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Pushing the Boundaries of Food Product Innovation Acceptance: A Case of Radical Ready-to-Eat Food Product Innovation in Malaysia

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Abstract: This study examines the impact of food neophobia and food innovation on Malaysian consumer attitudes, subjective norms, perceived behaviour control, and consumer behaviour intention towards ready-to-eat (RTE) foods. Additionally, this study investigates the mediating effects of food innovation, attitude, subjective norms, and perceived behaviour control on the relationship between food neophobia and consumer behaviour intention. A quantitative cross-sectional study was used whereby an online survey was developed and disseminated via social media platforms to all Malaysian consumers aged 18 years and above from October 2023 to January 2024. A total of 321 valid responses were used for hypothesis testing using SPSS and MPlus software. This study found eleven out of nineteen proposed hypotheses were statistically significant. Food neophobia directly influences food innovation, attitude, subjective norms, and perceived behaviour control. More importantly, this study found the significant influence of attitude, subjective norms, and food innovation as mediators in influencing the association between food neophobia and consumer behaviour intention. Findings from this study contribute to the RTE food behavioural studies by incorporating the theory of planned behaviour and stimulus-organism-response models. This study also introduces attitude, subjective norms, and food innovation as mediators in influencing the association between food neophobia and consumer behaviour intention. Results from the integrated model provide a more comprehensive understanding of the impact of food neophobia and food innovation on consumer attitude, subjective norms, perceived behaviour control, and behaviour intention. Findings underline the importance of RTE food producers exploring young consumers as the new markets for their products.

Keywords: *Food innovation, Food Neophobia, Malaysia, Ready to Eat Food, Stimulus Organism Theory, Theory of planned behavior*

1. Introduction and Background

Ready-to-eat (RTE) foods are described as foods that are pre-cleaned, precooked, packaged, and ready for consumption without further preparation process or cooking (Hwang et al., 2012). According to the Food Standards Agency in the United Kingdom, consumers can consume RTE foods such as salads, sandwiches, cheese, and desserts directly, as the foods do not need to be cooked or reheated before serving (Food Standard Agency, n.d.). This study operationalizes RTE foods as requiring minimal or no additional preparation or cooking before consumption. The RTE foods market is expanding worldwide due to a major shift in consumer choices and lifestyles (Malik et al., 2018; Casini et al., 2015). Consumer demographic shifted to urbanization, more disposable income and less time to spend on food preparation due to busy work and social engagement are among the factors influencing the increase in demand for RTE foods (Alvarez et al., 2018). Moreover, RTE foods require little to no preparation (Hwang et al., 2012), thus meeting the needs of modern consumers looking for convenient products (Azman et al., 2023). The variations offered convenience without sacrificing taste and, in some cases, nutrition, making the RTE a very appealing product for consumers (Scholderer & Grunert, 2005; Scholliers, 2015).

Crises such as the recent COVID-19 outbreak also contributed to the changing trends in the prepared foods market (Chenarides et al., 2021). The stay-at-home policy influenced the increase in home cooking and cooking frequency (Dezanetti et al., 2022). Although an increase in home cooking was reported during the earlier lockdown period, consumers started shifting to convenient and safe RTE options as the pandemic continued. The availability of e-hailing food delivery services, particularly during the restriction period of COVID-19, booster the growth of RTE foods trends in Malaysia as consumers can save time and order RTE foods via online

food ordering applications such as Foodpanda and Grab (Roslan & Mohd Nawi, 2022). For younger age groups in the Republic of Korea, RTE food is consumed as a snack, thus suggesting the need for a healthier RTE food diet (Choi, 2022). This trend is still observed despite the end of the lockdown restriction as consumers found the RTE foods to meet their requirement for wholesome and convenient products.

According to Statista (2024), the revenue for the RTE foods market in Malaysia as of March 2024 is US$2.15 billion. The market is expected to grow by 6.83% yearly, and the RTE meals market volume is expected to amount to 0.50 billion kilograms by 2028 (Statista, 2024). The growing need for ready meals due to hectic lives will propel the global ready meals market's expansion. Azman et al. (2023) surveyed Malaysian consumers and found that the convenience of RTE foods was the main factor influencing consumer behaviour, followed by health and taste. Earlier, Anusha et al. (2020) found convenience as the main motivation for RTE food purchase, and most Malaysians purchase RTE foods during lunch and spend up to RM20.00 (US$4.23) per meal. The increased desire for a variety of quick RTE options can be attributed to consumers' greater openness to tasting new and unusual flavours as international cuisines become more accessible and diverse. The rising population of health-conscious consumers increases the need to offer various healthy RTE food options that are easily accessible in the market.

Despite its popularity, RTE foods are associated with incidents of foodborne illness cases (Mengistu et al., 2022), and consumers raising concerns about their safety. RTE food suppliers serving unsafe food products to consumers without proper hygiene and safety practices are among the primary cause of foodborne illness (Cheesman et al., 2023). Such incidents create feelings of fear towards anything new and forbid consumers from trying new things or breaking from their routine, such as consuming RTE foods. Nonetheless, the RTE foods industry's globalization has also made it easier for new packaging technologies to be introduced, extending these items' shelf lives and guaranteeing their freshness and quality over time (Jabs & Devine, 2006). Chinchkar et al. (2023) addressed the importance of nanotechnology in enhancing the packaging quality of RTE food while improving the shelf life and preventing it from being contaminated by the external environment. With a proper system, RTE food producers can guarantee consumers' safety when consuming RTE foods.

Additionally, the market for RTE foods has grown significantly because of globalization, evolving social trends, and increasing disposable incomes. Interest in RTE food has recently expanded, mostly due to lifestyle changes. RTE food products are trending due to their convenience and quick preparation time. While the RTE foods business is expanding worldwide, a limited number of literature has addressed the perception and acceptance of Malaysian consumers of RTE food. Companies in the food business are actively responding to consumer needs in this dynamic landscape by focusing on health and wellness qualities, developing innovative products, and implementing sustainable practices. The rise in the market for RTE foods reflects both the food industry's flexibility and responsiveness to changing consumer demands, as well as a fundamental shift in how people approach their meals.

This study aims to answer the following research questions: (a) What is the impact of food neophobia and food innovation on consumer attitude, subjective norms, and perceived behaviour control towards RTE food's behaviour intention? (b) What is the impact of attitude, subjective norms, and perceived behaviour control on consumer RTE food's behaviour intention? (c) Does food innovation, attitude, subjective norms, and perceived behaviour control mediate the relationship between food neophobia and consumer RTE foods behaviour intention?

2. Literature Review

This research proposed two integrative theories to investigate the consumer's acceptance of radical RTE food product innovation in Malaysia: the stimulus organism response theory and the theory of planned behaviour. Applying stimulus organism response theory and the theory of planned behaviour is common in consumer behaviour studies (Alam et al., 2024; Liu et al., 2023). The theory of planned behaviour strength lies in its ability to explain the cognitive process that occurs during the decision-making process, while stimulus organism response theory adds another dimension to consumer behaviour research through stimulus or external factors that also have a significant influence in this research (Uzunoglu & Sozer, 2020; Bigne et al., 2020). Furthermore, the theory of planned behaviour constructs integrated into the stimulus organism response framework also

allows researchers to observe the mediating effect of organisms between stimulus and response, which allows for a better understanding of the phenomena under investigation (Alam et al., 2024).

Stimulus Organism Response Theory

The stimulus-organism response theory, introduced by Mehrabian and Russell (1974), is based on the notion that human response is directed by stimulus and organism. This theory is widely used in consumer behaviour studies as it can explain external and internal influences that influence consumer behaviour (Wu & Li, 2018; Chang et al., 2011; Kim et al., 2020). Consumer decision-making is a very complex process, especially for involvement purchases such as food products, as decision-making is often based on habit and automatic processes, thus creating another layer of complexity to fully understand why certain products appealed to consumers while certain products failed to attract consumers (Gigerenzer & Gaissmaier, 2011). Interaction between internal and external influences allows for a better understanding of the actual process that occurs during the decision-making process. The importance of stimulus in product packaging and the actual appearance of the products is widely discussed in the literature, as this stimulus often facilitates automatic decision-making (Clement, 2007). The perception of a stimulus is processed through the mediating response of organisms, which, in this case, is the consumer's internal cognitive process. Thus, the consumers' backgrounds and belief systems will automatically evaluate whether the stimulus fits their needs. Therefore, stimulus organism response theory allows researchers to test the specific stimulus against an organism, providing a better understanding of the area or product under investigation.

Radical Food Innovation as Stimulus: Food innovation is a standard process for staying relevant and competitive in the food industry. These include the need to cater to the changes in the consumers' expectations (Rabadán et al., 2021), managing the depletion of resources due to global warming (Gallen, 2019), and the need to feed the growing population (Hussain & El-Din Ahmed, 2023). The food industry's response to this issue is through food innovation. To ensure alignment with the goals of sustainability can be achieved, the market has launched genetically modified foods, insect-based foods, cultured meat, and plant-based products to help with the potential of future food shortages. These innovative ventures need to attract consumers while overcoming their reluctance toward unfamiliar food (Siddiqui et al., 2022). However, these unconventional foods are considered radical innovations that create a significant cultural and cognitive challenge in some cultures (Fischer & Van Loo, 2021; Gallen, 2019). While some cultures have long embraced the idea of eating insects and other unconventional foods, it is still cognitively challenging for most of the population (Onwezen et al., 2019).

Increased awareness about the relationship between food and health has pushed the innovation of products catering to consumers' health (Rabadán et al., 2021). Examples of products include vegan, gluten-free, and foods free from allergens. A study on European customers indicated that different opinions on improving health through food technology cause inconsistent approval of food innovation for health advantages (Priyadarshini et al., 2019). Organic farming, which stems from the refrainment of unnatural elements in food, brought organic foods to the shelves. Genetically modified foods are the industry's response to the need to produce superior products and quality for the masses. Nevertheless, consumers have a low acceptance of new food technologies due to the belief that the advantages of these technologies are overstated and concerns about potential adverse effects on health, natural quality, and the environment (Coutinho et al., 2021). To mitigate neophobia and promote sustainability, strategies tailored to introduce novel food items successfully are imperative (Wendt & Weinrich, 2023). Furthermore, it is strongly recommended that the industry prioritize using natural ingredients to create nutritious food that aligns with customer preferences and sustainability objectives.

Ready-to-Eat (RTE) Radical Food Innovation Influence on Neophobia and Organism: Ready-to-eat (RTE) foods refer to convenience products that require minimal preparation and are available in the market in many types and variants. RTEs have both practical and hedonistic benefits (Okada, 2005). Although some of these items are familiar to the consumers, the presentation may need to be more familiar, which causes reluctance or avoidance from the consumers. In the case of radical food innovation, the content of the product itself represents something that needs to be more familiar to most consumers; hence, it is difficult for consumers to accept these products (Gallen, 2019; Tan et al., 2015). Intrinsic stimulus refers to the actual products without looking at the packaging and often has a much more significant impact on consumer acceptance (Morris et al., 2022). Hence, without referring to the packaging, the idea of consuming the products is already rejected;

studies conducted in Western countries since 2015 indicate that specific radical food innovations are not well accepted in this society (Ardoin & Prinyawiwatkul, 2021). This psychological condition is known as food neophobia, which determines consumers' acceptance or rejection of new foods (Siddiqui et al., 2022). Rejection of foods may stem from unfavourable sensory qualities, disgust regarding the source or nature of the food, and fear of harmful health effects (Vidigal et al., 2014). Foods familiar with taste or health benefits are more acceptable to consumers (Dittmar, 1992). The selection of foods may also be a means for certain groups to demonstrate their ethnic identity and affiliation.

Furthermore, food neophobia also refers to the inclination to avoid trying new foods instead of regularly consuming the same kinds of food (Muhammad et al., 2016). As the technology matures and becomes more common, consumer behaviour changes to eliminate aversion to certain foods (Gaviria & Bluemelhuber, 2010). Food neophobia worsens with ageing (Dovey et al., 2008). As individuals enter middle age, health issues may increase their reluctance to try new foods, while younger consumers tend to have the least neophobia (Siegrist, 2008). Based on the review of the literature, this study proposed that:
H1a. There is a positive relationship between food neophobia and food innovation.
H1b. There is a positive relationship between food neophobia and attitude.
H1c. There is a positive relationship between food neophobia and subjective norms.
H1d. There is a positive relationship between food neophobia and perceived behaviour control.

Innovative Ready-to-Eat (RTE) Radical Food Influence on Organism: Consumers are sceptical of food innovation as it deviates from traditional products, which are considered authentic and healthier (Verneau et al., 2014). Technological developments in the food industry are linked to customer trust, which regrettably often results in doubt, mistrust, and ambiguity on the part of the consumer (Siegrist, 2008). It has been demonstrated that the qualities of an innovation affect how widely accepted it is (Van Wezemael et al., 2014; Barrenar et al., 2015). As technology advances and people gain confidence, product acceptance rises. Improvements in flavour, nutritional value, and packaging are among the advancements that have gained widespread acceptance (Chen, 2007; Evans & Cox, 2006). However, specific food product innovations push consumers' acceptance boundaries, which is why many food manufacturers refrain from pursuing radical innovation, as it is very costly and risky (Buijs et al., 2009).

In contrast, radical innovation can create worthwhile products for the organization; the risk often weighs more than the benefit. For instance, while radical food innovation has the potential to penetrate the underserved market (Gallen, 2019), however previous studies on radical food innovation do not support this theory (Onwezen et al., 2019). Consumer acceptance is the main issue, as the success of any product relies heavily on demand, and consumers' support is necessary for the existence to be relevant.

Genetically modified foods and nanotechnology are another example of radical food innovation. However, studies have shown that consumers fear these products as they resist them in the market (Hartmann & Siegrist, 2016). Genetically modified foods refer to “organisms in which genetic material has been modified with a new or intentionally modified primary molecular structure” (Rollin et al., 2011). When it comes to genetically modified foods, customers are worried about their health and the possibility of getting cancer. However, acceptance of genetically modified foods depends on customer understanding and information (Stanton et al., 2021). Based on the arguments, the following hypotheses are developed:
H2a. There is a positive relationship between food innovation and attitude.
H2b. There is a positive relationship between food innovation and subjective norms.
H2c. There is a positive relationship between food innovation and perceived behaviour control.

Theory of Planned Behaviour
The theory of planned behaviour introduced by Ajzen (1991) posits that human behaviour is directly related to intention, where intention directs the behaviours. Even though the behaviour is not directly observed, studies have shown that intentions accurately predict behaviour (Ajzen, 1991). The theory of planned behaviour consists of three predictors: attitude, subjective norms, and perceived behavioural control. In consumer behaviour studies, the theory of planned behaviour is one of the main theories widely used as it predicts intentions and behaviour toward product purchases for single products to various products or brands (Ajzen, 2015; Han & Stoel, 2017).

Attitude Towards RTE Radical Food Innovation and Its Influence on Behavioural Intention: Attitude refers to the evaluative judgment towards an attitude object, which also differs in strength based on valence (Fishbein & Ajzen, 2010; Haddock & Maio, 2008). Hence, attitude is multifaceted, consisting of hedonic/affective and utilitarian/cognitive dimensions (Voss et al., 2003; Nystrand & Olsen, 2020). Attitude is the foundation for predicting human behaviour, reflecting one disposition toward a specific condition or action (Ajzen, 1991; Ajzen, 2015). While intention helps to predict consumers' future intentions, attitude also plays a significant role in consumers' decision-making, as attitude is the internal force that guides the intention and behaviour, which leads to quick and effortless decision-making (Sanbonmatsu & Fazio, 1990). Attitude plays a significant role in low-involvement decision-making as it allows consumers to make quick decisions; the importance of attitude in predicting purchase behaviour for ready-to-eat products is well documented in previous studies (Smigic et al., 2023; Thienhirun & Chung, 2018; Bae et al., 2010). In food consumption, attitude and intention are frequently most strongly correlated (McDermott et al., 2015).

Attitude is one of the most robust predictors in the theory of planned behaviour due to its temporal stability or persistence toward changes (Conner et al., 2022). Hence, consumers' attitudes toward certain products, whether it is positive or negative, will have a significant influence on intention; in fact, effectiveness is one of the critical elements in attitude theory as affective represents valence or degree of likeability towards certain products or brands (Yeap et al., 2020). RTE radical food innovation studies show that most consumers find it difficult to accept new types of food due to their strong attitude toward unfamiliar or unconventional food. Culture is one of the cornerstones in forming human attitudes, which are the main barrier to radical food innovation (Pascucci & Magistris, 2013). Based on the review of the literature, the hypotheses formulated as below:
H3. There is a positive relationship between attitude and behavioural intention.
H6a. Attitude mediates the relationship between food neophobia and behavioural intention.
H6d. Food innovation and attitude mediate the relationship between food neophobia and behavioural intention.
H6g. Attitude mediates the relationship between food innovation and behavioural intention.

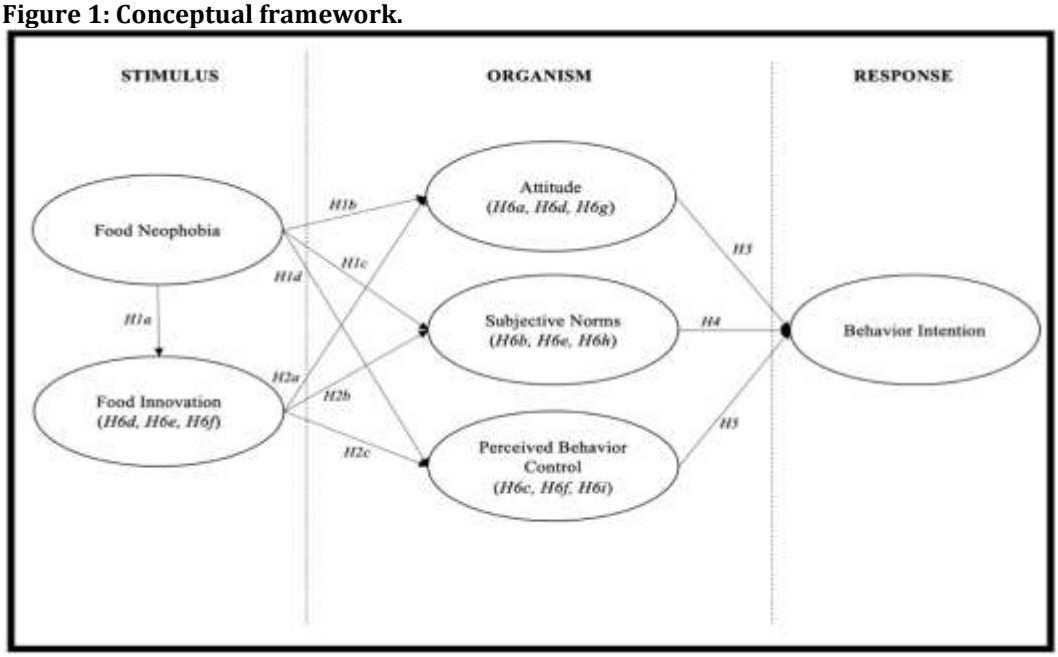
The Influence of Subjective Norms Towards RTE Radical Food Innovation and Behavioural Intention: Subjective norms refer to social pressure or the influence or pressure to perform certain behaviours (Ajzen, 1991). Subjective norms strongly influence consumers' behaviour because the decision-making also considers how others, including reference groups, will view one decision and whether it meets societal expectations (Al-Swidi et al., 2014). Overall, subjective norms do have a strong influence on consumers' decisions. For instance, a study by Hofstede and Bond (1984) shows that Asian countries, including Malaysia, fall under a collectivist culture where the opinions of those surrounding them are important to them. Although this study was conducted many years ago, the latest study on a similar subject has been carried out by Sumari et al. (2020), which still indicates that Malaysian culture is firmly collectivist. Therefore, the opinion of the reference group and those surrounding the consumers shape their final decision. Despite the patriarchal family system still being widely practised in Malaysia, with the increasing numbers of women entering the workforce, the changes in women's daily chores are becoming significant (Yuhaniz & Jusan, 2016). Changes can be seen through many studies on the acceptance of ready food in Malaysia, as it is now becoming a common consumption practice, especially among young adolescents (Basurra et al., 2021; Azman et al., 2023). While the home-cooked meal is expected in the patriarchal family system, societal changes have allowed for products such as this to be accepted by society due to their advantages, such as saving time and convenience in nature (Azman et al., 2023).

On the other hand, subjective norms' influence on radical food innovation was found to be challenging as subjective norms are related to the collective perception of society. Consuming unconventional is considered socially acceptable, which can lead to unfavourable perceptions and intentions toward radical food innovation (Fischer & Van Loo, 2021). Based on this argument, this study hypothesized that:
H4. There is a positive relationship between subjective norms and consumer behavioural intention.
H6b. Subjective norms mediate the relationship between food neophobia and behavioural intention.
H6e. Food innovation and subjective norms mediate the relationship between food neophobia and behavioural intention.
H6h. Subjective norms mediate the relationship between food innovation and behavioural intention.

The Influence of Perceived Behavioural Control Towards RTE Radical Food Innovation and Behavioural Intention: Perceived behavioural control is deciding whether to perform the behaviour based on the situation. While attitude provides the foundation for intention and subjective norms concerned about the view of others, perceived behavioural control is the actual factor determining whether the behaviour should be performed because humans still have free will (Ajzen, 1991). Hence, consumer behaviour is performed when the situation allows it; thus, consumers still have the power to control it even though the attitude and subjective norms favour performing the behaviour. For RTE food intention purchases, consumers facing time constraints and seeking convenience solutions will view these products as favourable (Azman et al., 2023). On the other hand, those who view RTE as unhealthy will only consider purchasing this product after time constraints (Alkerwi et al., 2015; Laska et al., 2015). Despite consumers consciously making the decision and having the power to do so, perceived behavioural control has a strong connection with attitude and subjective norms, and the strength of these variables will shape the final decision. Suppose the attitude and subjective norms do not favour radical food innovation. In that case, the chances are that they will not perform the behaviour even though the consumers can do so. From the review of literature, the following hypotheses are developed:
H5. There is a positive relationship between perceived behaviour control and consumer behavioural intention.
H6c. Perceived behaviour control mediates the relationship between food neophobia and behaviour intention.
H6f. Food innovation and perceived behaviour control mediate the relationship between food neophobia and behaviour intention.
H6i. Perceived behaviour control mediates the relationship between food innovation and behaviour intention.

Based on the literature review of the study variables, the researchers integrated the theory of planned behaviour and stimulus organism response theory and developed a conceptual framework, as shown in Figure 1. This study will investigate food neophobia and innovation's impact on Malaysian consumer attitudes, subjective norms, perceived behaviour control, and RTE food behaviour intention. Additionally, this study will investigate the impact of attitude, subjective norms, and perceived behaviour control on Malaysian consumer's RTE food behaviour intention. Lastly, this study will test the mediating effect of food innovation, attitude, subjective norms, and perceived behaviour control on the relationship between food neophobia and RTE food behaviour intention.

Figure 1: Conceptual framework.



3. Methodology

Sample and Procedures

The study aimed to investigate the impact of food neophobia and food innovation on consumer attitude,

subjective norms, and perceived behaviour control towards RTE foods' behaviour intention and to examine the mediation effects of food innovation, attitude, subjective norms, and perceived behaviour control. Using a quantitative convenience sampling approach, we developed an online questionnaire via Google Forms. We disseminated the survey link via social media platforms such as WhatsApp and Facebook. We sampled Malaysian consumers aged 18 years and above and asked them to forward the survey link to their networks. Respondents were assured of confidentiality and were informed about the study's purposes, data assurance, and anonymity. The respondents were asked for consent, and a screening question was included to ensure only eligible respondents (18 years and above) participated in the survey. An introduction to RTE food with some examples and the definition of each variable was given to ensure all respondents understood before proceeding with the questionnaire. The data collection period was from October 2023 to January 2024. Of the 323 responses, 321 were valid responses that were retained for analysis after eliminating non-eligible responses.

Measures

The current study adapted measures from previous studies. Food neophobia was assessed using five items developed by Pliner and Hobden (1992). Attitude (four items), subjective norms (four items), perceived behavioural control (three items), and behaviour intention (three items) were measured using scales developed by Verbeke and Vackier (2005). Food innovation was measured using six items from Goldsmith and Hofacker (1991). All the items were measured on a five-point Likert-type response scale with the level of agreement from (1) strongly disagree to (5) strongly agree. The demographic section consisted of some demographic profiling questions and consumer preferences about specific types of food. A bilingual-type questionnaire (English and Malay) was developed, and bilingual researchers performed back-to-back translation procedures for all the measures (Brislin, 1990) to ensure Malaysian consumers understood the items. A pilot study was conducted with a small sample to ensure no issue with the questionnaire. The pilot study findings did not lead to any changes in the scale items.

Data Analysis

The gathered data was coded using SPSS version 28 for preliminary and inferential statistics. Descriptive statistics were computed for each measure, such as means, standard deviations, coefficient alpha internal consistency for reliability, and intercorrelations between the constructs. Using Mplus version 8.3, a confirmatory factor analysis was conducted to determine the reliability and validity of the measures and to check for the fit of the proposed model (Muthen & Muthen, 2017). Then, we tested the conceptual model, hypothesizing the associations among the latent variables, for direct and indirect effects using structural equation modelling in Mplus. The output was assessed to determine the overall goodness of fit, the significance of the path coefficients, and the variance explained. We utilized the Harman one-factor test based on Podsakoff et al.'s (2012) recommendation for common method bias.

4. Results and Analysis

Demographic Information

Table 1 shows the characteristics of the respondents. Based on 321 respondents, the survey consisted of 51.2% females, followed by 48.8% males. Many of them were between 18 to 26 years old (61.3%, *n* = 196). Most respondents earned less than RM2,500 (US$534) a month (63.2%, *n* = 191). The data indicated that most respondents preferred plant-based food (Yes, 66%, *n* = 212) and genetically modified food (Yes, 68.5%, *n* = 220). Nonetheless, 83.2% of respondents did not prefer insect-based foods (No, *n* = 367) or 3D printed foods (No, 61.1%, *n* = 196). Regarding ethnic foods from different countries, an equal distribution of respondents preferred Japanese (Yes, 80.7%, *n* = 259) and Korean (Yes, 80.7%, *n* = 259), justifying the rise in popularity of Japanese and Korean restaurants in Malaysia. Meanwhile, about the same distribution of respondents preferred foods from the Philippines (Yes, 61.4%, *n* = 197) and Spanish (Yes, 60.4%, *n* = 194). About 248 respondents (77.3%) like organic foods. In terms of personalized foods, 65.7% like gluten-free food (*n* = 211), and 62.6% like allergen-free food (Yes, 62.6%, *n* = 201), while 55.8% of respondents dislike vegan food (*n* = 179).

Table 1: Respondents' demographics profiles.

Demographic	*Categories*	*n*	*%*
Gender	Male	156	48.8
	Female	164	51.2
Age group	18-26	196	61.3
	27-42	62	19.4
	43-58	58	18.1
	59 and above	4	1.3
Monthly income	Less than RM2,500 (US$534)	191	63.2
	Between RM2,501 to RM4,850 (US$534 to US$1,036)	60	19.9
	Between RM4,851 to RM10,970 (US$1,036 to US$2,343)	31	10.3
	More than RM10,971 (US$2,343)	20	6.6
Plant-based food	Yes	212	66.0
	No	109	34.0
Insect-based foods	Yes	54	16.8
	No	367	83.2
Cell-cultured meat	Yes	146	45.5
	No	175	54.5
3D printed foods	Yes	125	38.9
	No	196	61.1
Genetically modified foods	Yes	220	68.5
	No	101	31.5
Japanese food	Yes	259	80.7
	No	62	19.3
Korean food	Yes	259	80.7
	No	62	19.3
Philippine food	Yes	197	61.4
	No	124	38.6
Spanish food	Yes	194	60.4
	No	127	39.6
Organic foods	Yes	248	77.3
	No	73	22.7
Vegan	Yes	142	44.2
	No	179	55.8
Gluten-free	Yes	211	65.7
	No	110	34.3
Allergen-free	Yes	201	62.6
	No	120	37.4

Measurement Model Assessment

Table 2 presents the results of the constructs and their variables, including the reliability coefficients, composite reliability (CR), and average variance extracted (AVE). Reliability was assessed using Cronbach's alpha to check the internal consistency of the measures. The Cronbach's alpha values range from 0.788 to 0.936, above the suggested cut-off point of 0.60, which indicates internal consistency (Hair et al., 2010). Results for the measurement model indicated that all the variables had a composite reliability of > 0.60 (0.803 – 0.938), demonstrating the questionnaire's reliability. Fornell and Larcker (1981) recommended a CR value above 0.60 or more and AVE greater than 0.50. The AVE for each construct reported in Table II indicates an acceptable convergent validity (Bagozzi & Yi, 1988). The correlation of a construct with other constructs is less than the square root of its AVE, which successfully establishes the discriminant validity (Table 3). Confirmatory factor analysis revealed satisfactory goodness-of-fit indices and statistics. Chi-square test (x^2 = 819.612, df = 260, p < 0.001, x^2/df = 3.152); Root Mean Square Error of Approximation (RMSEA) = 0.082; CFI = 0.907, TLI = 0.893; Standardized Root Mean Square Residual (SRMR) = 0.066. All factor loadings of the constructs are significant (p < 0.001), ranging from 0.624 to 0.941, except for item four, under food neophobia, with a factor loading of 0.237. We followed Harman's (1976) approach for a single-factor test to evaluate common method variance among the variables. Results revealed that without rotation, four factors with eigenvalues of > 1 could be extracted; the cumulative explained and the percentage of variance was 44.751%, which is below 50%, indicating no common method bias. Hence, we concluded that common method bias would not be an issue for our analyses (Podsakoff et al., 2012).

Table 2: Factor loadings and reliability statistics.

Construct	Items	λ	SMC (λ2)	CR	AVE
Food neophobia (α = 0.801)	I like to try new RTE foods.	0.89	0.79	0.83	0.53
	I will try new RTE food available in the market.	0.88	0.77		
	I am constantly sampling new and different RTE foods.	0.80	0.64		
	I trust the RTE foods available in the market.	0.24	0.06		
	I like RTE foods from different countries.	0.62	0.39		
Food Innovation (α = 0.936)	I buy new, different, or innovative RTE foods before anyone I know.	0.78	0.61	0.94	0.72
	Generally, I am among the first in my circle of friends to buy new, different, or innovative RTE foods.	0.88	0.78		
	Compared to my friends, I purchase more new, different, or innovative RTE foods.	0.89	0.80		
	I always purchase new, different, or innovative RTE foods in shops and supermarkets.	0.83	0.69		
	I am the first among my friends who are familiar with brand-new, different, or innovative RTE foods.	0.88	0.78		
	I purchase new, different, or innovative RTE foods even if I have not tasted/experienced them beforehand.	0.80	0.64		
Attitude (α = 0.788)	RTE food is safe.	0.72	0.52	0.80	0.51
	RTE food is healthy.	0.78	0.61		
	RTE food is nutritious.	0.70	0.48		
	RTE food is tasty.	0.64	0.41		
Subjective norms (α = 0.875)	My family thinks I should eat/buy RTE food.	0.70	0.49	0.88	0.64
	My friends think I should eat/buy RTE food.	0.81	0.65		
	People around me often encourage me to eat/buy RTE food.	0.84	0.71		

	My relatives/siblings think I should eat/buy RTE food.	0.85	0.72		
Perceived behaviour control (α = 0.884)	I am knowledgeable about RTE food.	0.85	0.71	0.89	0.72
	I am well-informed about RTE food.	0.90	0.80		
	I am well-informed about the benefits offered by RTE food.	0.80	0.64		
Behaviour intention (α = 0.916)	The chances that I will purchase RTE foods are high.	0.92	0.84	0.92	0.79
	The chances that I will eat RTE foods are high.	0.94	0.89		
	My willingness to introduce RTE food to my daily consumption is high.	0.81	0.66		

Table 3: Fornell and Larcker's correlation matrix (criterion test).

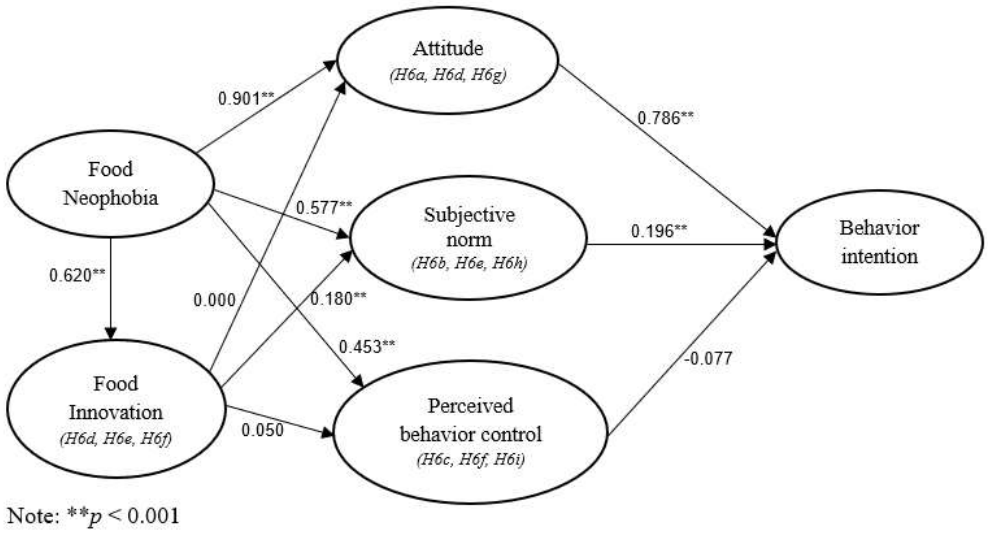
Variables	Food Neophobia	Food Innovation	Attitude	Subjective Norms	Perceived Behaviour Control	Behaviour Intention	Discriminant validity
Food Neophobia	(0.727)						Yes
Food Innovation	0.607**	(0.846)					Yes
Attitude	0.652**	0.441**	(0.711)				Yes
Subjective Norms	0.575**	0.506**	0.640**	(0.802)			Yes
Perceived Behaviour Control	0.367**	0.322**	0.457**	0.405**	(0.848)		Yes
Behaviour Intention	0.775**	0.562**	0.699**	0.643**	0.370**	(0.891)	Yes

Notes: Diagonals represent the square root of the AVE, whereas the off diagonals represent the correlations.
** Correlation is significant at the 0.01 level (2-tailed).

Structural Model Assessment

Results for the structural model revealed satisfactory goodness-of-fit indices and statistics. Chi-square test (x^2 = 919.649, df = 265, $p < 0.001$, x^2/df = 3.47); Root Mean Square Error of Approximation (RMSEA) = 0.088; CFI = 0.891, TLI = 0.877; Standardized Root Mean Square Residual (SRMR) = 0.073. The results of the hypothesis testing show that food neophobia has a positive effect on food innovation (β = 0.620, $p < 0.001$), attitude (β = 0.901, $p < 0.001$), subjective norms (β = 0.577, $p < 0.001$), and perceived behaviour control (β = 0.453, $p < 0.001$), thus supporting H1a – H1d. Nonetheless, when assessing the effect of food innovation, only the effect of food innovation on subjective norms is found to be significant (β = 0.180, $p < 0.05$), supporting H2b, while no significant results were found for food innovation on attitude (H2a) and on perceived behaviour control (H2c) ($p > 0.05$). Furthermore, this study found that attitude positively influenced behaviour intention (β = 0.786, $p < 0.001$) and subjective norms influenced behaviour intention (β = 0.196, $p < 0.05$); hence, H3 and H4 are supported. However, no significant result was obtained for perceived behaviour control on behaviour intention ($p > 0.05$). Figure 2 shows the structural model with direct effects.

Figure 2: A structural model with direct effects.



Mediation Analysis

Using Mplus software, we performed bias-corrected bootstrapping confidential interval analysis with 5,000 re-samplings to test the mediating effects of the proposed variables in Figure 1 (Hayes, 2018). This procedure generated a bootstrapped percentile and bias-corrected confidence intervals based on 5,000 samples at a 95% confidence interval (C.I.). Based on Preacher et al. (2007), the researchers reported the significance of the mediating effect by determining whether the estimated confidence interval included zero. Based on the results presented in Table 4, the findings exhibit four significant mediation effects out of nine proposed mediation effects. The findings show that attitude significantly mediates the relationship between food neophobia and behaviour intention (95% C.I. = 0.495, 0.888), which supported H6a. Additionally, subjective norms significantly mediate the relationship between food neophobia and behaviour intention (95% C.I. = 0.026, 0.237), supported by H6b. Interestingly, this study found that innovation and subjective norms significantly mediate the relationship between food neophobia and behaviour intention (95% C.I. = 0.002, 0.065), further supporting H6e. Subjective norms mediate the relationship between innovation and behaviour intention (95%, C.I. = 0.003, 0.102); thus, supported H6h. With the present model, approximately 81.2% of the variability in attitude (R^2 = 0.812), 49.4% of the variability in subjective norms (R^2 = 0.494), 23.6% of the variability in perceived behaviour control (R^2 = 0.236), 38.4% of the variability in food innovation (R^2 = 0.384), and 79% of the variability in behaviour intention (R^2 = 0.790), can be explained.

Table 4: Bootstrapping mediation results.

Hypothesis	Point estimate	Bootstrap 5000 times 95% confidence interval			
		Bias-corrected		Percentile	
		Lower	Upper	Lower	Upper
H6a. Food Neophobia → Attitude → Behaviour Intention	0.708	0.524	0.976	0.495	0.888
H6b. Food Neophobia → Subjective Norms → Behaviour Intention	0.113	0.028	0.257	0.026	0.237
H6c. Food Neophobia → Perceived Behaviour Control → Behaviour Intention	-0.035	-0.096	0.006	-0.089	0.006
H6d. Food Neophobia → Food Innovation → Attitude → Behaviour Intention	0.000	-0.072	0.065	-0.067	0.061
H6e. Food Neophobia → Food Innovation → Subjective Norms → Behaviour Intention	0.022	0.003	0.070	0.002	0.065

H6f. Food Neophobia → Food Innovation →Perceived Behaviour Control → Behaviour Intention	-0.002	-0.019	0.005	-0.017	0.004
H6g. Food Innovation → Attitude → Behaviour Intention	0.000	-0.124	0.119	-0.103	0.099
H6h. Food Innovation → Subjective Norms → Behaviour Intention	0.035	0.004	0.122	0.003	0.102
H6i. Food Innovation → Perceived Behaviour Control → Behaviour Intention	-0.004	-0.032	0.008	-0.027	0.007

Discussion

This study aimed to examine RTE food neophobia and food innovation on Malaysian consumers' attitudes, subjective norms, perceived behaviour control, and behaviour intention using two integrative theories: the theory of planned behaviour and stimulus organism response theory. Based on the direct associations tested, this study confirmed that food neophobia positively influenced food innovation, attitude, subjective norms, and perceived behaviour control. This finding is in tandem with previous literature on food neophobia, which determines consumer acceptance and rejection of new foods (Siddiqui et al., 2022). Food innovation acceptance may be influenced by consumer familiarity with the taste or health benefits (Dittmar, 1992), whereas rejection is influenced by unfavourable sensory qualities or fear of harmful health effects (Vidigal et al., 2014). Food neophobia among consumers might be influenced by foodborne illness cases (Mengistu et al., 2022) and improper hygiene and safety practices among RTE food suppliers (Cheesman et al., 2023). Despite that, RTE food safety and hygiene can be enhanced through quality packaging using nanotechnology to improve the shelf life and prevent contamination (Chinchkar et al., 2023). Moreover, this study found that food innovation positively influenced subjective norms, whereas attitude and subjective norms positively influenced consumer behavioural intention.

Findings from this study confirmed the role of attitude and subjective norms as mediators in influencing the associations between food neophobia and behaviour intention. Such findings corroborated Al-Swidi et al. (2014), who suggested that subjective norms strongly influence consumer behaviour because the decision-making process is also influenced by how others view one's decision and whether it meets society's expectations. Asian cultures, such as Malaysia, are still collectivist when they believe the opinions of those around them are essential (Sumari et al., 2020). Attitude is not only a significant predictor of behaviour intention but also acts as a mediator to food neophobia and behaviour intention. In other words, food neophobia can affect behavioural intention toward RTE food products through the mediator of consumer attitude (either positive or negative). Interestingly, this study reported both food innovation and subjective norms significantly mediate the relationship between food neophobia and behaviour intention. Also, this study found subjective norms mediate the relationship between food innovation and behaviour intention.

Furthermore, this study briefly profiles RTE food consumer segments in Malaysia. Based on the data, it is found that more Malaysians preferred plant-based food, genetically modified foods, and organic foods compared to insect-based foods, cell-cultured, and 3D printed foods. The plant-based food product is getting popular these days as consumers believe that plant-based alternatives are healthy, and some tried the plant-based food because of the food trend (Mahasuweerachai et al., 2023; Statista Research Department, 2022). Our findings on Malaysian consumer's preferred organic food are supported by a previous study in Malaysia by Abdullah et al. (2022). Nevertheless, the socio-economic background of the consumers might prohibit them from frequently consuming organic foods because these foods are typically sold at higher prices than non-organic food (Abdullah et al., 2022; Guine et al., 2022). Findings on organic food preference among Malaysians also aligned with a similar study conducted in China (Huo et al., 2023), Bangladesh (Kabir, 2023) as well as in Portugal and Turkey (Guine et al., 2022). Consumer knowledge of organic food health benefits could influence their food preference.

Regarding ethnicity, more Malaysians preferred Japanese and Korean food than Philippine and Spanish. Such findings aligned with the current situation in Malaysia, with many Japanese and Korean restaurants available, especially in major cities like Kuala Lumpur and Penang. Korean food is popular among young consumers (Wan & Yazdanifard, 2021). For personalized foods, more Malaysians preferred gluten- and allergen-free food to

vegan food. Nonetheless, Mohd Fauad et al. (2020) found higher carbohydrate and lower protein content in gluten-free products than in gluten-containing products; hence, they concluded that gluten-free products have no nutritional advantage but cost more than gluten-containing products. Interestingly, this study found that more people dislike vegan food, which contradicted Zainal Abidin et al. (2017), where nearly 60% of their respondents (non-vegetarian Chinese consumers in Malaysia) had a favourable view of vegetarian food. Vegetarian food is popular among the Chinese and Indian communities due to religious beliefs.

5. Implications and Conclusion

Theoretical Implications

From a theoretical perspective, the overall findings contributed to the RTE foods-related studies. This study represents the pioneering effort in combining the theory of planned behaviour and stimulus organism response theory to investigate the Malaysian consumer behaviour intention of RTE foods. Results from the integrated model provide a more comprehensive understanding of the impact of food neophobia and food innovation on consumer attitude, subjective norms, perceived behaviour control, and behaviour intention. Such findings also fill the gap in terms of model development for RTE-related research since previous studies utilized descriptive research design (Anusha et al., 2020; Basurra et al., 2020). Moreover, findings on the mediating effects of food innovation, attitude, subjective norms, and perceived behaviour control on the relationship between food neophobia and consumer behaviour intention contribute to the current literature in RTE foods-related and consumer behavioural studies; hence, justify the novel contribution of this study.

Managerial Implications

The study offers several practical implications. The growing demand for RTE foods is driven by convenience, ease of access, and various choices suitable for consumers, particularly those with a busy schedule. They do not need to spend much of their time preparing food. Therefore, food producers should promote RTE food products by increasing awareness and highlighting the benefits of consuming RTE foods. For instance, promoting the quick and convenient aspects of RTE foods and offering healthier RTE food options could diminish the negative perception toward RTE food, thus, increasing consumer acceptance. Moreover, this study sheds light on the untapped potential for RTE food producers to explore young consumers as the new markets for their products. Using young and well-known food influencers could increase the young consumers' intention to purchase RTE food products. Appropriate strategies are needed to avoid food neophobia toward new food trends in the market. For instance, food producers and marketers can positively present the food or use well-known influencers to showcase the food, so it looks delicious. Siddiqui et al. (2022) suggested that food neophobia can be reduced when consumers taste the new foods themselves. Additionally, food producers and marketers must understand consumer behaviour patterns, protect consumer health, and take preventive measures to prevent foodborne diseases from RTE foods.

Limitations and Future Research Recommendations

This study is constrained by several limitations, drawing attention to future research avenues. First, this empirical study uses cross-sectional and self-reported data to test the hypotheses; thus, there could be bias in the responses. Future research can further explore the associations between the variables using longitudinal studies. Longitudinal research could also provide more insights into RTE foods' behaviour patterns over time. Second, this study may lack generalizability due to its research context, as it focused exclusively on Malaysian consumers. For that reason, cross-country data can be beneficial in model comparisons to investigate the differences between Malaysia and other countries (e.g., Indonesia, Thailand) in terms of RTE foods behavioural intention. Future research could validate our findings with consumers from other countries. A comparison study between countries will benefit future researchers to investigate the similarities and differences of RTE food trends between countries. While no cross-country study has been found on RTE food to date, a study by Guine et al. (2022) on organic food trends and consumption among consumers from Portugal and Turkey found similar results in terms of consumption pattern, albeit consumers in Portugal have a higher value perception for organic products compared to Turkey.

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