

a: Predictors: (Constant), Employment, ASC, Gender, Age, Income
b: Dependent variable: Consumer Purchase Behavior

Based on Table 3, the model summary showed the R^2 value was 0.326. This indicated that 32.6% of the variation in the dependent variables, which was consumer purchase behavior, could be explained by the independent variables, which were sensory cues, gender, age, income, and employment. In other words, sensory cues and demographic characteristics can predict more than 30% of consumer purchase behavior. We also found that sensory cues and demographic characteristics explain a significant amount of the variance in the value of consumer purchase behaviour in the food online context (F (5, 353) = 32.082, p<0.01, R^2 = 0.326).

Table 4: Regression analysis for sensory cues and demographic factors toward consumer purchase behaviour

Model	Standardized Coefficients Beta	Std. Error	t	p	Results
Constant		.229	7.384	<.001	
ASC	.537	.047	12.208	<.001	Supported
Gender	.050	.054	1.128	.260	Not supported
Age	-.116	.049	-2.390	.017	Supported
Income	.115	.024	2.262	.024	Supported
Employment	-.071	.053	-1.469	.143	Not supported

Dependent variable: Consumer purchase behavior

4.3 Hypotheses results

The study seeks to investigate the effect of sensory cues, gender, age, income, and employment on consumer purchase behaviour. The dependent variable (consumer purchase behavior) was regressed on predicting variables of sensory cues and demographic factors such as gender, age, income, and type of employment. The independent variables significantly predict consumer purchase behavior (F (5, 353) = 32.082, p <0.01), which indicates that the five factors under study have a significant impact on consumer purchaser behaviour in the online setting. Moreover, the R^2 = 0.326 indicates that the model explains 32.6% of the variances in consumer purchase behavior.

Additionally, the coefficient was further assessed to ascertain the influence of each of the factors on the creation variable (consumer purchase behavior). H1 evaluates whether sensory cues significantly and positively affect consumer purchase behavior. The results revealed that sensory cues have a significant and positive impact on consumer purchase behaviour (B = 0.537, t = 12.208, p = <0.001). Hence, H1 was supported. H2 evaluates whether gender has a significantly positive impact on consumer purchase behavior. The results show that gender has an insignificant positive impact on consumer purchase behaviour (B = 0.050, t = 1.128, p = 0.260).

Consequently, H2 was not supported. H3 evaluates whether age has a significantly positive impact on consumer purchase behavior. The result shows that age has a significant negative impact on consumer purchase behaviour (B = -0.116, t = -2.390, p = 0.017). Hence, H3 was supported. H4 evaluates whether income has a significantly positive impact on consumer purchase behavior. The result shows income has a significant positive impact on consumer purchase behaviour (B =0.115, t = 2.262, p = 0.024). Therefore, H4 was supported. Lastly, H5 evaluates whether the type of employment has a significantly positive impact on consumer purchase behavior. The result shows there is an insignificantly negative impact of employment on consumer purchase behaviour (B = -0.71, t = -1.469, p = 0.143). Thus, H5 was not supported. The results are presented in Table 4.

5.   Conclusion and recommendations

In conclusion, the study confirmed that sensory cues used in food apps influence consumer purchase behaviour when purchasing food online. The study shows sensory cues such as food images help consumers overcome uncertainty and doubt about the food on-screen. Additionally, the implication of sensory cues as supporting aids in online food purchases was found to deliver foods' perception of food information and create engagement with the goods on screen. Moreover, food business owners that conduct their business online should embrace product information with a proper selection of food images to be competitive and meet consumers' needs. In alignment with the previous study, Avery et al. (2021) and Wang et al. (2019) reported that the sensory perception of customers is influenced by the visual representation of food, which conveys distinct gustatory attributes such as sweetness, sourness, saltiness, and spiciness. In light of the fact that the eyes consume information first (van der Laan et al., 2011), this demonstrates the effectiveness of a visual approach in marketing strategy, particularly on the digital platform (Bertini et al., 2020; Blechert et al., 2019). Thus, some clear insights appeared that in online food purchases, the image of food products is essential for consumers to decide whether to purchase among food online purchasers in Klang Valley, Malaysia.

Other than that, the results from regression indicated that demographic variables significantly impact consumer purchase behaviour in online settings. However, it has to be noted that the results vary among the four different demographic groups, which include gender, age, income, and type of employment. The findings showed that gender has a negative influence on consumer purchase behaviour. The study indicates there is no difference between male and female genders when purchasing food online. This result contradicts the previous finding, which found a difference in buying food online between both genders, where females had greater buying power than men (Dominici et al., 2021; Natesan & Venkatesalu, 2020).

Align with tradition, women have generally assumed the responsibility of purchasing household groceries, and internet food shopping has not altered this customary practice. For age, the findings indicate a positive impact on consumer purchase behaviour. From the analysis, young people between 18 and 27 are more likely to purchase food online than older people. This result fits the idea that younger people are more tech-savvy and likelier to shop online than older people. (Dominici et al., 2021). This study indicates that the younger generation prefers to make online purchases because it facilitates their transactions, eliminating wasting time going out to buy food. Other than that, the wide range of food offered on the apps, especially fast food options, is another factor that influences younger people to purchase food online (Chambers et al., 2008; Dana et al., 2021). Furthermore, the younger demographic is naturally exposed to online buying and selling activities, thus influencing the findings of this research.

With respect to income, there is a positive impact between income and consumer purchase behaviour. This study also demonstrates that customers' income contributes to their decision to purchase food online. Buying food online is not a significant burden for those with moderate to high incomes, as they do not face financial constraints. In the same vein as the previous studies, people with stable incomes show positive behaviour toward purchasing online (Spurlock et al., 2020; Van Droogenbroeck & Van Hove, 2017). This is because factors such as the busy nature of work, time constraints, and the need to commute make it more challenging for them to buy food physically compared to online purchases. It is essential to note that food delivery companies like Grab impose high service taxes on every online food purchase, but this does not have a negative impact on the decision to buy food online.

However, the results indicate that the type of employment negatively influences consumer purchase behaviour in a virtual setting. Especially in urban areas, their time constraints and chaotic lifestyles contribute to their preference for online food shopping (Yusra & Agus, 2020). Therefore, not all demographic variables significantly influence consumer purchase behaviour.

Regarding the study's limitations, it exclusively examined the influence of sensory cues, specifically food images, on consumer purchasing behaviour through food apps. Consequently, it is recommended that future research explore additional variables, such as the impact of customer reviews and star ratings. Moreover, there is a suggestion for future studies to narrow down their focus to specific demographic groups, such as university students from various courses, to gain more in-depth insights into their online food purchasing behavior.

Furthermore, the study's sample lacks diversity, as it primarily concentrates on the Klang Valley and urban areas, neglecting a comprehensive representation of Malaysia as a whole. It is proposed that future research endeavours include rural areas to assess consumer purchase behaviour in the context of online food. In terms of research design, the study solely employed quantitative methods. However, employing a mixed-methods approach to observe respondents' reactions to the utilised sensory cues could enhance the depth of the study's findings. Additionally, the study exclusively captures the perspective of online food purchasers. To add depth, it could be intriguing for future researchers to conduct the study during the Ramadan month, when Muslims abstain from eating during daylight hours. This approach could shed light on potential differences in consumer purchasing behaviour when acquiring food online during Ramadan.

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Appendix

A1. Questionnaire items

Instruction: Please rate how strongly you agree or disagree according to the number (1 until 5) with each of these statements (1=strongly disagree; 5=strongly agree).

Sensory Cues:

No.	Items	Source
1.	I feel the presence of food from visual cue	
2.	I experience the flavour of food from visual experience	
3.	I can feel the texture of food from food image	
4.	The colour of food used make me taste the spiciness	
5.	The image of food droll me to eat	
6.	Overall, the visuals of food in food apps (e.g., colours, sizes, shapes) were of high quality	(Brewer & Sebby, 2021; Kim et al. 2023)
7.	Overall, the visuals of food made me want to purchase from the restaurant in the food apps	
8.	The visuals of food used by restaurants were attractive	
9.	The online visuals of food were visually appealing	
10.	I like the visual of food displayed	

Consumer Purchase Behavior:

	Items	Source
1.	I am highly aware about food online purchasing	
2.	I have positive perception towards food online purchasing	Miah et al. (2022)
3.	My willingness to purchase food from online shops is high	
4.	I am satisfied to buy food using online food delivery applications	
5.	I will recommend others to make purchase from online food delivery applications	

About the Authors

Nur Alya Nasuha Sakri is a student in the Department of Hotel Management, Faculty of Hospitality and Tourism Management at UiTM Puncak Alam Selangor, Malaysia. Her main research areas are sensory cues and digital marketing. She can be reached through her email at 2021632746@student.uitm.edu.my.

Aslinda Mohd Shahril is an associate professor in the Department of Hotel Management, Faculty of Hospitality and Tourism Management at UiTM Puncak Alam Selangor, Malaysia. (ORCID: https://orcid.org/0000-0002-8972-0527). Her main research areas are service marketing, strategic marketing, service operation, sensory marketing and consumer behavior. She can be reached through her email at aslinda@uitm.edu.my.

Chemah Tamby Chik is a professor in the Department of Foodservice Management, Faculty of Hospitality and Tourism Management at UiTM Puncak Alam Selangor, Malaysia. (ORCID: https://orcid.org/0000-0002-6801-639). Her main research activities are in food quality, foodservice management, food safety, and sensory evaluation. She can be reached through her email chemah@uitm.edu.my.

Meylani Tuti is an associate professor in the Department of Management, at Universitas Asa, Indonesia (ORCID: https://orcid.org/0000-0001-7956-018X). Her research interests are in marketing, service operation and consumer behavior. She can be contacted through her email at meylanituti@stein.ac.id.

Authors' contributions

Nur Alya Nasuha Sakri carried out the research, conceptualised the central research idea, provided the theoretical framework and wrote the original article. Aslinda Mohd Shahril supervised research progress. Aslinda Mohd Shahril, Chemah Tamby Chik, and Meylani Tuti edited and revised the article.