Risk Assessment of Halal Products and Services: Implication for Tourism Industry

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ABSTRACT

This empirical study entailed proposing conceptual models for investigating customers' satisfaction, their intention to recommend, and their continued intention to purchase and consume halal products and services. Complexity theory was used to support the developed models. The study applied a symmetrical analysis to investigate the risk factors that are sufficient for affecting the desired outcomes. An asymmetrical approach was used to explore the causal configurations that lead to both high and low outcomes scores. A necessary condition analysis was performed to identify the risk conditions required to achieve the expected outcomes. The models were tested using data collected on the perceptions of patrons at international halal restaurants in Malaysia. According to the results, the heterogeneous interactions of risk conditions support complexity theory. Policy implications for the status of the tourism industry and the Muslim world are discussed at the end of the paper.

Keywords: risk; halal; tourism; Muslim; necessary condition; complexity theory

1. Introduction

Demands for halal products and services have increased with the development of tourism and the geographical mobility of tourists. The provision of halal items for travelers from the world's 52 Muslim countries would provide a competitive advantage for destinations targeting this segment of tourism (Henderson, 2016; Ryan, 2016). The halal market is recognized as a global market that is worth US$580 billion a year. Previous research identified that "the Halal food industry [is] pegged to grow at a rate of 7 percent annually" (Shah Alam & Mohamed Sayuti, 2011, p. 9). The supply of halal products and services (hereafter halal items) has created new opportunities for the expansion of the hospitality and tourism industry. Non-Muslim tourists—especially those who are seeking a health-conscious lifestyle and those who are socially aware of other cultures and societies—also purchase halal items, which makes this niche market a flourishing sector of the tourism industry (Stephenson, 2014).

In many circumstances, such as online shopping, customers perceive several types of risk (Tieman, 2011; Wilson & Liu, 2010). Similarly, in the purchase of halal items, several complex

religious, cultural, and social factors must be taken into account. As Tieman (2011) concluded, the supply of halal items, based on the consumer's perception, is a complex matter because of the variety of Islamic cultures, Islamic schools of thought, local *fatwas*, and local customs. This complexity increases in multicultural societies, such as Malaysia, where there are diverse religions and ethnicities. In other words, individuals might perceive low levels of risk in the purchase and consumption of halal items in countries where there is a Muslim majority, such as Saudi Arabia and Pakistan. These major Muslim countries are not as religiously and ethnically diverse as Malaysia is (Muhammad, Isa, & Kifli, 2009), because their legal systems are entirely based on *Shariah* (i.e., Islamic law) (Jafari & Scott, 2014).

The association between perceived risk, attitude, and the behavioral responses of customers has been identified in the tourism literature (e.g., Olya & Altinay, 2016; Quintal, Lee, & Soutar, 2010; Reisinger & Mavondo, 2005; Tangeland, Vennesland, & Nybakk, 2013; Tavitiyaman & Qu, 2013; Yüksel & Yüksel, 2007) and the marketing literature (e.g., Belanche, Casaló, & Guinalíu, 2012; Currás-Pérez, Ruiz-Mafé, & Sanz-Blas, 2013; Lu, Hsu, & Hsu, 2005; Mitchell & Greatorex, 1993; Park, Lennon, & Stoel, 2005; Rogers & Gould, 2015). The ability to manage the potential risk of using a product or service was found to boost the customer's trust, satisfaction, and loyalty, which ensures the profitability of a business (Aldas-Manzano, Ruiz-mafé, Sanz-Blas, & Lassala-Navarre, 2011). Several scholars have modeled the attitudes and behavior of halal consumers in a global market of 1.6 billion people (Jafari & Scott, 2014; Tieman, 2011; Wilson & Liu, 2010). Considering the complexity of the halal phenomenon, it is worthwhile to assess the risks in the purchase and consumption of halal items. This empirical study was intended to fill this gap in the research by answering the following questions: What risk factors (i.e., sufficient conditions) affect the positive attitudes and behavioral intentions of halal consumers? What pattern of risks offers causal configurations that are sufficient to indicate desirable attitudes, undesirable attitudes, and behavioral intentions of halal consumers? What type of risks are necessary conditions for achieving the desired responses of halal consumers?

The aim of this empirical study was to advance the theory and methodology of modeling consumer behavior by conducting a risk assessment of halal items in a multicultural society. The outcomes of this study are intended to provide helpful guidelines for both Muslim and non-Muslim tourist destinations to mitigate the types and patterns of risks associated with halal items.

The study applied complexity theory as the framework of the research model. The study also used systematic and innovative analytical approaches, including structural equation modeling (SEM), fuzzy set qualitative comparative analysis (fsQCA), and necessary condition analysis (NCA), to investigate significant sufficient risks, sufficient configurations of various risk types, the risks necessary to predict satisfaction, the intention to recommend, and the continued intention to use halal items. Furthermore, the results of this study provide new insights into the complex configurations of the risk conditions that lead to unexpected altitudinal and behavioral responses (i.e., dissatisfaction, low intention to recommend, and low continued intention to use) of halal consumers. The results also provide evidence of the fit validity of the measurement and research models as well as predictive validity of the proposed configurational model.

2. THEORETICAL BACKGROUND

2.1. What do halal and haram mean?

Halal is an Arabic word used in the Quran, and "it is defined as things or actions permitted by the *Shariah* (Islamic law). In other words, Halal is an object or an action which is permitted or lawful to be used or taken, according to the Islamic law" (Ali et al., 2017, p. 527). The opposite of halal is *haram*, which means prohibited, unlawful, or illegal (Ali et al., 2017; Jafari & Scott, 2014). Tieman (2012) stated that *haram* items include the flesh of swine, blood, carrion, and intoxicants that are not fit for consumption. The designation of halal or *haram* must be applied to each object and action. According to *Shariah*, this designation "provides guidance for all aspects of life" (Jafari & Scott, 2014, p. 4). Annabi, Husein, Hassan, and Nasir (2017) reported that to be safe and aware of impurities, individuals must follow the instructions regarding what is halal and *haram* in the Quran and the *Sunnah* (i.e., the prophetic tradition). According to the *Sunnah*, people must consider what is halal and *haram* in order to safeguard their religion and honor (Annabi et al., 2017; Tieman, 2011). According to Tieman (2011), the individual perceives the risk of consumption and avoids products that are doubtful and questionable.

2.2. Risks of halal items

The direct contact between halal items and *haram* products carries the potential risk of contamination, which is an important concern and must be avoided by consumers (Tieman, Ghazali, & Van Der Vorst, 2013; Yaacob, Jaafar, & Rahman, 2016). Consumers also perceive

the risk of the purchase and consumption of halal items (Tieman, 2011). According to Lu et al. (2005, p. 109), "Consumer researchers define perceived risk as a consumer's perceptions of the uncertainty and adverse consequences associated with buying a product (or service)." Mai (2001, p. 36) stated that "a bad purchase decision could result in risks such as (a) financial risk, (b) performance risk, (c) social risk, (d) physical risk, (e) psychological risk, (f) time-loss risk, and (g) opportunity risk." Radzi, Saidon, and Ghani (2016) identified major risks in halal food supply management: production risk, purchase price risk, halal compliance risk, demand risk, and procurement risk. Japanese companies in Malaysia have perceived these risks. Fuseini, Wotton, Knowles, and Hadley (2017) highlighted the importance of the safety and health risks of halal food in response to the discovery of *haram* ingredients in the United Kingdom, which caused Muslim consumers a great deal of panic and distress. Halal consumers may perceive environmental risk, quality risk, and health risk because of the possible contamination of halal products and direct contact between, and mixture of, halal products and forbidden *haram* ingredients. Consumers may also perceive psychological risks and social risks due to the doubtful contents of halal items because they have been advised to avoid the consumption of *haram* items in order to safeguard their religion and honor. In addition, Bonne and Verbeke (2006) and Bonne, Vermeir, Bergeaud-Blackler, and Verbeke (2007) reported that because consumers might need to spend increased time and effort in finding, purchasing, and consuming halal items, they would perceive time-loss and financial risks.

2.3. Risks and consumers' responses

Risk is recognized as a multi-dimensional construct that critically influences consumers' decision making (DeFranco & Morosan, 2017; Lu et al., 2005). Bauer (1960) defined risk in terms of the uncertainty and consequences associated with consumers' responses. For instance, social risk increased second-home owners' intention to purchase nature-based tourism activity products (Tangeland et al., 2013), and perceived risk negatively affected the satisfaction and behavioral intention of travelers to Thailand (Tavitiyaman & Qu, 2013). Reisinger and Mavondo (2005) revealed that social and cultural risks escalated levels of travel anxiety, which negatively affected the tourist's intention to travel. Similarly, Nugraha (2014) found that the decision to visit a risky destination country was negativity influenced by perceived risk. Park et al. (2005) reported the negative impact of perceived risk on the customer's intention to purchase apparel.

Lu et al. (2005) found that perceived risk negatively affected the intention to use online applications. Their findings showed that the negative effect of risk was stronger among the continuous use group compared to the trial-and-leave group.

The relevant literature demonstrates that risk is a heterogeneous (i.e., positive and/or negative role) indicator of the attitudinal and behavioral responses of customers. For example, Currás-Pérez et al. (2013) found that perceived risk was not significantly associated with the user's loyalty, whereas it significantly and negatively affected the user's attitude toward social networking sites. Belanche et al. (2012) found that perceived risk played a positive role in consumers' satisfaction. In contrast, Quintal et al. (2010) identified that perceived risk negatively influenced the attitudes of Japanese and Korean tourists toward visiting Australia. Kannungo and Jain (2004) identified that risk comprised multi-dimensional and complex factors and its combination with other indicators, such as product category, had a significant and positive effect on customers' purchase intentions. Olya and Altinay (2016) applied asymmetrical modeling with complexity theory to address the heterogeneous roles and complex interactions of perceived risk with other indicators of customers' intention to purchase tourism weather insurance and destination loyalty. Table I, a supplementary file, provides a summary of the relevant literature.

2.4. Prospect theory and complexity theory

Prospect theory is frequently used to model consumer behavior because it is based on real-life choices instead of optimal decisions (Camerer, 2005; Chiu, Wang, Fang, & Huang, 2014). Developed by Kahneman and Tversky (1979), prospect theory posits that consumers make decisions on the basis of the potential value of losses and gains rather than outcomes, and they evaluate these losses and gains using certain heuristics. Although prospect theory considers consumer's decision making under uncertainty and risk, this approach is insufficient because it assumes that perceived risk is associated with negative consequences (Ali, Tan, Pawar, & Makhbul, 2014; Lu et al., 2005). However, a review of the existing empirical studies showed that risks also might lead to positive outcomes (e.g., Belanche et al., 2012; Olya & Altinay, 2016). Because individuals' attitudes and behaviors are based on the complex interactions of several indicators, a combination of these heterogeneous factors may lead to unpredicted outcomes. Furthermore, because of the complex nature of halal items, prospect theory is not sufficient to indicate consumers' responses under risky conditions (Radzi et al., 2016).

Therefore, we offer complexity theory as a sufficient and necessary framework of the proposed research model to predict consumers' responses to the risks of halal items. Complexity theory is used to explain the non-linear, heterogeneous, and dynamic process of complex phenomena in various disciplines (e.g., politics, economics, and biology). Hoffmann and Riley (2002, p. 313) noted, "Complexity theory is not a new, or the only way, to do science, rather it is a set of concepts for modeling the world in a non-linear fashion." Baggio (2008) put forward that complexity theory could help justify complex systems in which simple linear approaches cannot adequately describe the interactions of a large number of components. Complexity theory was recently used in sub-disciplines of management, such as marketing (e.g., Wu et al., 2014) and tourism (e.g., Olya & Altinay, 2016; Olya & Mehran, 2017), as the theoretical framework of research models that were used to indicate complex behavioral responses of customers/tourists. Kotler (1967, p. 1) stated, "Marketing decisions must be made in the context of insufficient information about processes that are dynamic, non-linear, lagged, stochastic, interactive, and downright difficult."

The major tenets of complexity theory and qualitative comparative analysis (QCA) include the following. The propositions that set relations are asymmetrical (*asymmetry*). There are multiple paths or solutions (not one) that lead to the same outcome—that is, *equifinality* occurs. Alternative asymmetric combinations of indicators (i.e., algorithms) are sufficient, but no one combination is necessary for accurately predicting behavioral outcomes. There are combinations of causal measures that lead to the outcome (*causal complexity*); that is, a combination of antecedents, not a net effect of a single factor, must be used as a causal solution for indicating complex social phenomena. The present study assessed the model results according to the key tenets of complexity theory to understand whether this theory supports the complex interactions of risk factors in purchasing and consuming halal items in a model used to indicate the satisfaction and behavioral intentions of consumers.

2.5. Proposed research model

The proposed research model consists of seven risk antecedents: health risk, psychological risk, environmental risk, social risk, quality risk, financial risk, and time-loss risk. The model includes three outcomes: satisfaction, intention to recommend, and continued intention to use halal items. A Venn diagram illustrates the proposed conceptual model (Figure 1). In Figure 1,

the causal configuration of the risk antecedents of predicting consumer satisfaction is indicated with arrow A, the intention to recommend with arrow B, continued intention to use halal items with arrow C, and the combination of the three with arrow D. To the best of our knowledge, the proposed model is the first attempt to use seven predictive risk conditions as a complex configuration (i.e., causal conditions) to predict the combination of three desired outcomes.

The combination of three outcomes (i.e., arrow D) represents the conditions under which consumers are satisfied with, intend to recommend, and intend to continue using halal items. These causal conditions provide practical implications for businesses that aim to achieve these three desired outcomes, which may increase profitability. The study explored the causal configuration of the negation of all four outcomes (i.e., satisfaction, intention to recommend, continued intention to use, and the combination of three outcomes). The study also investigated the separate effects of seven risk factors on the study outcomes, which indicates the factors that play a positive or negative role in the three expected consumers' responses. The study highlighted the risk factors that are necessary for achieving the desired outcome.

Place Figure 1 here.

3. Material and Methods

3.1. Research process

The study used a systematic process comprising eight steps to satisfy the research objectives. As demonstrated in Figure 2, in the first step, the questionnaire was designed and the managers of international halal restaurants were then contacted to obtain permission to collect data from their customers. A pilot study was conducted to check for ambiguity in the scale items and identify issues that emerged during the survey procedure. In the second step, the main field survey was administered. In the third step, the data were screened and digitized. In the fourth step, a rigorous set of measurements was used to test the reliability and validity of the proposed models. In the fifth step, SEM was used to investigate the effects of risk factors (i.e., sufficient conditions) on the study outcomes (i.e., satisfaction, intention to recommend, and continued intention to use halal items). To explore the causal recipes (i.e., sufficient configurations based on the risk antecedents) for predicting both high and low outcomes scores, configurational modeling using fsQCA was conducted. In the sixth step, the predicative validity of the

configurational model was tested. In the seventh step, an NCA was performed to identify the necessary antecedents of the model's outcomes. In the last step, the results were evaluated in light of the key tenets of complexity theory.

Place Figure 2 here.

3.2. Measurement instruments

The structured survey measured seven risk factors that are associated with the use of halal items, satisfaction, intention to recommend, and continued intention to use. The employed measures were extracted from validated scales used in previous research (Chiu et al., 2014; Chiu, Chiu, & Chang, 2007; Currás-Pérez et al., 2013; Deng & Ritchie, 2016; Kim & Damhorst, 2010; Lu et al., 2005; Reisinger & Mavondo, 2005) and were modified for the setting of the present study. Intention to recommend was measured using three items based on Currás-Pérez et al. (2013). Three items were extracted from Chiu et al. (2007) and Chiu et al. (2014) to measure continued intention to use. Consumer satisfaction was measured using four items from Chiu et al. (2007). Three items for psychological risk, three items for time-loss risk, three items for environmental risk, and three items for financial risk were adapted from Currás-Pérez et al., (2013), Deng and Ritchie (2016), and Reisinger and Mavondo (2005). Quality risk was measured by four items modified from Kim and Damhorst (2010) and Ali et al. (2014). Four items from Reisinger and Mavondo (2005) were used to measure health risk.

The responses to all items were on a seven-point Likert scale ranging from 1 = strongly disagree to 7 = strongly agree. A seven-point Likert scale was used instead of a five-point Likert scale for the following reasons: First, the seven-point Likert scale improves the psychometric properties of the measures, specifically reliability (Symonds, 1924). Second, Miller (1956) recommended the seven-point Likert scale because respondents could judge and rate the scale items according to the mechanism of the human brain, which "can distinguish about seven distinct categories, a span of immediate memory for about seven items, and a span of attention that can encompass about six objects at a time, which suggested that any increase in number of response categories beyond six or seven might be futile" (cited in Colman, Norris, & Preston, 1997, p. 335). Third, in accordance with the studies from which the scale items were adapted, Saleh and Ryan (1991) also confirmed that the functionality of the seven-point Likert scale was superior to other rating scales for measuring hospitality-related factors.

The survey consisted of three sections. The first section was an introduction that briefly explained the purpose of the survey and reassured the respondents of their anonymity and the confidentiality of their information. The second section was used to collect demographic information about the respondents, including age, gender, education, income level, and marital status. The survey was checked by two academic professionals in the area of hospitality and tourism. A pilot study was conducted with 12 consumers, and the results showed that the items were clear and understandable.

3.3. Data and procedure

Data were obtained from customers of five certified international halal restaurants in Kuala Lumpur, Malaysia (Jabatan Kemajuan Islam Malaysia, Malaysian Official Institution for Halal certification). Using convenience sampling, 320 costumers were approached and invited to participate in the survey, which spanned one month (January 19, 2017 to February 19, 2017). Initially, two filter questions ("Are you familiar with the concepts of halal and *haram*?" and "Do you purchase and consume halal items consciously?") were asked to ensure that the respondents met the study criteria. The survey was in English. A total of 253 customers positively responded to these questions. The sample comprised Muslim respondents from Algeria, Brunei, Egypt, China, Indonesia, India, Iran, Iraq, Morocco, Pakistan, Palestine, Singapore, Somalia, Sudan, Turkey, and Yemen. As per Hair, Black, Babin, and Anderson's (2014) guidelines, surveys with more than 10% of data missing were eliminated from the study sample. The final response rate was 64%; 205 valid cases were then subjected to further data analyses using SPSS 22.0, AMOS 22.0, and fsQCA 2.5 software.

The sample included 110 (54%) males and 95 (46%) females. In terms of age, 124 (60%) respondents were 18–27 years old, 60 (29%) were 28–37 years old, 13 (6%) were 38–47 years old, and 8 (3%) were older than 48 years. Nine (4%) respondents had not completed high school, 79 (39%) had a high school diploma, 48 (23%) had a partial college degree, 44 (21%) respondents had a college degree, and 25 (12%) had a postgraduate degree. The annual income of 135 (66%) respondents was under $19,999, 44 (21%) had an income of $200,000–$39,999, 12 (6%) had an income of $40,000–$59,999, and 14 (7%) had an income of $60,000 or higher. With regard to marital status, 131 (64) respondents were single and 74 (36%) were married or in a relationship.

3.4. Analytical methods

The reliability of the measurements was checked using Cronbach's alpha (α) and composite reliability (CR). The scale composition of the items was explored using exploratory factor analysis (EFA) and was confirmed using confirmatory factor analysis (CFA). As this study was the first to use the scale items in the halal setting, both EFA and CFA were performed to check the validity of the measurements (Hurley et al., 1997; Olya & Altinay, 2016). Harman's single-factor test was used as a statistical remedy to evaluate the potential common method variance (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003).

The three key objectives of this empirical study were as follows: to investigate the net effects of risk factors on the satisfaction and two behavioral intentions (i.e., intention to recommend and continued intention) of halal consumers by applying SEM (Hair et al., 2014); to explore the causal recipes (i.e., combination of the risk conditions) of the outcomes by using fsQCA (Ragin, 2008); and to identify the risk antecedents necessary to achieve the desired outcomes by using NCA (Dul, 2016). Both fit validity and predictive validity were tested (Gigerenzer & Brighton, 2009; Olya & Gavilyan, 2017; Olya, Khaksar, & Alipour, 2017; Wu et al., 2014). The results of the configurational model testing were evaluated according to the six tenets of complexity theory (Woodside, 2014).

4. Results and Discussion

4.1. Evidence of reliability and validity

Two measures of Cronbach's alpha and CR were calculated to check the internal consistency of the scale items. As shown in Table 1, the values of Cronbach's alpha and CR in all constructs were higher than the acceptable level of .7 (Bagozzi & Yi, 1988; Cortina, 1993). These results provided evidence of the reliability of the study measures. The structure and composition of the scale items were checked using EFA. The results showed that all items loaded under the expected components and the magnitude of the items satisfied the commonly accepted cutoff ($\lambda > 45$). The items were not cross-loaded. The results of Harman's single-factor analysis revealed that no general factor (i.e., component with high variance percentage) emerged, indicating that the study measures were not affected by the potential common method bias (Podsakoff et al., 2003). The results of the CFA also confirmed that the items were sufficiently and significantly

loaded under the assigned factors (SFL > .5, $P < .001$). The results of the EFA and CFA confirmed that there was no need to drop a scale item to ensure the validity of the measures (Anderson & Gerbing, 1988).

A set of fit statistics (X^2/df, comparative fit index: CFI, parsimonious comparative fit index: PCFI, root mean square error of approximation: RMSEA) was calculated to check the fitness of the measurement model. The results (X^2/df = 2.39, CFI = .94, PCFI: .79, RMSEA: .06) confirmed the model's fit with the empirical data (Table 1). The construct validity, including convergent and discriminate validity, was checked. Based on Hair et al. (1998), the average variance extracted (AVE) values were greater than .5 and smaller than the respective values of CR, which confirmed the convergent validity of the study measures. The results of discriminate validity showed that the AVE of all factors was greater than the corresponding maximum shared squared variance (MSV) and the average shared square variance (ASV) (Anderson & Gerbing, 1988; Fornell & Larcker, 1981)

Insert Table 1 here.

4.2. Sufficient antecedents

The results of SEM, which show sufficient antecedents of three desired outcomes, are illustrated in Figure 3. Halal consumer satisfaction was influenced by health risk ($\beta = .74$, $p < .001$), psychological risk ($\beta = .16$, $p < .01$), environmental risk ($\beta = .16$, $p < .001$), quality risk ($\beta = .13$, $p < .05$), and time-loss risk ($\beta = -.13$, $p < .05$). Intention to recommend was associated with health risk ($\beta = .44$, $p < .001$), psychological risk ($\beta = .24$, $p < .001$), environmental risk ($\beta = .29$, $p < .001$), and financial risk ($\beta = .14$, $p < .05$). Continued intention to use halal items was affected by health risk ($\beta = .42$, $p < .001$), psychological risk ($\beta = .31$, $p < .001$), environmental risk ($\beta = .25$, $p < .001$), quality risk ($\beta = .15$, $p < .05$), and financial risk ($\beta = -.13$, $p < .05$). Based on the fit indices (X^2/df = 3.38, CFI: 83, PCFI: .74, RMSEA: .07), the structural model fitted the data.

Insert Figure 3 here.

The SEM results aligned with those found in previous research on the heterogeneous effects of risk factors associated with individual attitudes and behavioral responses (Belanche et al., 2012; Currás-Pérez et al., 2013; Kannungo & Jain, 2004; Lu et al., 2005; Nugraha, 2014; Olya &

Altinay, 2016; Park et al., 2005; Quintal et al., 2010; Reisinger & Mavondo, 2005; Tangeland et al., 2013; Tavitiyaman & Qu, 2013). Health risk, psychological risk, environmental risk, and quality risk had positive effects on satisfaction, whereas intention to recommend, continued intention to use halal items, financial risk, and time-risk negatively affected these three outcomes (Figure 3).

The positive relationship between halal risk and behavioral intentions of consumers supported Tangeland et al. (2013), who found that social risk boosted the intention of second-home owners to purchase nature-based tourism activity products. Similarly, Belanche et al. (2012) found that risk positively contributed to the satisfaction of online users. The negative links of financial risk and time-loss risk were in line with the findings of Tavitiyaman and Qu (2013), Reisinger and Mavondo (2005), Nugraha (2014), Park et al. (2005), and Lu et al. (2005), who reported that perceived risk led to negative consequences (i.e., undesirable customers' responses).

According to the SEM results, social risk did not significantly affect the three outcomes. Currás-Pérez et al. (2013) and Kannungo and Jain (2004) reported a similar finding that perceived risk was not related to customers' loyalty. The results of the present study are in line with the findings of Olya and Altinay (2016), who identified that risk played both positive and negative roles in contributing to customers' loyalty. Although the results of the SEM revealed that the net effects of risk factors on the desired outcomes of halal consumers, the heterogonous relationships between the antecedents, and the outcomes offered that a combination of antecedents (i.e., causal recipe) must be calculated to predict satisfaction, to recommend and continued intention to use. Furthermore, the SEM results assumed suggested that the condition for the low level of the study's outcomes was the opposite of the condition for the high levels of the study's outcome. As Hsiao, Jaw, Huan, and Woodside (2015), Olya et al. (2017), and Olya and Mehran (2017) concluded, the conditions for low outcome scores are unique and different from the conditions leading to high outcome scores. Therefore, the complex configurations (i.e., causal recipes) of the risk antecedents for both high and low levels of the study's outcomes needed to be calculated using asymmetrical modeling. The results of fsQCA are presented in the following section.

4.3. Sufficient configurations

The fsQCA results showed that the configurations were sufficient to predict high and low scores in the study's outcomes, based on the calculation of the complex combination of seven risk conditions, which are presented in Tables 2–5. These results were informative. Ordanini, Parasuraman, and Rubera (2014) noted that recipes based on the combination of seven risk conditions are more important than the ingredients (i.e., risk factors). According to the results, three causal recipes described the condition of high satisfaction (coverage: .75, consistency: .99). Coverage and consistency in asymmetrical modeling, which are analogous to the coefficient of determination and the correlation in symmetrical modeling, respectively, are two probabilistic measures used to confirm the calculated recipes that are sufficient and consistent causal configurations. The cutoffs for coverage and consistency are .20 and .8, respectively (Ragin, 2008). As shown in Table 2, the high satisfaction of halal customers was achieved when they perceived high health, psychological, environmental, social, and quality risks and low time-loss risk (see A, M1). The second model indicated that high health, psychological, environmental, quality, and financial risks and low time-loss risks resulted in high satisfaction. The third model showed that high satisfaction was obtained when consumers perceived high health, psychological, environmental, social, quality, and financial risks.

Insert Table 2 here.

This empirical study explored the causal recipes leading to low satisfaction (see ~A in Table 2). These results are line with Kan, Adegbite, El Omari, and Abdellatif (2016), who recognized fsQCA as a method for generating knowledge based on set theory. According to the fsQCA results, four casual recipes explained low satisfaction (coverage: .82, consistency: .75). Model 1 indicated that low satisfaction resulted from low health, psychological, environmental, social, quality, and financial risks and high time-loss risk. Alternatively, low health, psychological, social, and time-loss risks and high environmental, quality, and financial risks led to the low satisfaction of halal consumers (see Model 2 in Table 2). The third model showed that low satisfaction was caused by high health, financial, and time-loss risks, and low psychological, environmental, social, and quality risks. According to Model 4, low health and psychological risks, and high environmental, social, quality, financial, and time-loss risks contributed to the low satisfaction of halal consumers.

The sufficient configurations of both high and low intentions to recommend halal items were calculated using fsQCA (Table 3). High intention to recommend was achieved by three causal conditions (coverage: .73, consistency: .99), which were similar to the causal models of high satisfaction (c.f. Table 2). As shown in Table 3, low intention to recommend resulted from one causal recipe (coverage: .78, consistency: .82) that matched the low satisfaction in Model 1 (c.f. Table 2).

Insert Table 3 here.

The fsQCA results indicated four causal recipes for predicting the high continued intention to use halal items (coverage: .80, consistency: .98). Model 1 indicated that high continued intention was achieved when consumers perceived high health, psychological, environmental, and quality risks and low time-loss risk. The second model showed the effects of low psychological risk and high environmental, social, quality, financial, and time-loss risks. The third model yielded the same results as the third causal model of high satisfaction (c.f. Table 2). In Model 4, a combination of health, environmental, social, quality, financial, and time-loss risks led to the high continued intention to use halal items. As shown in Table 4, in three models, the recipes for low continued intention to use halal items were similar to the results of the first three models (Models 1–3) showing low satisfaction (c.f. Table 2).

Insert Table 4 here.

fsQCA is a pragmatic tool that allows researchers to combine two or more outcome variables into one desired outcome condition (Olya et al., 2017; Olya & Gavilyan, 2017; Wu et al., 2014). In this study, the combination of satisfaction, intention to recommend, and continued intention was the outcome of the proposed configurational model. It has been acknowledged that satisfaction has a significant impact on loyalty (i.e., positive behavioral intentions of consumers), which is directly related to profitability (Helgesen, 2006). Nevertheless, “merely satisfied customers are likely to remain in the relationship but are not committed and will switch to a competitor when an alternative offering appears to provide superior value” (Liu & Leach, 2001, p. 149). Therefore, it seemed worthwhile to calculate the causal recipes for retaining customers that are both satisfied and loyal. As shown in Table 5, two causal recipes explained the high expected outcome (coverage: .86, consistency: .90). In Models 1 and 2, the pattern matched the

conditions of Models 1 and 4 regarding the high continued intention to use halal items (c.f. Table 4).

The fsQCA results for the negation of the expected outcomes showed four causal recipes (coverage: .53, consistency: .82). The first model indicated that low expected outcomes resulted from low psychological risk and high environmental, social, quality, financial, and time-loss risks. The second model indicated low health, psychological, environmental, social, quality, and financial risks and high time-loss risk. The third model indicated that low health, psychological, social, and time-loss risks and high environmental, quality, and financial risks led to the desired combination of low outcomes. The fourth model explained that high health, financial, and time-loss risks and low psychological, environmental, social, and quality risks resulted in the low outcome condition (Table 5). These results confirmed the complex nature of the halal concept (Ali et al., 2014) and the heterogeneous interactions of risk factors in the attitudinal and behavioral responses of consumers (Currás-Pérez et al., 2013; Kannungo & Jain, 2004; Olya & Altinay, 2016).

Insert Table 5 here.

4.4. Predictive validity

Table 6 shows evidence of the predictive validity of the proposed configurational model. In line with previous research (Hsiao et al., 2015; Olya & Altinay, 2016; Olya & Gavilyan, 2017; Olya & Mehran, 2017; Wu et al., 2014), the original sample was divided into two subsamples. As shown in Table 6, the causal recipes emerged from the data on high satisfaction in subsample 1, which were tested using the data in subsample 2 (i.e., another sample). The high coverage (> .2) and consistency (> .8) of the causal models of subsample 1, which were tested with data in subsample 2, confirmed the predictive validity of the proposed model (Ragin, 2008). In other words, the proposed model showed predictive validity with another sample (i.e., future data). As shown at the bottom of Table 6, fuzzy XY graphs of causal Models 1 and 3 using data from subsample 2 illustrate the asymmetric relationship of causal models with the study's outcome (i.e., satisfaction).

Insert Table 6 here.

4.5. Necessary conditions

Table 7 shows the results of the NCA conducted to identify the risk conditions necessary to achieve the desired consumer responses. The recommended necessity consistency threshold of 0.9 was used to select the necessary risk conditions (Tóth, Thiesbrummel, Henneberg, & Naudé, 2015). Health and environmental risks were two necessary conditions in all four desired outcomes. Psychological risk emerged as a necessary condition for continued intention to use halal items as well as the combination of three outcomes (i.e., out). Although quality risk was not a necessary condition for satisfaction and two behavioral intentions of consumers, it was necessary to achieve the combination of desired outcomes (Table 7). As Dul (2016, p. 1516) noted, "single necessary (but not sufficient) conditions are critically important for business theory and practice. Without them, the outcomes cannot occur, and other conditions cannot compensate for this absence." Therefore, the necessary risk conditions identified in this study could provide useful guidelines for managers for achieving customers' satisfaction, intention to recommend, continued intention to use halal items, and the combination of these three outcomes.

Insert Table 7 here.

4.6. Evaluation of complexity theory

The results of the configurational model were evaluated using the six tenets of complexity theory (Woodside, 2014). According to the fsQCA and NCA results, health is a necessary but insufficient antecedent for predicting high and low outcome conditions. Thus, tenet 1 was supported. The second tenet, the *recipe principle*, postulates that a complex combination of risk antecedents is sufficient for a consistently high score in the outcome condition (e.g., Model 1 in Table 2). Therefore, tenet 2 was supported. According to the third tenet, which is known as the *equifinality principle*, a causal model is sufficient but not necessary to achieve a given outcome. The results for tenet 3 showed that three alternative models offered conditions of high satisfaction (Table 2); three models offered high intention to recommend (Table 3); and four causal models offered high continued intention to use (Table 4).

As shown in Table 5, the two causal recipes of high desired outcome conditions were unique and did not reflect the opposites of the four conditions of low desirable outcome conditions. These results supported tenet 4. Since the role of each risk antecedent depended on the feature of

other risk conditions, the single antecedent played both positive and negative roles in predicting an expected outcome. For example, in Table 5, the time-loss risk contributed negatively (Model 1) and positively (Model 2) to achieving a high level of desired outcome conditions. Therefore, tenet 5 was supported. According to tenet 6, to obtain a high outcome, a causal combination represents the views in some but not all cases (i.e., respondents), and the coverage should be less than 1.00 in any single combination. The fsQCA results shown in Tables 2–6 revealed that coverage was less than 1.00 in each causal recipe, which supported tenet 6. Overall, the key tenets of complexity theory were supported by the results of the configurational model testing. Therefore, the application of this theory supported the complex interactions of risk conditions in predicting the desired responses of halal consumers.

5. Conclusion and Policy Implications

This empirical study extends the understanding of the attitudes and behaviors of consumers regarding the consumption of halal items, which is an expanding market in the tourism industry. Importantly, the recent US travel ban affecting seven Muslim-majority countries and the US and UK bans on electronic devices in flights from several Muslim countries have served to enhance the global awareness of, and attention to, the Muslim world. However, these bans could provide opportunities for countries that are interested in developing tourism by targeting travelers who face difficulties in traveling to the United States and the United Kingdom. In addition, these findings will be helpful for marketing tourism in countries, such as Japan and South Korea, because of the recent political conflicts with China, which have had adverse effects on the latter's tourism industry. These countries have begun to focus on the Middle East—specifically on countries with more stable economies, such as the United Arab Emirates, Saudi Arabia, Oman, Kuwait, Qatar and Bahrain—and Asian countries, such as Malaysia, Brunei, and Indonesia, as new, alternative source markets.

The present study focused on halal and *haram*, which are concepts that must be applied in all aspects of Muslim life. Individuals must always discriminate halal and *haram* products and services. In failing to select halal items, consumers face various kinds of risk, such as health, psychological, environmental, social, quality, financial, and time-loss risks. The findings of this study could help the tourism industry in understanding how to treat and serve both Muslim and non-Muslim tourists who are sensitive to halal items. The tourism industry could be a pioneer in

the integration of human values and business interests by creating and delivering halal items to individuals. From the tourist's perspective, halal items have cultural value; therefore, addressing the perceived risks could increase the satisfaction and loyalty of tourists.

This study contributes to the current knowledge in several ways. First, the study investigated the effects of *sufficient risk conditions* on satisfaction, intention to recommend, and continued intention to use halal items using a symmetrical approach (i.e., SEM). The satisfaction of halal consumers was significantly affected by perceived health, psychological, environmental, quality, and time-loss risks. Intention to recommend and continued intention to use halal items were significantly influenced by perceptions of health, psychological, environmental, and financial risks. Quality risk was positively related to continued intention to use halal items. Social risk did not significantly affect the study's outcomes. The findings revealed non-significant links of quality risk and intention to recommend, financial risk and satisfaction, and time-loss risk and two behavioral intentions. The heterogeneous associations of risk factors with consumers' responses confirmed the complex nature of the consumption of halal items, which was modeled using configurational modeling based on complexity theory.

Second, the study examined the complexity of the attitudes and behaviors of halal consumers under risk conditions by using asymmetrical modeling (i.e., fsQCA). The complex configurations of the risk antecedents were used to explore the causal conditions for simulating both high and low satisfaction, intention to recommend, and continued intention to use halal items. This study is among the first to predict causal recipes, based on risk conditions, leading to the combination of three desired consumer responses (i.e., consumers who are satisfied, intend to recommend, and intend to continue their use of halal items). The application of complexity theory explained the interactions of risk conditions with the model outcomes. The fsQCA results supported the six tenets of complexity theory. The results of the calculated causal models could provide practical guidelines for attuning perceived risk factors in the production and sale of halal items based on the calculated *sufficient configurations* that lead to desirable and undesirable outcomes that affect profitability. The results confirmed the predictive validity of the proposed configurational model.

Third, this study identified the necessary risk antecedents of expected consumer responses. Health and environmental risks were two necessary factors for halal consumers to be satisfied,

intend to recommend, and intend to continue using such products and services. Managers must be vigilant in addressing perceived quality risk if they aim to achieve all three desired outcomes. This study focused on the risk assessment of halal items—a topic that has received little attention in the tourism and hospitality industry from both academics and practitioners. We believe that increasing the knowledge of both supply and demand is a helpful strategy for the risk management of halal items. Businesses that are interested in halal markets need to reach a mutual understanding with customers about the risks involved in the purchase and consumption of halal items. Advisory services regarding the risks of halal items could be offered by governments to businesses as well as by businesses to customers. Businesses and service providers could organize training workshops for their employees to learn ways to interact effectively with customers who are concerned about halal items.

These suggestions are provided with a view to increase the understanding of decision makers about the concerns of halal consumers. Countries that are new to the concept of halal and are willing to target the halal consumer segment could submit bids to host international sports events, tourism activities, and conferences. The increased awareness of halal could enhance the interactions of Muslim tourists with their host communities, which could provide opportunities for cultural exchanges and sharing the values of halal. Policy makers could encourage the production of TV programs by inviting Muslim celebrities to share their experiences of the provision of halal products and services at tourist destinations. Such measures would assist in raising awareness of halal items both locally and globally. In addition, destination marketing organizations (DMO) could advise marketers to use social media and organize advertising campaigns in targeted Muslim countries to change negative stereotypes about catering to Muslim customers and tourists, which would increase the profitability of this tourism segment. Decision makers could develop a systematic platform to reinforce measures against halal risk-mitigating strategies. Specifically, as the findings of this study indicate, necessary risks (e.g., to health) are critical drivers of customers' satisfaction, intention to recommend, and continued intention to purchase and consume halal items.

In the wake of globalization, the integration of the Muslim world with the international tourism industry could be extended to other industries (e.g., food, education, and health) by increasing the export of halal items and services that are produced and served on the basis of

Islamic law to Muslim countries. Consequently, Muslims would be able to identify the global awareness of halal items. This global recognition of Muslim cultural values (i.e., halal items) might positively affect attitudes and behaviors in destinations that have diverse cultures and ethnicities.

Owing to the following limitations, we recommend caution in generalizing our findings. One limitation of this study is that it used data obtained in a cross-sectional study that was aimed at examining the perceptions of halal consumers who visited Malaysia. Another limitation of this study is that the linguistic medium of the survey was English. Because the concept of halal is complex and varies in different contexts, future researchers are advised to design surveys in the respondents' language and conduct longitudinal studies in different tourist destinations. Despite these limitations, the findings of this study offer new insights into obtaining the satisfaction and behavioral outcomes of customers based on their risk perceptions with regard to halal products and services. These insights could be the basis for further empirical research that enriches our knowledge of the assessment, management, and communication of the risks involved in the purchase and consumption of halal items in the context of the tourism and hospitality industry.

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Table 1. Results of reliability and validity

Scale items	λ (**α**)	% of variance	SFL (**CR**)	AVE	MSV	ASV
Intention to recommend	**.867**	**4.416**	**.728**	**.678**	**.277**	**.142**
I will recommend halal items to other consumers.	.821		.767***			
I will say positive things about halal items to other people.	.814		.853***			
I will encourage friends and relatives to consume halal items.	.657		.848***			
Continued intention to use halal items	**.750**	**2.561**	**.711**	**.582**	**.410**	**.181**
I intend to continue consuming halal items in the future.	.795		.860***			
I will continue consuming halal items as much as possible in the future.	.731		.845***			
I will re-consider halal items as a priority in my needs in the future.	.436		.540***			
Satisfaction	**.893**	**19.057**	**.732**	**.732**	**.448**	**.236**
I am pleased to consume halal items.	.831		.861***			
I think that consuming halal items is a good idea.	.797		.840***			
I am satisfied with my overall experience of being a consumer of halal items.	.821		.866***			
Health risk (*risk involves the potential threat to an individual's health and wellbeing*)	**.927**	**4.635**	**.714**	**.762**	**.531**	**.230**
I worry about the risks to my health if I do not consume halal items.	.608		.821***			
I worry about being susceptible to epidemic diseases if do not consume halal items.	.689		.894***			
I worry about consuming non-halal items that are unhealthy. I	.779		.860***			
worry about consuming non-halal items that are harmful.	.745		.913***			
Psychological risk (*refers to the disappointment in oneself at not achieving a purchasing goal; not making good halal item choice*)	**.955**	**17.726**	**.744**	**.864**	**.531**	**.272**
The thought of consuming non-halal items makes me feel anxious.	.831		.937***			
The thought of consuming non-halal items makes me feel psychologically uncomfortable.	.842		.927***			
The thought of consuming non-halal items causes me to experience unnecessary tension.	.843		.925***			
Environmental risk (*involves the possibility of becoming contaminated and spoiled from production to sale process*)	**.892**	**2.290**	**.735**	**.732**	**.473**	**.220**
I am concerned about the environmental conditions in which halal items are produced and processed.	.455		.804***			
I am concerned about the hygiene standards of halal items.	.510		.884***			
I am concerned about the physical conditions in which halal items are store and sold.	.434		.876***			
Social risk (*is concerned with an individual's ego and the impact that purchase of halal items will have on the opinions of reference groups)*	**.908**	**4.023**	**.743**	**.793**	**.686**	**.165**
I worry that consuming halal items would not be compatible with my self-image.	.856		.842***			
I worry that consuming halal items would change the way my friends think of me.	.877		.940***			
I worry that consuming halal items would not be consistent with my status (social class).	.850		.886***			

Quality risk (*refers to possibility of purchasing low quality item; not satisfying the expected or declared standard*)	**.926**	**16.581**	**.712**	**.757**	**.686**	**.242**
I worry about the integrity of halal item and sellers and about the quality of items.	.750		.834***			
I worry that the quality of the halal item is less than I expected.	.805		.874***			
I worry that quality of the halal item does not match the descriptions given on packages and in ads.	.739		.879***			
I worry that the requirements of halal items are not fulfilled.	.792		.893***			
Financial risk *(refers to the possibility that the halal item will not be worth the financial price and would have been available cheaper elsewhere)*	**.898**	**3.635**	**.740**	**.754**	**.672**	**.176**
I worry that the consumption of halal items would involve unexpected extra expenses.	.736		.801***			
I worry that halal items would be more expensive than non-halal items.	.876		.879***			
I am worry that an additional fee must be paid when I purchase halal items.	.869		.920***			
Time risk *(refers to the possibility that a purchase/consumption of halal item will take too long or waste too much time)* I worry that the consumption of halal items would be a waste of time.	**.974**	**7.196**	**.749**	**.928**	**.672**	**.182**
	.936		.941***			
I worry that planning for the purchase of halal items would take too much time.	.952		.994***			
I worry that the preparation of halal items would take too much time.	.934		.954***			
Model fit statistics: X^2*=764.371, (df=319, p<.01), X2/df =2.396, CFI =.945, PCFI: .798, RMSEA: .064.*						

Note: λ is factor loading coefficient. α is Cronbach's alpha representing internal consistency. Kaiser-Meyer-Olkin (KMO) measure with .894 and Bartlett's test of Sphericity of 6162.579 was significant (p<.001). SFL: standardized factor loading; AVE: average variance extracted; MSV: maximum shared squared variance; ASV: average shared square variance; CR: composite reliability. CFI: comparative fit index; PCFI: parsimonious comparative fit index; RMSEA: root mean square error of approximation. ***: SFL is significant at the .001 level. Definition of different kinds of risk is provided within the parentheses.

Table 2. Sufficient configurations of customer's satisfaction of halal items

Causal models for high satisfaction	**Raw Coverage**	**Unique Coverage**	**Consistency**
A. *sat = f(helth, pysc, env, soc, qual, fin, tim)*			
M1:helth*pysc*env*soc*qual*~tim	.406	.033	1.00
*M2:*helth*pysc*env*qual*fin*~tim	.430	.057	1.00
M3: helth*pysc*env*soc*qual*fin	.660	.287	.995
Solution coverage: .751 *Solution consistency: .996*			
Causal models for low satisfaction			
~**A**. *~ sat = f(helth, pysc, env, soc, qual, fin, tim)*			
M1: ~helth*~pysc*~env*~soc*~qual*~fin*tim	.704	.022	.907
M2: ~helth*~pysc*env*~soc*qual*fin*~tim	.710	.008	.844
M3: helth*~pysc*~env*~soc*~qual*fin*tim	.736	.027	.835
M4: ~helth*~pysc*env*soc*qual*fin*tim	.766	.045	.817
Solution coverage: .827 *Solution consistency: .751*			

Note: M stands for Model, sat stands for satisfaction, helth: health risk, pysc: psychological risk, env: environmental risk, soc: social risk, qual: quality risk, fin: financial risk, tim: time-loss risk. ~ indicates negation condition.

Table 3. Sufficient configurations of intention to recommend of halal items

Causal models for high intention to recommend	**Raw Coverage**	**Unique Coverage**	**Consistency**
B. *itr = f(helth, pysc, env, soc, qual, fin, tim)*			
M1: helth*pysc*env*soc*qual*~tim	.396	.032	.998
M2: helth*pysc*env*qual*fin*~tim	.419	.056	.998
M3: helth*pysc*env*soc*qual*fin	.644	.280	.995
Solution coverage: .733 *Solution consistency: .995*			
Causal models for low intention to recommend			
~**B**. *~ itr = f(helth, pysc, env, soc, qual, fin, tim)*			
M1: ~helth*~pysc*~env*~soc*~qual*~fin*tim	.780	.780	.826
Solution coverage: .780 *Solution consistency: .826*			

Note: M stands for Model, itr stands for intention to recommend, helth: health risk, pysc: psychological risk, env: environmental risk, soc: social risk, qual: quality risk, fin: financial risk, tim: time-loss risk.

Table 4. Sufficient configurations of continued intention to use halal items

Causal models for high continuance intention to use	**Raw Coverage**	**Unique Coverage**	**Consistency**
C. *itcu = f(helth, pysc, env, soc, qual, fin, tim)*			
M1: helth*pysc*env*qual*~tim	.482	.108	.995
M2: ~pysc*env*soc*qual*fin*tim	.194	.003	.990
M3: helth*pysc*env*soc*qual*fin	.661	.019	.988
M4: helth*env*soc*qual*fin*tim	.530	.026	.991
Solution coverage: .801 *Solution consistency: .988*			
Causal models for low continuance intention to use			
~**C**. *~ itcu = f(helth, pysc, env, soc, qual, fin, tim)*			
M1: ~helth*~pysc*~env*~soc*~qual*~fin*tim	.646	.020	.888
M2: ~helth*~pysc*env*~soc*qual*fin*~tim	.662	.035	.840
M3: helth*~pysc*~env*~soc*~qual*fin*tim	.665	.025	.805
Solution coverage: .721 *Solution consistency: .779*			

Note: M stands for Model, itcu is continued intention to use halal items, helth: health risk, pysc: psychological risk, env: environmental risk, soc: social risk, qual: quality risk, fin: financial risk, tim: time-loss risk.

Table 5. Sufficient configurations of a combination of desired response outcomes of halal customers

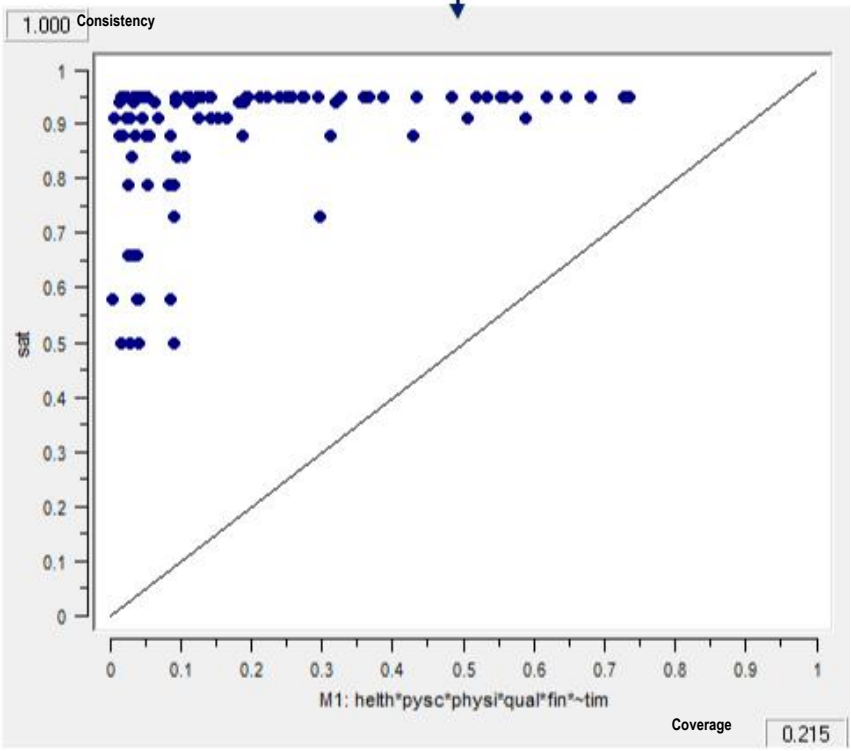
Causal models for high expected outcome responses	**Raw Coverage**	**Unique Coverage**	**Consistency**
D. *out = f(helth, pysc, env, soc, qual, fin, tim)*			
M1: helth*pysc*env*qual*~tim	.563	.286	.952
M2: helth*env*soc*qual*fin*tim	.578	.302	.887
Solution coverage: .865 *Solution consistency: .905*			
Causal models for low expected outcome responses			
~**D**. *~ out = f(helth, pysc, env, soc, qual, fin, tim)*			
M1: ~pysc*env*soc*qual*fin*tim	.500	.132	.822
M2: ~helth*~pysc*~env*~soc*~qual*~fin*tim	.322	.009	.993
M3: ~helth*~pysc*env*~soc*qual*fin*~tim	.346	.016	.985
M4: helth*~pysc*~env*~soc*~qual*fin*tim	.360	.007	.979
Solution coverage: .534 *Solution consistency: .829*			

Note: M stands for Model, out represents a combination of desired response outcomes of halal customers, helth: health risk, pysc: psychological risk, env: environmental risk, soc: social risk, qual: quality risk, fin: financial risk, tim: time-loss risk.

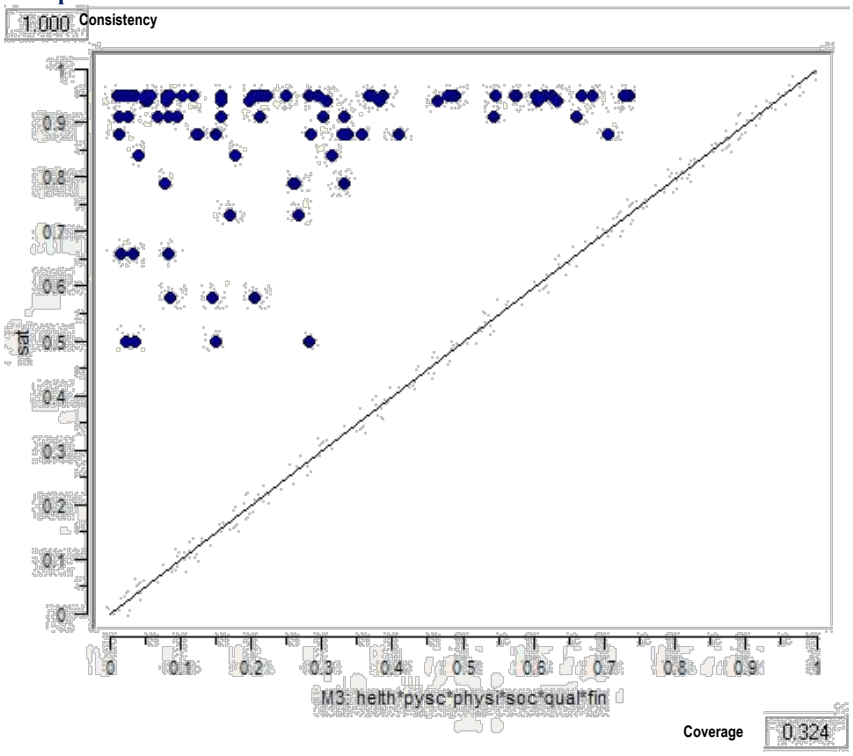
Table 6. Results of predictive validity

Models from subsample 1	Raw coverage	Unique coverage	Consistency
Subsample 1: *sat = f(helth, pysc, physi, soc, qual, fin, tim)*			
M1: helth*pysc*physi*qual*fin*~tim	.415	.036	1.000
M2: helth*pysc*physi*soc*qual*~tim	.417	.038	1.000
M3: helth*pysc*physi*soc*qual*fin	.696	.317	.998
Solution coverage: .771			
Solution consistency: .998			

Test of M1 with subsample 2



Test of M3 with subsample 2

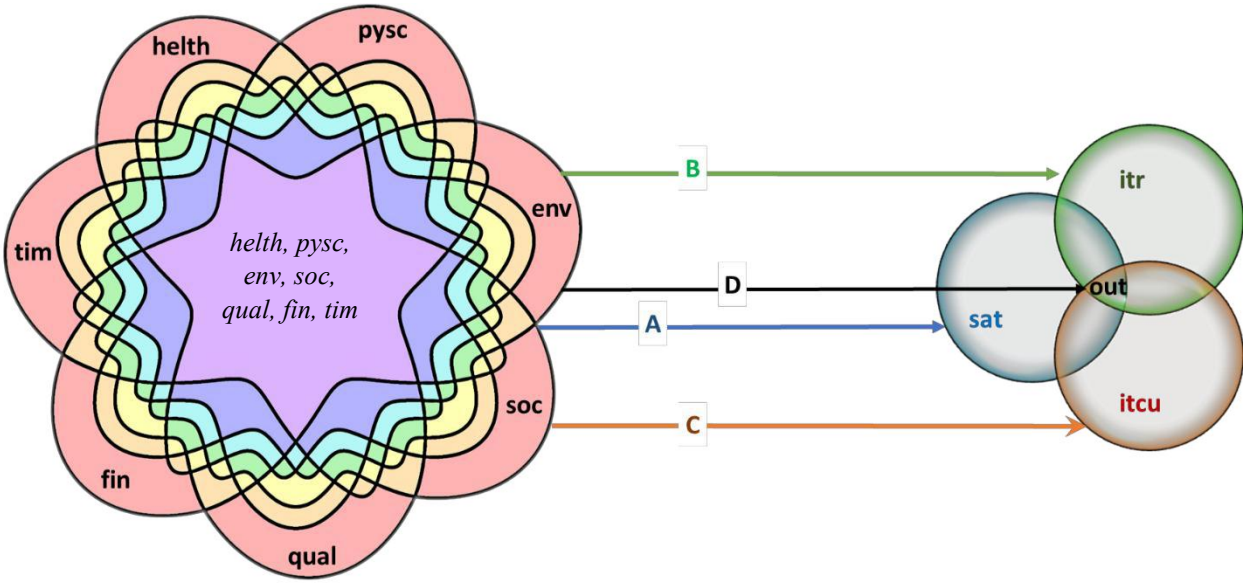


Note: The XY plots revealed an asymmetric relationship between satisfaction and its causal models.

Table 7. The results of necessary condition analysis

Antecedent condition	*Outcome condition*							
	sat		itr		itcu		out	
	Con.	Cov.	Con.	Cov.	Con.	Cov.	Con.	Cov.
helth	**0.957**	0.982	**0.940**	0.988	**0.953**	0.970	**0.986**	0.824
~helth	0.154	0.963	0.151	0.966	0.157	0.970	0.174	0.883
pysc	0.898	0.980	0.886	0.991	**0.900**	0.974	**0.954**	0.848
~pysc	0.212	0.969	0.207	0.971	0.215	0.976	0.244	0.908
env	**0.949**	0.977	**0.935**	0.987	**0.951**	0.971	**0.985**	0.825
~env	0.159	0.971	0.155	0.971	0.161	0.976	0.184	0.918
soc	0.800	0.980	0.789	0.989	0.801	0.972	0.845	0.842
~soc	0.313	0.985	0.305	0.984	0.317	0.988	0.366	0.936
qual	0.881	0.980	0.866	0.987	0.884	0.975	**0.940**	0.851
~qual	0.231	0.982	0.226	0.982	0.234	0.985	0.272	0.939
fin	0.817	0.973	0.805	0.982	0.822	0.970	0.873	0.846
~fin	0.290	0.986	0.284	0.987	0.293	0.985	0.345	0.954
tim	0.585	0.967	0.578	0.979	0.591	0.969	0.626	0.843
~tim	0.527	0.995	0.513	0.991	0.524	0.980	0.594	0.912

Note: sat stands for satisfaction, itr is intention to recommend, itcu: continued intention to use, out: expected outcomes, helth: health risk, pysc: psychological risk, env: environmental risk, soc: social risk, qual: quality risk, fin: financial risk, tim: time loss risk. Con. is Consistency and Cov. is Coverage. ~ indicates negation condition.



Note: sat stands for satisfaction, itr is intention to recommend, itcu: continued intention to use, out: expected outcomes, helth: health risk, pysc: psychological risk, env: environmental risk, soc: social risk, qual: quality risk, fin: financial risk, tim: time loss risk.

Figure 1. The research configurational model

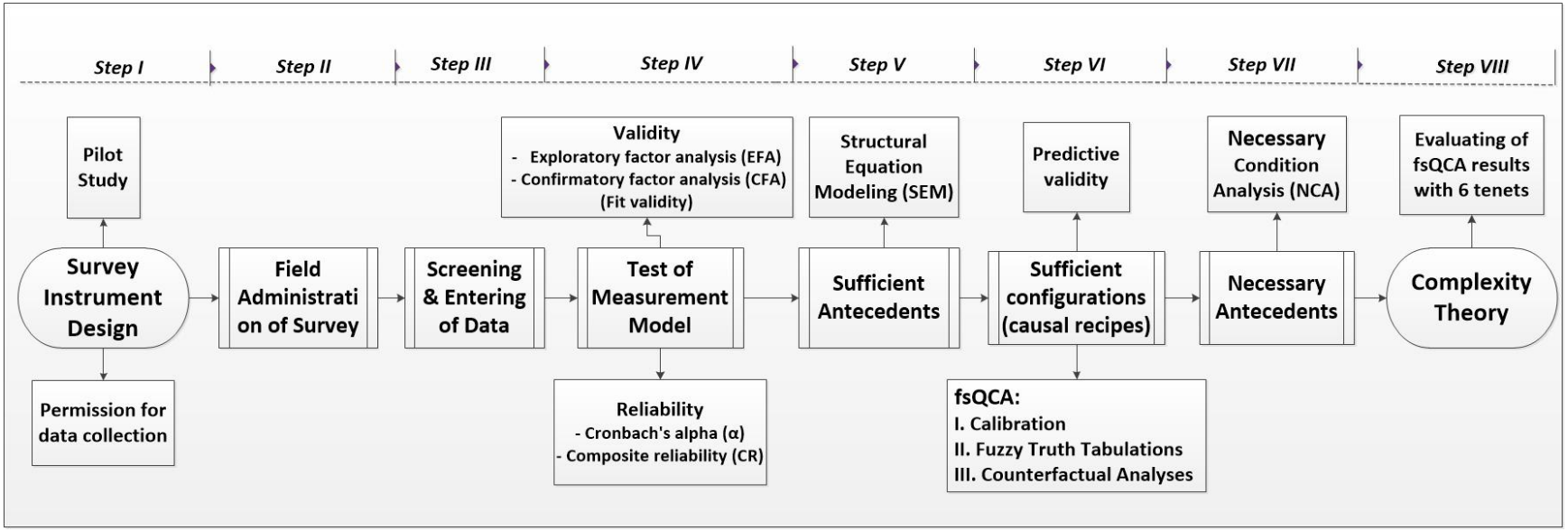
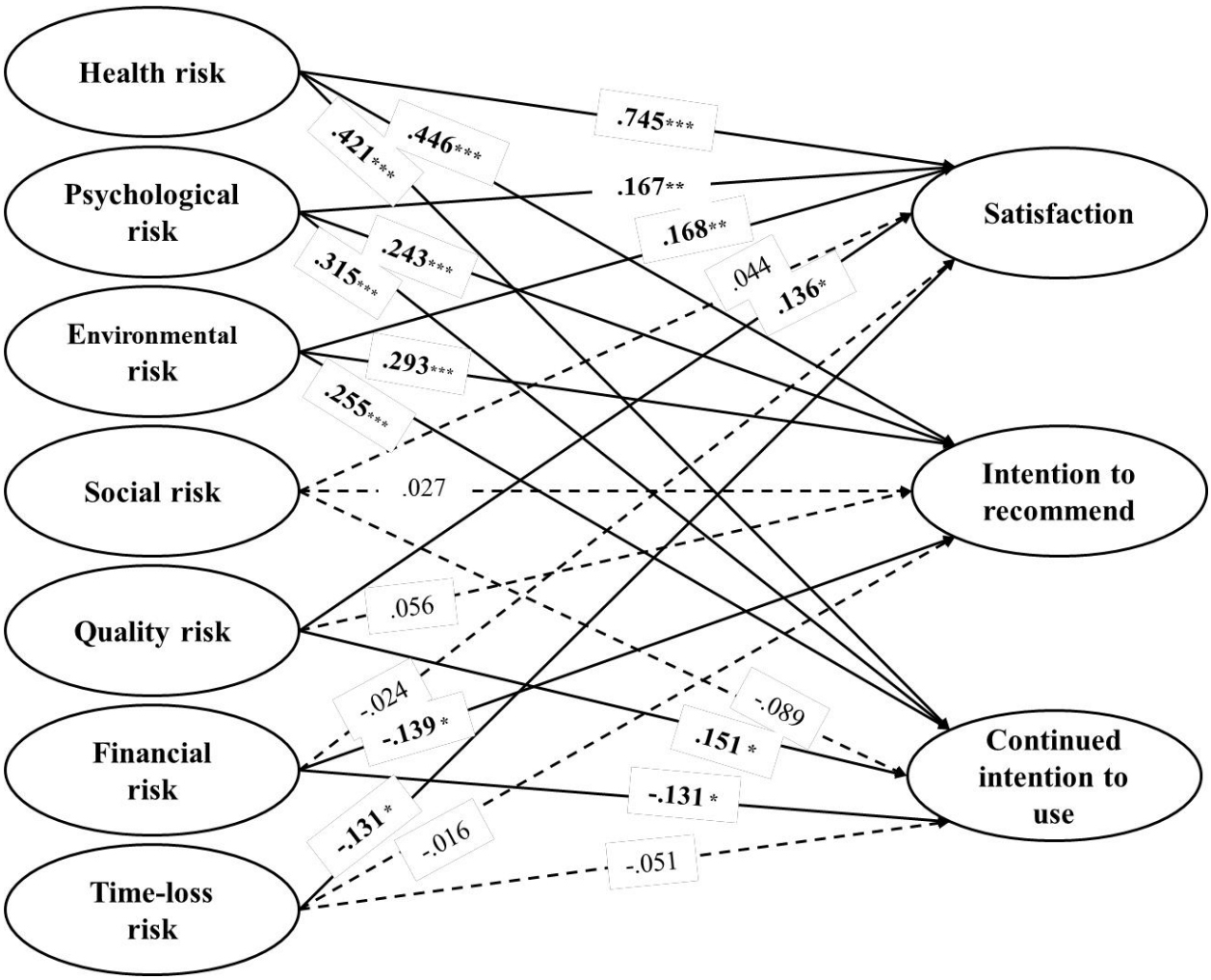


Figure 2. The research design



Note: Bolded line indicates significant effect, dotted line indicates non-significant effect. ***: $p < .001$, **: $p < .01$, *: $p < .05$. $X^2 = 1497.712$ (df= 443, $p < .001$), $X^2/df = 3.381$, CFI: 833, PCFI: .744, RMSEA: .078.

Figure 3. The results of symmetrical modeling using SEM for identifying the sufficient antecedents