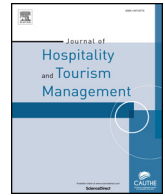




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## Strategy for enhancing the image of edible insect restaurants: Focus on internal environmental locus of control



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## ABSTRACT

This study was designed to investigate the importance of internal environmental locus of control in the context of edible insect restaurants. More specifically, this study proposed that four sub-dimensions of internal environmental locus of control, such as green consumers, environmental activists, environmental advocates, and recyclers positively affect the image of edible insect restaurants. In addition, it was hypothesized that image helps to enhance behavioral intentions including intentions to use, word-of-mouth intentions, and willingness to pay more. For this, 394 samples were collected in South Korea. The results showed that green consumers, environmental activists, and environmental advocates play an important role in the formation of image of edible insect restaurant. Furthermore, image had a positive influence on intentions to use, word-of-mouth intentions, and willingness to pay more.

### 1. Introduction

A serious threat to food security has been addressed due to the increasing world population, which will lead to 60 percent greater demand for food by 2050 (World Economic Forum, 2016) and the anticipated food shortage related to the current system of food production, food waste, global warming, and pollution (Baker, Shin, & Kim, 2016; Sciencing, 2017). Therefore, food availability focusing on supply in eco-friendly manner to meet the rise in demand has been one of the controversial topics these days. In this regard, endeavors in minimizing the environmental impact on food production and consumption have been substantial, and many global organizations and scholars in the academic world have proposed various strategies. As an example, Burchi and De Muro (2016) identified lack of education as one of the causes of current food insecurity and emphasized the importance of the knowledge exchange for lessening the global challenge in the security of food supply with nutritional capabilities. The United Nations aroused public opinion to rethink how we grow, share and consume our food and promoted sustainable agriculture as the part of the Sustainable Development Goals (SDGs) (United Nations, 2019).

On the other hand, alternative food sources have been suggested as a way to cope with the shortage of food in due time. Despite a long and ancient history of insects as a human food, today edible insects are sparking renewed discussion as a major source of food in the future

(Baker et al., 2016; Fogliano, 2017; Kohl, 2016; Sogari, 2015; van Huis et al., 2013). That is, numerous scholars indicated edible insects as a viable option in consideration of their significant nutritional benefits, great flavor and, more importantly, ecological perspective. For instance, Mitsuhashi (2010) presented how edible insects contribute to recycling of animal waste which helps to protect the environment. Megido et al. (2016) explicated the superiority of edible insects due to high fecundity rates with all year round breeding, better conversion rates, and low greenhouse gas emissions and compared their premium value with the traditional livestock. Along the same vein as studies in academia, edible insects were spotlighted as a food of the future by the media and world organizations such as the Food and Agriculture Organization of the United Nations (BBC, 2013). Following this trend, edible insect restaurants take advantage of it to penetrate the market of the restaurant industry throughout the world (Business Insider, 2019; Euronews, 2019; Han, Shin, Kim, Choi, & Kim, 2017; USA Today, 2018, p. 2019).

Issues in the environment have been a popular debate topic in the last half century, attracting unceasing attention from many researchers. A large part of these studies were conducted to understand the association between psychological constructs and pro-environmental behaviors/intentions (Biswas et al., 2010; Dietz, Stern, & Guagnano, 1998; Han, Hsu, & Lee, 2009; Moisaner & Pesonen, 2002). In other words, the general consensus in the environmental studies is that

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individuals' ecological behavior depends on their fundamental beliefs and attitudes. In this respect, [McCarty and Shrum \(2001\)](#) asserted that internal environmental locus of control is notably related to customers' propensity to engage in environmentally friendly behavior. Internal environmental locus of control is grounded in the belief that one's significant capabilities to the outcomes is directly impacted by own attitudes pertaining to individual control over the environment ([Yang & Weber, 2019](#)). Many studies supported that idea that internal environmental locus of control is the most important psychological mechanism to undertake the pro-environmental behaviors/intentions ([Aguilar, Waliczek, & Zajicek, 2008](#); [Bamberg & Möser, 2007](#); [Cleveland, Kalamas, & Laroche, 2012](#); [Colebrook-Claude, 2019](#)). In addition, corporate image in the field of environmental sustainability has been examined as a result of green practices and has been verified as a strong predictor of customers' behavioral intentions in the hospitality industry. For example, [Han et al. \(2009\)](#) examined customers' environmental friendly decision-making process and illustrated the strong association between overall image and behavioral intentions in the green hotel context. [Jeong, Jang, Day, and Ha \(2014\)](#) explored the driving forces behind of green image in a café setting and their results revealed that eco-friendly practices such as using recyclable take-out containers affect the perception of green image, but only across environmentally conscious customers. Given this, the interrelationships among the internal environmental locus of control, image, and customers' behavioral intentions are expected in the context of edible insect restaurants which specialize in the eco-friendly food source. As such, it is vital to uncover the role of internal environmental locus of control that creates the image of edible insect restaurants in generating favorable behavioral intentions.

Edible insect restaurants emerged as an innovative solution in the restaurant industry from a pro-environment viewpoint, however, there is little knowledge about the customers' perspective. Indeed, studies in the context of edible insect restaurants are nonexistent and current the literature remains in the domain of food itself such as acceptance, consumption, risk perceptions, and value of edible insects ([Baker et al., 2016](#); [Mitsuhashi, 2010](#); [Sogari, 2015](#); [van Huis et al., 2013](#)). Filling this void, the present research was designed to assess the connection among internal environmental locus of control, the image of edible insect restaurants, and customers' behavioral intentions. Based on the analysis results, this study provides a comprehensive understanding of roles of internal environmental locus of control in building the image of edible insect restaurants to predict customers' behavioral intentions and offers meaningful implications in theory and practice.

## 2. Literature review

### 2.1. Internal environmental locus of control

According to [Rotter \(1966\)](#), locus of control refers the extent to which people believe that they can affect outcomes through their actions. Namely, the concept of locus of control is related to individuals' perceptions of personal control in future behaviors and was classified into internal locus of control and external locus of control ([Rotter, 1966](#)). People who have an internal locus of control tend to perceive themselves to hold the control over their future and believe the outcomes depending on their input ([Cleveland et al., 2012](#); [Lefcourt, 1991](#)). In contrast, the latter dimension, external locus of control, describes individuals who believe that they are incompetent and have relatively little influence over outcomes which are beyond their control ([Rotter, 1966](#); [Yang & Weber, 2019](#)). The locus of control has been often adapted to explain individuals' behaviors/intentions in various contexts that include work-related outcomes such as job attitudes and work-life balance, and physical activity and other health behaviors ([Hiatt, Collins, Pastorek, & Bellows, 2009](#); [Karkoulian, Srour, & Sinan, 2016](#); [Lee, Chang, Cheng, & Chen, 2018](#); [Mercer et al., 2018](#)). Moreover, it was also widely used to articulate customers' ecological

behaviors/intentions ([Aguilar et al., 2008](#); [Colebrook-Claude, 2019](#); [McCarty & Shrum, 2001](#)).

Following the notion of internal locus of control, [Cleveland et al. \(2012, p. 293\)](#) conceptualized internal environmental locus of control as “a construct captures individuals' multifaceted attitudes pertaining to personal responsibility towards and ability to affect environmental outcomes.” They also asserted that increasingly knowledgeable and sophisticated consumers in environment today tend to concern the potential environmental impact of their consumption behavior and their roles, and therefore internal environmental locus of control is the most critical psychological factor regulating individuals' ecological behaviors. In other words, if a consumer holds a high degree of environmental concern, they will be more engaged in pro-environmental behavioral intentions. In accordance with this, a large body of studies has demonstrated a positive relationship between consumers with internal environmental locus of control and pro-environmental behaviors/intentions ([Aguilar et al., 2008](#); [Colebrook-Claude, 2019](#); [Yang & Weber, 2019](#)). Likewise, internal environmental locus of control has been verified as a crucial driver in shaping an individual's pro-environmental behavioral intentions. For example, [McCarty and Shrum \(2001\)](#) explained the internal environmental locus of control as a basic belief about how they interact with their environment and investigated the relationship between internal locus of control and recycling behavior. [Aguilar et al. \(2008\)](#) studied the effectiveness of a school gardening programs and confirmed its positive influence in building environmental attitudes and internal environmental locus of control that consequently led to students' pro-environmental actions.

In addition, the needs of segmenting consumers in the green context were addressed in the existing studies ([Chitra, 2007](#); [Straughan & Roberts, 1999](#); [Trivedi, Patel, & Savalia, 2015](#)), which suggested it as a critical information for an effective marketing communication. Furthermore, these scholars supported that consumer segmentation depending on the environment-specific variable were more appropriate rather than socio-demographic segmentation in the domain of sustainable behavior. It is also because of the emerging consensus that individuals' general beliefs, dispositions, and attitude toward the environment do not always translate into the actual pro-environmental behavior ([Cleveland, Kalamas, & Laroche, 2005](#)). Likewise, [Roberts and Bacon \(1997\)](#) derived the four dimensions of citizens' environmental concerns, which include balance of nature, limits to growth, god and nature, and adaptation before modification. [Chitra \(2007\)](#) used the personality measures of an environmental footprint to categorize consumers into aspirants, addicts, adjusters, and avoiders. [Albayrak, Caber, and Aksoy \(2010\)](#) presented three clusters of population depending on their environmental concerns, which include keen skeptics, fanatics, and hesitant. Also, [Cleveland et al. \(2012\)](#) argued the need to segment the consumers by psychographics with environmentally friendly behavior from an internal environmental locus of control perspective. They accordingly proposed multi-dimensional characters of internal environmental locus of control, which included green consumers, environmental activists, environmental advocates, and recyclers.

Green consumers are an “exemplary citizen who tirelessly but with a relatively ‘low profile’ works towards sustainable development, doing small but monuments good deeds, guided and motivated by a rigid personal ethic and a firm confidence in his/her ability to make a difference” ([Moisander & Pesonen, 2002, pp. 332–333](#)). In comparison to green consumers, environmental activists are more effortful ecological behavior to improve environmental quality through financial support, protests, and voluntary works ([Dono, Webb, & Richardson, 2010](#); [Fielding, McDonald, & Louis, 2008](#)). Meanwhile, environmental advocates tend to take part in environmental movements that are less public and available with a lower degree of commitment ([Larson, Stedman, Cooper, & Decker, 2015](#)). As such, persuading friends or colleagues to join pro-environmental activities are often exemplified to depict environmental advocates. Last, the recycler is regarded as a person who has a relatively simple and affordable environmental

commitment (Iyer & Kashyap, 2007). That is to say, they are used to daily or weekly recycling activities as being mindful of his/her contribution to the environment. This multi-faceted internal environmental locus of control has been found with incremental improvements in validity and a higher predicting power in ecological context since each of them captures individual expressions of control over the environment (Cleveland et al., 2012; Colebrook-Claude, 2019). As an example, Cleveland et al. (2012) argued a unidimensional conceptualization of internal environment locus of control is not capturing subtleties in environmental contexts and presented the effectiveness of employing multi-dimensional internal environment locus of control. In other words, psychographic segmentation contributes to better explain the roles of individuals' dispositions and the attitude toward the environment in their consumption behavior. Moreover, this is one of few validated consumer segmentations related to the internal environmental locus of control until now, so the current study therefore adopted consumer categories of internal environmental locus of control that encompass green consumers, environmental activists, environmental advocates, and recyclers.

## 2.2. Image of edible insect restaurants

Edible insects are well known for benefits such as rich nutrition and taste (Han et al., 2017; House, 2016; van Huis et al., 2013). More importantly, many experiments have confirmed the significant contribution of edible insects on the environmental footprint. Substantial benefits of edible insects in environment are grounded from the lower cost of farming (i.e. high fecundity rates, less space and water, and low-tech equipment) and the greater relief to climate change (i.e. less greenhouse gases and ammonia emissions) in comparison with current livestock (Durst & Shono, 2010; Kohl, 2016; Megido et al., 2016; Oonincx et al., 2010; van Huis et al., 2013). Thus, edible insects are an alternative and valuable food source which provides a solution to the environmental challenges we face today.

Recognizing the value of edible insects in environmental sustainability, restaurants began to embrace edible insects as their natural food source and promote signature dishes made with them. Edible insect restaurants are not currently active, however, edible insects were nominated as new trends in the food industry and there are more and more restaurants offering edible insects in the globe (Channel News Asia, 2019; National Restaurant Association, 2019; USA Today, 2018, p. 2019). For instance, a restaurant called The Insect Experience in South Africa provides bug-inspired meals such as black-fly-larvae croquettes and mopane polenta (Business Insider, 2019). Many kinds of innovative dishes incorporating edible insects are showcased for an exceptional dining experience at Insects in the Backyard, which is the first edible insect restaurant in Thailand (Channel News Asia, 2019). Linger restaurant in Denver, United States is a venue where chefs toss black ants with white rice and wok-fry vegetables with diced crickets and grasshoppers to offer extraordinary culinary such as sweet and sour crickets (USA Today, 2018, p. 2019).

Baloglu and Brinberg (1997, p. 11) defined image as “the sum of beliefs, ideas, and impressions that people have of a place or destination.” Image was also described as customers' overall perceptions of a company which is built through processing knowledge and information about a company and its attributes (Han et al., 2009). According to these notions, restaurant image has been studied as the reflection of customers' cumulative consumption experiences comprised of food and service quality and physical environment, and its influence on customers' behavioral intentions has been examined (Han & Hyun, 2017; Jang, Ro, & Kim, 2015; Ryu, Lee, & Gon Kim, 2012).

Green practices in the restaurant industry are various, encompassing energy and water-efficient equipment, environmentally friendly cleaning supplies, recycling and composting programs, serving ware and packaging, and menu sustainability (Jeong & Jang, 2010). Such eco-friendly practices were widely examined as building a green image

that exerted the positive influence on customers' behavioral intentions in various settings of the hospitality industry (Han et al., 2009; Jeong et al., 2014; Lee, Hsu, Han, & Kim, 2010). In particular, Jeong and Jang (2010) explicated a number of menu sustainability potentially influencing the green image of restaurants, including offering local or organic food ingredients, offering fish and seafood harvested eco-friendly and free of harmful pollutants, and avoiding genetically modified foods. 2019's What's Hot Culinary Forecast report indicated consumers crave foods that are healthy for the planet and presented the growing needs of the natural ingredients and eco-friendly perspective in culinary concepts (National Restaurant Association, 2019). In this respect, sustainable sources related to environmental concern at edible insect restaurants are of importance in forming the image of this type of restaurant, and Han et al. (2017) asserted that edible insect restaurants can gain a competitive edge in an ecological aspect.

## 2.3. Behavioral intentions

The concept of behavioral intentions originated from the theory of planned behavior, which was proposed by Ajzen (1991). The theory suggested that behavioral intentions are important outcomes of attitudes, subjective norms, and perceived control. In addition, the theory also indicated that customers' behavioral intentions are the predictor of their readiness to undertake a certain behavior. Similarly, Oliver (1997) defined behavioral intentions as the likelihood to engage in a specific behavior. One of the important goals for the hospitality enterprise is to build customers' behavioral intentions, because it is directly related to the company's revenue (Han et al., 2009; Lewis & Chambers, 2000). Previous studies have commonly suggested the following three concepts as sub-dimensions of behavioral intentions, which include intention to use, word-of-mouth intentions, and willingness to pay more. According to Warshaw and Davis (1985, p. 214), intentions to use can be defined as “the degree to which a person has formulated conscious plans to perform or not perform some specified future behavior.” In addition, word-of-mouth intentions refers to informal and noncommercial person-to-person communication between consumers about a brand, a product, or a service (Han et al., 2009). Lastly, willingness to pay more means the level of the consumers' own volition to spend more for a product or a service (Han et al., 2009; Harrison-Walker, 2001).

These underlying dimensions have been either individually (Araci, Bulut, & Kocak, 2017; Lee et al., 2010) or collectively (Ryu et al., 2012; Zeithaml, Berry, & Parasuraman, 1996) used in the context of the hospitality industry. As an example of studies that dealt with these sub-dimensions using an individual approach, Heung and Gu (2012) assessed intentions to return, intentions to spread positive word-of-mouth, and willingness to pay more to predict dining behavioral intentions of restaurant patrons. Their results showed how the impact of restaurant atmospherics and guest satisfaction vary on these three underlying dimensions of behavioral intentions. Hwang, Kim, and Kim (2020) measured intentions to use, word-of-mouth intentions, and willingness to pay more separately to understand the consumers' accepting behavior toward innovative technology in the food delivery services. Likewise, each sub-dimension is rather distinctive, so the present study therefore adopted all of the three underlying dimensions in order to predict the customers' behavioral intentions comprehensively and respectively toward edible insect restaurants.

## 2.4. Relationships among study variables

Studies in the extant pro-environmental literature empirically demonstrated significant relationships among involvement in environment, image on green product or service, and behavioral intentions. Fielding et al. (2008) surveyed a group of 169 people who identified themselves as environmental activists and confirmed that a stronger sense of him/herself as an environmental activist was positively associated with behavioral intentions in environmentally friendly way.

Dono et al. (2009) conducted an empirical study using data collected from students in Australia, and their results discovered the environmental activism is indirectly related to pro-environmental behavior. Cleveland et al. (2012) analyzed data gathered from consumers in Canada and explored the relationship between internal environmental locus of control and ecological behavior. In particular, they tested a total of 50 episodes in consumers' pro-environmental behavior and demonstrated 94 percent (i.e. 47 out of 50) of behavior were affected by green consumers, environmental activists, environmental advocates, and recyclers. More recently, Priadi, Patria, Sarkawi, and Oktaviani (2018) incorporated the individuals' discretionary sense of commitment to sustainability to examine their willingness to engage in pro-environmental behavior and found people with greater internal locus of control exhibited more environmentally friendly behavior.

While there is sufficient support in the direct relationship between internal locus of control and behavioral intentions, ample evidence also exists about the role of image in such a relationship. That is, studies provided the evidence in strong associations between internal locus of control and the self or body image in the domain of fitness and health (Hiatt et al., 2009; Radell, Adame, & Cole, 2002; Salomé & Ferreira, 2017). Similar to this, DiPietro, Gregory, and Jackson (2013) examined customers' perceptions regard the pro-environmental practices of quick service restaurant in the Midwest, and their findings showed the difference between respondents who implement green practices at home and who do not. Lee (2013) examined how consumers received the image of green policy communications and validated the role of the beliefs that an individual's behaviors impact the environmental wellness. In other words, personal characteristics with respect to the environmental locus of control influence the way consumers perceive a message, which is created by a supplier in the green marketing context. Jeong et al. (2014) referred the green image of restaurants as customers' perceptions of a particular restaurant that are highly engaged with environmental commitments and concerns. The authors further explored the difference between the group of people who are environmentally conscious and those who are not, indicating that the influence of green practices on a restaurant's green image is much stronger in customers who are greatly conscious of ecological behavior. Trivedi et al. (2015) supported the varied responses among consumers with the different level of environmental locus of control and asserted that creating a socially responsible corporate image is of great importance. Lee et al. (2018) studied the organic labels on food products and asserted that healthy image is associated with the organic labels and demonstrated the interrelationship with perceived healthiness of food subject to the people with internal locus of control. Afsar et al. (2020) echoed from the prior studies that individuals with the high degree of internal environmental locus of control positively perceive living and operating with the greater ecological awareness and tried to find how pro-environmental behaviors are formulated at the workplace. They concluded that a shared green vision of an organization is more important for employees with internal environmental locus of control. The stream of these studies supported that the group of individuals who share the burden of environmental responsibility would have a favorable image towards the company, which operates with the sense of environmental concerns. As such, it implies that the internal environmental locus of control would increase the positive image of edible insect restaurants that exercise eco-friendly practices. Along parallel lines, the present study postulated the four sub-dimensions of internal environmental locus of control would be significantly associated with the image of edible insect restaurants.

**H1.** Green consumers will relate positively to the image of edible insect restaurants.

**H2.** Environmental activists will relate positively to the image of edible insect restaurants.

**H3.** Environmental advocates will relate positively to the image of

edible insect restaurants.

**H4.** Recyclers will relate positively to the image of edible insect restaurants.

A host of existing studies have been conducted in the way that intentions are regarded as critical predictors of individuals to carry out behaviors and numerous research examined intentions to use, word-of-mouth intentions, and willingness to pay more to explain customers' behavioral intentions in the domain of the hospitality. Furthermore, robust findings exist on how corporate image is engaged with customers' behavioral intentions. For example, Han et al. (2009) investigated customers' eco-friendly decision making process in the green hotel context, and they measured visit intentions, word-of-mouth intentions, and willingness to pay more in articulating behavioral intentions as consequences of overall hotel image. Lee et al. (2010) collected data from 416 US hotel patrons and confirmed that a strong association exists between a green image of hotel and customers' word-of-mouth, willingness to pay a premium, and revisit intentions. Based on the results, they stressed the importance of green image as the consumers are increasingly concerned about the environment, proposing effective green management as a strategic tool in inducing favorable behavioral intentions. Jang et al. (2015) studied social servicescape as a predictor of restaurant image and the data analysis using 500 surveys verified that a formed restaurant image exerts an influence on customer behavioral intentions. Han and Lee (2016) demonstrated green practices as a tool to build a positive corporate image in the restaurant industry incorporating value orientations and collected 467 responses in the Midwest region of the United States to examine willingness to choose, intention to say positive things, and willingness to pay a premium price as underlying dimensions of behavioral intentions. Hwang, Kim, Choe, and Chung (2018) assessed Korean food as one type of ethnic foods from US customers' standpoint and found its nutritional value is the salient factor for preferring Korean food and articulated how it is associated with destination image and customers' behavioral intentions. This empirical evidence clearly explains that when an individual possesses a favorable image of a product/service, brand, or a company, there is a high possibility of positive behaviors/intentions toward the specific supplier. Hence, the above mentioned studies suggested that image of edible insect restaurants plays an essential role in inducing customers' behavioral intentions and the following hypotheses were developed.

**H5.** Image of edible insect restaurants will relate positively to customers' intentions to use.

**H6.** Image of edible insect restaurants will relate positively to customers' word-of-mouth intentions.

**H7.** Image of edible insect restaurants will relate positively to customers' willingness to pay more.

## 2.5. Proposed conceptual model

Based on a thorough review of extant studies, the proposed conceptual model is displayed in Fig. 1. Our theoretical framework encompassed the consumer segments of the internal environmental locus of control that included green consumers, environmental activists, environmental advocates, recyclers, the image of an edible insect restaurant, and the three underlying dimensions of behavioral intentions towards an edible insect restaurant, which included intentions to use, word-of-mouth intentions, and willingness to pay more. Likewise, the research model involves a total of eight latent constructs, and it contains a total of seven hypotheses.



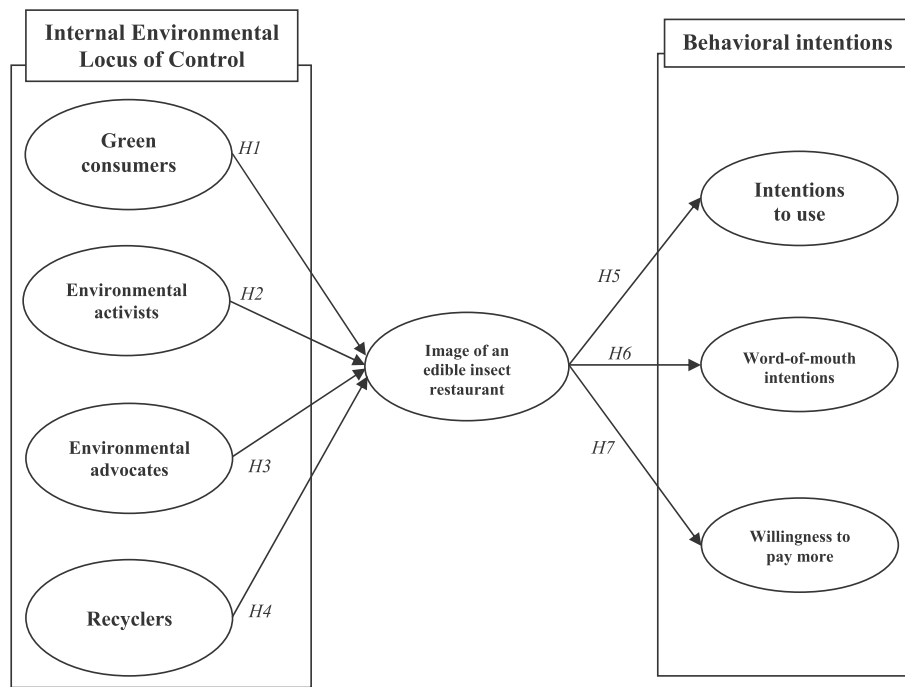


Fig. 1. Proposed conceptual model.

### 3. Methodology

#### 3.1. Measurement

The survey questionnaire included three sections, such as introductory letter, questions for variables, and questions for demographic information. To measure eight constructs in the proposed model, items validated in prior research were adapted and employed. Multi-item measures with seven-point Likert-type scales (1 = strongly disagree and 7 = strongly agree) were used for all dimensions of the proposed model. First, INELOC included four sub-dimensions, such as green consumers, environmental activists, environmental advocates, and recyclers, and were measured using 16 items employed from Cleveland et al. (2005) and Cleveland et al. (2012). Second, image contained three items adapted from Han, Lee, Chua, Lee, and Kim (2019) and Hwang and Choe (2019). Lastly, behavioral intentions consisted of three sub-dimensions, including intentions to use, word-of-mouth intentions, and willingness to pay more, and they were measured with nine items cited from Gremler and Gwinner (2000), Hwang and Kim (2019), and Zeithaml et al. (1996).

All the measurement items were revised to be appropriate in the present study setting. After that, we invited the following three groups in order to evaluate the content validity. The three groups included (1) two professors whose main research focus was the food service industry, (2) three graduate students majoring in food service management, and (3) two restaurant employees. They confirmed that all the measurement items measure the concept used in this study well, which suggested a high level of context validity.

#### 3.2. Data collection procedure

After confirming that there is no problem with the content validity, a pretest was performed to assess the reliability of the measurement items using 30 restaurant customers through online surveys in Korea. The background of this study is edible insect restaurants, but there are no the edible insect restaurants in Korea, which leads to a low level of respondents' understanding of these types of restaurants. For this reason, we provided two news articles and one video, which are related

to edible insect restaurants, before starting the questionnaire. The results indicated that the Cronbach alpha values of all the measurement items were higher than 0.70 (Nunnally, 1978), which suggests a high level of reliability. For the main data collection, a Web-based survey was performed using a survey system of a market research company in South Korea. Using the same method as the pretest, two news articles and one video related to edible insect restaurants, which clearly explained the operation system of edible insect restaurants and its eco-friendly role, were provided to respondents. About 6479 e-mail invitations were sent, and a total of 450 filled questionnaires were obtained. In addition, 56 outliers were removed based on visual inspection and a Mahalanobis distance check. As a result, 394 samples were employed for further statistical analysis.

### 4. Results of data analysis

#### 4.1. Descriptive statistics

Of the 394 samples, 51.5% and 48.5% were male and female participants, respectively. Ages ranged from 20 to 59 years, with 38.32 being the mean age. In addition, the largest proportion of the respondents (28.4%,  $n = 112$ ) indicated a monthly household income between \$1001 and \$2000. About 53.3% ( $n = 210$ ) indicated that they were married. Lastly, the majority of the respondents (55.1%,  $n = 217$ ) hold a bachelor's degree. Table 1 includes details of the sample.

#### 4.2. Confirmatory factory analysis

A confirmatory factory analysis (hereafter CFA) was conducted before the estimation of the structural model. The results of the CFA are presented in Tables 2 and 3. Our findings showed that the model satisfactorily fit to the data ( $\chi^2 = 547.847$ ,  $df = 224$ ,  $\chi^2/df = 2.446$ ,  $p < .001$ , NFI = 0.952, IFI = 0.971, CFI = 0.971, TLI = 0.964, and RMSEA = 0.061). All standardized factor loadings between latent variables and related items, which fell between 0.789 and 0.973, were statically significant ( $p < .05$ ).

Values for composite reliability ranged from 0.895 to 0.967. These findings indicated that the internal-consistency level of measurement

**Table 1**  
Profile of survey respondents (n = 394).

Variable	n	Percentage
<b>Gender</b>		
Male	203	51.5
Female	191	48.5
<b>Monthly household income</b>		
US\$6001 and over	15	3.8
US\$5001-US\$6000	22	5.6
US\$4001-US\$5000	39	9.9
US\$3001-US\$4000	54	13.7
US\$2001-US\$3000	111	28.2
US\$1001-US\$2000	112	28.4
Under US\$1000	41	10.4
<b>Marital status</b>		
Single	179	45.4
Married	210	53.3
Widowed/Divorced	5	1.3
<b>Education level</b>		
Less than High school diploma	54	13.7
Associate's degree	74	18.8
Bachelor's degree	217	55.1
Graduate degree	49	12.4
Mean age = 38.32 years old		

items for each construct is suitable (Hair, Black, Babin, Anderson, & Tatham, 2006). And then, the construct validity of the measures was assessed. The values of average variance extracted (hereafter AVE) fell between 0.740 and 0.908, exceeding the recommended threshold of 0.50 (Hair et al., 2006). In addition, the AVE values for all the constructs were greater than the values of the correlations between the pairs of study constructs (Fornell & Larcker, 1981). These findings confirmed high levels of the convergent and discriminant validity of the

**Table 2**  
Confirmatory factor analysis: Items and loadings.

Construct and scale items	Standardized Loading <sup>a</sup>
<b>Green consumer</b>	
The sooner consumers start buying greener products, the sooner companies will transform to respond to their demands.	.920
The more I buy 'green' products, the more I help persuade companies to become 'friendlier' to the environment.	.921
By buying greener products, I can make a difference in helping the environment.	.885
<b>Environmental activist</b>	
Any donation to environmental groups helps it attain its goals.	.845
The efforts deployed by environmental groups have an impact on the end result of many ecological challenges.	.929
By making donations to pro-environmental groups, I can help make a positive difference on the state of the environment.	.886
<b>Environmental advocate</b>	
I am able to convince a friend to change his/her conservation habits.	.892
I am able to convince some of my friends to take some kind of action with regards to environmental challenges.	.895
If willing, people can generally influence their friends' transportation habits.	.789
<b>Recycler</b>	
By recycling, I am helping to reduce pollution.	.934
By recycling, I am doing my part to help the state of the environment.	.973
By recycling, I am saving valuable natural resources.	.927
<b>Image</b>	
The overall image for dining out at an edible insect restaurant is good.	.911
The overall image of an edible insect restaurant is great.	.943
Overall, I have a good image about an edible insect restaurant.	.891
<b>Intentions to use</b>	
I will dine at an edible insect restaurant.	.937
I am willing to dine at an edible insect restaurant.	.950
I am likely to dine at an edible insect restaurant.	.963
<b>Word-of-mouth intentions</b>	
I am likely to say positive things about edible insect restaurants to others.	.890
I am likely to recommend edible insect restaurants to others.	.968
I am likely to encourage others to dine at edible insect restaurants.	.923
<b>Willingness to pay more</b>	
I am likely to pay more for dining at an edible insect restaurant.	.932
It is acceptable to pay more for dining at an edible insect restaurant.	.966
I am likely to spend extra in order to dine at an edible insect restaurant.	.961

Goodness-of-fit statistics:  $\chi^2 = 547.847$ ,  $df = 224$ ,  $\chi^2/df = 2.446$ ,  $p < .001$ , NFI = 0.952, IFI = 0.971, CFI = 0.971, TLI = 0.964, and RMSEA = 0.061.

Notes 1: <sup>a</sup> All factors loadings are significant at  $p < .001$ .

Notes 2: NFI = Normed Fit Index, CFI = Comparative Fit Index, TLI = Tucker-Lewis Index, and RMSEA = Root Mean Square Error of Approximation.

measures used in the present research (Fornell & Larcker, 1981; Hair et al., 2006).

### 4.3. Structural equation modeling

The structural model was evaluated to validate the proposed theoretical framework. The results of structural equation modeling (hereafter SEM) revealed that our model appropriately fits the data ( $\chi^2 = 809.869$ ,  $df = 239$ ,  $\chi^2/df = 3.389$ ,  $p < .001$ , NFI = 0.929, IFI = 0.949, CFI = 0.949, TLI = 0.941, and RMSEA = 0.078). In addition, the results of data analysis showed that six of the seven hypotheses were statistically supported. More specifically, Green consumer ( $\beta = 0.206$ ,  $p < .05$ ), environmental activist ( $\beta = 0.157$ ,  $p < .05$ ), and environmental advocate ( $\beta = 0.286$ ,  $p < .05$ ) positively affected image. Thus, H1, H2, and H3 were supported. However, H4, which suggested the effect of recycler on image, was not supported. In addition, the results of data analysis showed that image has a positive influence on intentions to use ( $\beta = 0.837$ ,  $p < .05$ ), word-of-mouth intentions ( $\beta = 0.807$ ,  $p < .05$ ), and willingness to pay more ( $\beta = 0.640$ ,  $p < .05$ ), so H5, H6 and H7 were supported. The results of SEM are presented in Fig. 2 and Table 4.

## 5. Discussion and implications

### 5.1. Theoretical implications

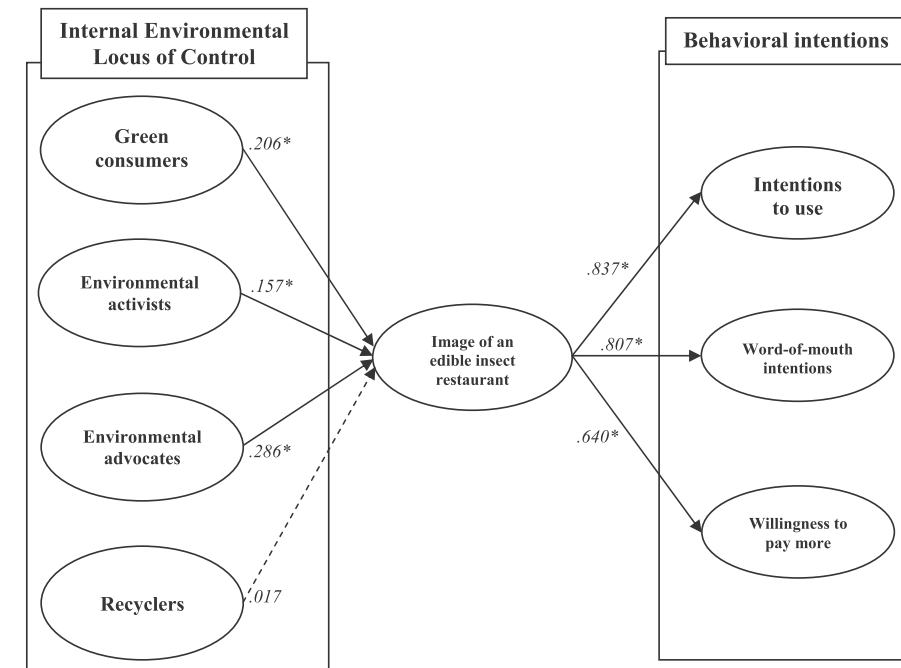
First, this study is the first empirical application of the concept of internal environmental locus of control to edible insect restaurants. CFA was conducted to identify the appropriateness of the measurement model. High levels of reliability and validity confirms that the proposed model fits the data well. Particularly, this study helps to explain the

**Table 3**  
Descriptive statistics and associated measures.

	No. of Items	Mean (SD)	AVE	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
(1) Green consumer	3	5.34 (1.10)	.826	<b>.934<sup>a</sup></b>	.634	.398 <sup>b</sup>	.712	.447	.217	.262	.085
(2) Environmental activist	3	4.93 (1.04)	.787	.402 <sup>c</sup>	<b>.917</b>	.632	.562	.464	.317	.403	.257
(3) Environmental advocate	3	4.36 (1.07)	.740	.158	.399	<b>.895</b>	.473	.439	.338	.468	.341
(4) Recycler	3	5.33 (1.13)	.893	.507	.316	.224	<b>.962</b>	.367	.226	.271	.161
(5) Image	3	4.26 (1.12)	.838	.200	.215	.193	.135	<b>.939</b>	.754	.784	.575
(6) Intentions to use	3	3.83 (1.30)	.903	.047	.100	.114	.051	.569	<b>.965</b>	.818	.717
(7) Word-of-mouth intentions	3	3.91 (1.19)	.860	.069	.162	.219	.073	.615	.669	<b>.949</b>	.686
(8) Willingness to pay more	3	3.30 (1.22)	.908	.007	.066	.116	.026	.331	.514	.471	<b>.967</b>

Notes 1: SD = Standard Deviation and AVE = Average Variance Extracted.

Notes 2: a. Composite reliabilities are along the diagonal, b. Correlations are above the diagonal, and c. Squared correlations are below the diagonal.



Note: \* $p < .05$

**Fig. 2.** Standardized theoretical path coefficients.

Note: \* $p < .05$ .

**Table 4**  
Standardized parameter estimates for structural model.

			Coefficients	t-value	Hypothesis	
H1	Green consumer	→	Image	.206	2.612*	Supported
H2	Environmental activist	→	Image	.157	2.023*	Supported
H3	Environmental advocate	→	Image	.286	4.278*	Supported
H4	Recycler	→	Image	.017	.235	Not supported
H5	Image	→	Intentions to use	.837	18.957*	Supported
H6	Image	→	Word-of-mouth intentions	.807	18.576*	Supported
H7	Image	→	Willingness to pay more	.640	13.914*	Supported

Goodness-of-fit statistics:  $\chi^2 = 809.869$ ,  $df = 239$ ,  $\chi^2/df = 3.389$ ,  $p < .001$ ,  $NFI = 0.929$ ,  $IFI = 0.949$ ,  $CFI = 0.949$ ,  $TLI = 0.941$ , and  $RMSEA = 0.078$ .

Notes 1: \* $p < .05$ .

Notes 2: NFI = Normed Fit Index, CFI = Comparative Fit Index, TLI = Tucker-Lewis Index, and RMSEA = Root Mean Square Error of Approximation.

relationships among the internal environmental locus of control and overall image of edible insect restaurants, which exercise pro-environmental operations and customers’ behavioral intentions. Also, the current study adopted consumer segments of the internal environmental locus of control that included green consumers, environmental activists, environmental advocates, and recyclers to take things a step further. This enabled us to gain a more detailed understanding of the formation of consumer behavior, and this research contributes to clearly explain

how the relationship between individuals and the image of edible insect restaurants vary according to the different categories of people who feel empowered to act in environmental wellness and the impact of image on behavioral intentions. Previous studies have examined the significant role of internal environmental locus of control to explain various eco-friendly behaviors (e.g. Colebrook-Claude, 2019; McCarty & Shrum, 2001) but did not explore the effect of internal environmental locus of control in the context of edible insect restaurant. Therefore,

identifying the relationships between internal environmental locus of control and important outcome variables of edible insect restaurants is a critical theoretical implication of this study.

Second, this study proved the effects of “green consumers”, “environmental activists”, and “environmental advocates” on image of edible insect restaurants. These findings are similar to those of previous studies (e.g. Jeong et al., 2014; Lee et al., 2018) indicating a positive association between environmental consciousness and the image of the consumption product. For example, Jeong et al. (2014) argued that environmentally conscious customers are more likely to concern with a restaurants’ green image. What is meaningful in this study is that this study first confirmed and expanded existing literature by empirically investigating the role of important dimensions of internal environmental locus of control in the edible insect restaurant context. This is a significant theoretical contribution.

Third, Hypothesis 4, which proposed the effect of recyclers on image of edible insect restaurants, was not statistically supported. This result is somewhat different from our expectation in that previous studies have demonstrated the positive relationship between internal environmental locus of control and the image of the consumption product or self-health image (e.g. Lee et al., 2018; Salomé & Ferreira, 2017). This result can be attributed to the distinctive characteristic of the current study context. In South Korea, separate garbage collection for recycling is the normal practice throughout the country. When throwing out waste, people are required to separate garbage for recycling in subways, hotels, tourist attractions, and public areas. Since 1995, general waste has not been allowed in public places but should be handled properly using standard plastic bags by every household. Because all Korean consumers are familiar with the regulation, an individual may not necessary consider recycling behavior as the high expression of control over the environment but regular task to be done. In fact, recycler was described as a group who put a relatively simple and affordable environmental commitment (Iyer & Kashyap, 2007). The findings of this study show that a high level of “recycler” does not necessary mean that they have a positive image of edible insect restaurants which is known to have numerous benefits in terms of sustainability.

Fourth, another important theoretical implication of this study is that this study confirmed the positive relationships between the image of edible insect restaurants and important behavioral intentions such as intention to use, word-of mouth intention, and willingness to pay more. These findings are consistent with previous studies (e.g. Han & Lee, 2016; Jang et al., 2015), which prove the important role of corporate image and its impact on customers’ behavioral intentions. In this regard, the present study has found image to be a critical factor forming intention to use, word-of mouth intentions, and willingness to pay more in the context of edible insect restaurant for the first time. This is considered an important theoretical implication.

### 5.2. Managerial implications

First, in order to improve the overall image of edible insect restaurants, it is necessary to raise the number of “Green consumers”. The more consumers are convinced that buying eco-friendly products can help the environment, the more they form a positive image of edible insect restaurants. Hence, it is first necessary to emphasize to potential customers that dining in edible insect restaurants is a definite eco-friendly consumption. Emphasis should be placed on marketing to highlight the advantages of environmentally friendly edible insect restaurants. For example, edible insects are an eco-friendly foodstuff that reduces greenhouse gas emissions (van Huis, 2015) and they are found to be the most environmentally sustainable animal source of food because of their least level of global warming potential (Makkar, Tran, Heuzé, & Ankers, 2014). It is important to educate consumers that eating at edible insect restaurants is not simply tasting unique cuisine, but a consumption that helps protect the environment. Therefore, it is

important to use such marketing phrases actively in restaurant websites and mobile apps.

Second, consumers with a high level of “environmental activist” are the ones believe that their financial support, and voluntary works will improve environmental quality (Dono et al., 2010). In order to improve the image of edible insect restaurants, it is very important to identify who are the most actively acting for the environment and believing in its impact. Edible insect restaurant managers should learn how and why those consumers have become “environmental activists” and utilize the information for the edible insect restaurant marketing. For example, when designing a menu in edible insect restaurants, restaurant managers can input the message that shows how much green house gas emission will be reduced when ordering edible insect cuisine compared to that of regular dish made of beef or pork.

Third, regarding “environmental advocates”, consumers with a high level of persuasion of friends or colleagues to take environmental activities are more likely to have a positive image of edible insect restaurants. To increase the high level of “environmental advocate”, it is necessary to emphasize the sense of self-achievement and satisfaction that people gain by persuading others to take part in green habits. For example, edible insect restaurant managers can utilize marketing phrases such as “Exercise your influence for the environment.” In addition, when “environmental advocates” group brings new customers to the edible insect restaurant, their efforts should be recognized by the restaurant and should be rewarded in any forms. It is very important that edible insect restaurant managers pay attention to those influencers.

Lastly, potential diners generate favorable image of edible insect restaurants tend to visit the edible insect restaurant, are more likely to spread positive words about the restaurant, and are willing to pay more to dine out at edible insect restaurants. Thus, edible insect restaurant managers and food marketers should understand the antecedents of image of edible insect restaurants. This study finds that “green consumer”, “environmental activist”, and “environmental advocate” proved to be effective in generating a positive image of edible insect restaurants. However, “recycler” was not significantly related to image of edible insect restaurants. Therefore, even though multidimensional approach of studying internal environmental locus of control was found to be appropriate in the current study, the inclusion of “recycler” in internal environmental locus of control should be more explored in the future studies in diverse contexts.

### 6. Limitations and future research

Since the data of this study were collected in Korea, it is somewhat difficult to apply the results of this study to other regions. Similarly, this study focused only on edible insect restaurants, so future research is necessary to apply our research model to other fields. Lastly, since edible insect restaurants are not yet commercialized in South Korea, this study tried to fully explain the environmentally friendly role to the respondents. However, it is recommended to collect data from respondents who have actually used edible insect.

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