

# Can sustainable restaurant practices enhance customer loyalty? The roles of value theory and environmental concerns

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## ABSTRACT

Attracting diner participation in sustainable restaurant practices, such as waste reduction, are highly significant for the environment and in reducing the carbon footprint of food consumption. However, there are concerns as to whether the adoption of sustainable practices in restaurant settings is favored by consumers. To examine such issues we aim to identify, by applying value theory, whether sustainable restaurant practices increase diner loyalty. To do this, this research develops and tests an integrated theoretical model on relationships between sustainable restaurant practices, consumer values (hedonic and utilitarian), environmental concern, and diner behavior. Results reveal that sustainable restaurant practices as a second-order construct of food sustainability and waste reduction influence hedonic/utilitarian values. Sustainable restaurant practices also positively influence diner behavior as a second-order construct of participation in waste reduction practices and loyalty to sustainable restaurants. Diner behavior is affected by hedonic/utilitarian values on waste reduction, which are moderated by environmental concern.

## 1. Introduction

The hospitality industry has become increasingly interested in reducing waste (e.g., Gössling & Hall, 2013; Han, Lee, Trang, & Kim, 2018; Pirani & Arafat, 2016; Sakaguchi, Pak, & Potts, 2018; Tatàno, Caramiello, Paolini, & Tripolone, 2017; Wang et al., 2017). There is also growing research on the restaurant sector on the development and application of sustainable practices (e.g., Pulkkinen, Roininen, Katajajuuri, & Järvinen, 2016; Visschers & Siegrist, 2015) given that food service provision imposes significant environmental and societal impacts in terms of energy and water use, waste and carbon footprint (Filimonau, Lemmer, Marshall, & Bejjani, 2017; Gössling & Hall, 2013). However, much restaurant research, while extremely valuable, has documented sustainable practices in terms of environmental concerns without fully addressing the response of diners (Baldwin, Wilberforce, & Kapur, 2011; Hall & Gössling, 2013; Higgins-Desbiolles, Moskwa, & Wijesinghe, 2019; Hu, Horng, Teng, & Chou, 2013; Iamkovaia, Arcila, Martins, & Izquierdo, 2019; Jang, Zheng, & Bosselman, 2017; Kim & Yun, 2019; Martin-Rios, Demen-Meier, & Gössling, 2018; Wang, Chen, Lee, & Tsai, 2013). Despite the significance of consumer value and concern for supporting eco-friendly practices in restaurants (e.g. Shin,

Im, Jung, & Severt, 2017a, 2018, 2019; Joo, Hwang, & Yoon, 2018; Teng & Wu, 2019), the understanding of sustainable restaurant practices has not been sufficiently studied in relation to consumer value theory. Indeed, an important question for many restaurants that seek to generate economic as well as environmental returns from the adoption of sustainable practices is will such practices affect diner loyalty?

Customer perceptions of values are created according to the evaluation of emotional or affective features (hedonic value) and functional or economic benefits (utilitarian value) as the main value dimensions of the dining experience (Ha & Jang, 2010). Among hotel guests, perceived hedonic and utilitarian values play a key role in improving consumer trust (Gupta, Dash, & Mishra, 2019) and mediating the influence of waste reduction management on guest participation and loyalty (Han et al., 2018). With respect to various aspects of sustainability in restaurants, consumer perceived values (hedonic and utilitarian) appear critical factors in their attitude, satisfaction, and behavioral intentions (Kallbekken & Sælen, 2013; Teng & Wu, 2019; Visschers & Siegrist, 2015).

Perhaps, not surprisingly, eco-friendly practices in restaurants are regarded as being important to consumers who possess high levels of environmental concern (Joo et al., 2018; Kim & Hall, 2019b; Shin et al.,

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2017a, 2018, 2019). Although values and environmental concern appear as potentially important determinants on consumer behavior in the context of sustainable restaurant practices, there is surprisingly limited theoretically integrated research on the role of these determinants of diner behavior. Therefore, the purpose of this research is to build and test a conceptually comprehensive model to identify whether sustainable restaurant practices of food sustainability and waste reduction influence diner behavior with respect to participation in sustainability practices and loyalty to the restaurant via values on waste reduction and environmental concern. Accordingly, this study seeks to answer the following research questions: do sustainable restaurant practices increase consumer perceived values (hedonic and utilitarian)?; do hedonic as well as utilitarian values enhance consumer participation and loyalty?; and, does environmental concern moderate the linkage of values and diner behavior?

In sum, this research provides theoretical and practical contributions to better understanding sustainability in the hospitality industry. The findings of this study provide a potential grounding for future research on sustainable restaurant practices in terms of the relationships between consumer loyalty and sustainability, while, the results also offer practical insights to stakeholders (e.g., restaurateurs, policy-makers, employees) to increase pro-environmental behavior while bringing benefits to restaurants, consumers, and the environment.

## 2. Literature review

### 2.1. Theoretical framework

#### 2.1.1. Sustainable restaurant practices

Although there is no single accepted definition, sustainable restaurants are often regarded as 'ecological' or 'green' restaurants that operate in an environmentally friendly manner (Green Restaurant Association, 2019; Iamkovaia et al., 2019). However, sustainable restaurant associations or networks usually incorporate a number of environmental, economic, and social sustainable practices including: waste reduction; efficient water and energy usage; use of local, organic, and seasonal food; use of Fair Trade products where appropriate; recycling; use of eco-friendly products and furnishings; livable wage and fair labor relations; and engagement with the local community (Hall & Gössling, 2013; The Sustainable Restaurant Association, 2019; Wang et al., 2013).

There has been a substantial growth in studies on the hospitality industry related to food sustainability and waste reduction (Baldwin et al., 2011; Hu et al., 2013; Pirani & Arafat, 2016; Visschers & Siegrist, 2015). For example, restaurant practices that met the requirements of the Green Seal standard certification were found to significantly reduce the environmental footprint of restaurants with no additional long-term costs (Baldwin et al., 2011). More climate-friendly menus have been found to have no negative impact on customer satisfaction (Visschers & Siegrist, 2015). Waste reduction is currently a major focus of government and the restaurant sector because of concerns over the disposal of edible food and the environmental impact of plastics as well as the linkages between waste and carbon emissions (Pirani & Arafat, 2016). Managerial and policy reinforcement is necessary for sustainable restaurant practices becoming a determinant of consumer choice, with even the presentation of carbon footprint information on menus generally being viewed positively by consumers (Filimonau et al., 2017). However, waste reduction in the hospitality sector requires substantial changes in the way the sector operates, along with customer perceptions and, in some cases, improvements in their participation in waste reduction practices (Gössling, Hall, & Scott, 2015).

The adoption of sustainability and waste reduction practices in the restaurant industry is a growing area of research (Gössling, Garrod, Aall, Hille, & Peeters, 2011; Jang et al., 2017; Martin-Rios et al., 2018; Roy, Hall, & Ballantine, 2016; Sakaguchi et al., 2018; Salzberg, Gough, & Suen, 2019; Tatano et al., 2017). Food waste generation can be

reduced by using fresh, quality, and local food; limiting the number of menu items; consolidating cooking experience and knowledge; and ensuring plate and serving size are appropriate (Tatano et al., 2017). A study by Sakaguchi et al. (2018) of restaurants in Berkeley, California, found that 65% of the restaurants in their study were measuring the amount of food waste produced and 84% of them compost edible food waste, while 14% of restaurants dump food waste into landfill bins. Seventy-two per cent of edible was given to restaurant's employees, however, three-quarters of restaurants do not donate food due to fears of legal liability. Nevertheless, the adoption of waste reduction and sustainability is not just a function of legislation, technology, or restaurant managers' environmental commitment but also requires engagement with stakeholders because of the impacts that changes in restaurant practices may have for financial and non-financial performance (Jang et al., 2017). Three predictive variables (behavioral control, past experience, and perceived innovation characteristics) have been identified as determining whether or not a restaurant will participate in future sustainable innovations (Salzberg et al., 2019). Therefore, predicting diner response to initiatives becomes an important factor in influencing the adoption of sustainable restaurant practices, including food sustainability and waste reduction practices.

#### 2.1.2. Environmental concern

According to Fransson and Gärling (1999), environmental concern is defined as "a specific attitude toward environmentally relevant behaviour to a more encompassing value orientation" (p. 370). From a pro-environmental behavior perspective (Bamberg & Möser, 2007; Bamberg & Schmidt, 2003), environmental concern is likely a significant precondition for evolving ethical and moral standards with respect to what consumers regard as acceptable and appropriate in relation to sustainability practices in restaurants. Such concerns for the environment may be egoistic (concerns for one's own health, life, and wellbeing); social-altruistic (concern for future generations, community, and others); and/or biospheric (concern for nature as a whole as well as specific plants and animals) (Helm, Pollitt, Barnett, Curran, & Craig, 2018). Importantly, levels of environmental concern are not similarly expressed the same across all environmental issues, highlighting the importance of understanding specific relationships to different environmental practices and problems (Skogen, Helland, & Kaltenborn, 2018).

In foodservice, hospitality, and tourism, scholars have broadly given attention to the relationship between environmental concern and consumer behavior (De Groeve & Bleys, 2017; Gupta et al., 2019; Han et al., 2018; Huang & Liu, 2017; Kim & Yun, 2019). For instance, environmental concern enhances awareness of environmental consequences, which in turn prompts pro-environmental behaviors and intentions such as visiting 'green' coffee-shops (Kim & Yun, 2019). Individuals with higher levels of environmental concern with respect to climate change have been shown to support initiatives to reduce meat consumption, with females being more supportive than males (De Groeve & Bleys, 2017). In a study of ecotourists, environmental concern (together with experience) mediates the relationships between motivation and revisit intention, international travelers' revisit intention as well as ecotourism experience are strongest if environmental concern as a moderator is high (Huang & Liu, 2017). Environmental concern has been identified as a moderator that affects relationships between hedonic value and pro-environmental intention as well as utilization value and post-purchase behavior of green hotel guests (Han et al., 2018). A moderating role of environmental concern positively signifies the importance of creating affirmative sustainable experiences for such consumers to heighten trust in hospitality businesses (Gupta et al., 2019). Environmental concern is therefore likely to be a moderator in consumer perceptions of sustainable restaurant practices given the above findings as well as its role in eco-friendly behavior at restaurants (Joo et al., 2018; Shin et al., 2017a, 2018, 2019).

### 2.1.3. Value theory

Consumer value can be defined in both utilitarian (the conscious pursuit of an intended consequence) and hedonic terms (the spontaneous outcome of a fundamental quality of recompense for much human behavior) (Babin, Darden, & Griffin, 1994). From a general view of value theory, individuals perform an act because they want to get something and/or they love it (Triandis, 1977). A person gains extrinsic rewards from participating in events, but the person also gains a more personal, intrinsic, and affective reward from resulting pleasure (Deci, Betley, Kahle, Abrams, & Porac, 1981). Studies have documented the role of hedonic and utilitarian value in a sustainability context (e.g., Cheng, Chang, & Lee, 2018; Wang, 2014). For example, while farmers' market customers experience greater pleasure, specialty food customers experience greater utility value; in farmers' markets, the functional and hedonic values of customers are often more concerned with satisfaction than specialty food customers (Wang, 2014). In eco-friendly consumption, consumer hedonic and utilitarian values positively and negatively influence environmental involvement, respectively (Cheng et al., 2018).

Hedonic and utilitarian values have been intensively studied because both values are very important in hospitality businesses (Gupta et al., 2019; Han et al., 2018; Nejati & Moghaddam, 2013; Ryu, Han, & Jang, 2010; Teng & Wu, 2019). Perceived values (hedonic and utilitarian) have been found to significantly influence consumer satisfaction in fast-casual restaurants, which in turn leads to behavioral intention (Gupta et al., 2019; Nejati & Moghaddam, 2013). Guest values (hedonic and utilitarian) play a significant role in re-patronage intention in green hotels (Gupta et al., 2019; Han et al., 2018). Perceived values (hedonic and utilitarian) also influence consumer preferences for eco-friendly restaurants (Teng & Wu, 2019). Thus, in applying value theory, we consider consumers' perceived values (hedonic and utilitarian) as significant constructs to identify diner behavior with respect to sustainable restaurant practices.

## 2.2. Hypothesis development

### 2.2.1. Sustainable restaurant practices and values

Reducing the amount of food waste in the foodservice industry (e.g., hotel restaurants) constitutes a potential win-win situation for restaurants by reducing environmental impacts with no change in levels of consumer satisfaction (Kallbekken & Sælen, 2013). Implementing environmentally friendly practices can potentially lead to improvements in the health of customers and the environment throughout the entire culinary system (Gössling & Hall, 2013), including in the context of sustainable restaurants (Hollis, 2018). Water conservation management performances in green hotels have significant effects on the value (hedonic and utilitarian) of visiting the hotels, and waste reduction management performances in green hotels have a significant impact on hedonic and utilitarian value (Han et al., 2018). Eco-friendly food and menu labeling practice is also an effective and acceptable means to reduce greenhouse gas emissions, and environmentally friendly meals have been found to improve the consumer experience, changing diners' beliefs on sustainable meals (Visschers & Siegrist, 2015).

It has long been argued that improvements in environmental management practices improve restaurant economic performance and profitability, primarily due to better utilization of resources (De Burgos-Jiménez, Cano-Guillén, & Céspedes-Lorente, 2002; Llach, Perramon, del Mar Alonso-Almeida, & Bagur-Femenías, 2013). However, importantly, visible changes in environmental practices can also have behavioural implications for customers and employees with the stimulation of sustainable practices contributing "to the construction of knowledge and sustainable values" (Teixeira et al., 2020, p. 803). For example, the adoption of sustainable organic waste management practices in a campus restaurant influenced the perception, awareness, and actions of employees and students (Teixeira et al., 2020). Jeong and Jang (2010) found that different restaurant green practices could influence different

groups of customers' perceived ecological image and their ecological behavioral intention to the restaurant, implying that sustainable restaurant practices may also have effects on consumers' values. For restaurants with food-focused green practices, advertising messages emphasizing the benefits of food-focused green practices are effective in influencing customers' attitudes and behaviour intentions toward green restaurants (Xu & Jeong, 2019), suggesting that green restaurant practices may be closely related to diners' values. Therefore, it is assumed that eco-conscious diners, who assess restaurant practices of food conservation and waste reduction practices positively, would have a higher value perception. As a second-order factor, sustainable restaurant practices consist of food sustainability practices and waste reduction practices of two sub-constructs as first order factors. Hence, the two sub-constructs function as elements of sustainable restaurant practices in this study, representing factors for the construct of sustainable restaurant practices. Drawing upon the literature review above, it is anticipated that sustainable restaurant practices lead to consumers' hedonic and utilitarian values. Hence, two hypotheses are proposed as follows in the context of waste reduction when eating out:

**H1.** Sustainable restaurant practices have a positive effect on diner hedonic value.

**H2.** Sustainable restaurant practices have a positive effect on diner utilitarian value.

### 2.2.2. Sustainable restaurant practices and diner behavior

Consumer knowledge of sustainable restaurant practices and environmental issues is an important determinant of consumer intent to visit green restaurants (Hu, Parsa, & Self, 2010). The development of new sustainability practices (Salzberg et al., 2019), such as the provision of carbon footprint information on menus, appear significant for encouraging climate-friendly dining behavior (Pulkkinen et al., 2016). Furthermore, green practices in a restaurant are essential for consumer positive attitude toward the restaurant and consumers' behavioral response to sustainable products (Line, Hanks, & Zhang, 2016), and it is assumed that green restaurant practices lead to consumer behavioral intention. Diner behavior as a second-order factor is defined as participation in sustainable practices and loyalty to sustainable restaurants (first order factors as sub-constructs). Hence, the two sub-constructs of first order factors of participation in waste reduction practices and loyalty to sustainable restaurant represent elements of the second-order factor (i.e., diner behavior) in this study. According to the literature, we posit a hypothesis as follows:

**H3.** Sustainable restaurant practices have a positive effect on diner behavior.

### 2.2.3. Values and diner behavior

In farmers' markets, the effects of perceived values (hedonic and utilitarian) have an effect on shoppers' fulfillment, which influences their re-patronage intentions (Wang, 2014). Among green hotel guests, perceived values (hedonic and utilitarian) have very substantial impacts on guest involvement in green hotel practices and customer loyalty to green hotels (Han et al., 2018). Hedonic and utilitarian values as self-preferred values influence hotel-consumer trust that, in turn, influences re-patronage intention in green hotels (Gupta et al., 2019). In a green restaurant context, the effect of consumers' perceived values (hedonic and utilitarian) have a considerable influence on their preference of restaurant, resulting in behavioral intention to revisit (Teng & Wu, 2019). Therefore, we anticipate two hypotheses as follows:

**H4.** Hedonic value has a positive effect on diner behavior.

**H5.** Utilitarian value has a positive effect on diner behavior.

2.2.4. Moderating role of environmental concern

Environmental concern has been increasingly playing an important role in influencing consumer loyalty since greater environmental concern results in higher levels of perceived quality, satisfaction, and loyalty (Wu & Cheng, 2017). The degree of consumer environmental concern plays a critical role in the hospitality industry and consumer behavior with subsequent consequences for the environment (Okumus, Köseoglu, Chan, Hon, & Avci, 2019). As a consumer's general attitude toward environmental problems change, environmental concern is one of the most significant determinants in predicting diner's pro-environmental behavior (Shin et al., 2017a). Consumers with higher environmental concern have a greater willingness to pay and intention to visit eco-friendly restaurants (Shin, Im, Jung, & Severt, 2019). Hence, in restaurants, consumers who have higher levels of environmental concern tend to revisit restaurants having eco-friendly practices more often as compared to their counterparts (Joo et al., 2018; Shin et al., 2017a, 2018, 2019).

With respect to ecotourism experiences, environmental concern substantially moderates effects on the association of motivation as well as revisit intention (Huang & Liu, 2017). Environmental concern is also a useful and satisfactory moderator between relationship values (hedonic and utilitarian) and consumer behaviors (e.g., guest loyalty to a green hotel as well as guest participation in green hotel practices) (Han et al., 2018). In addition, pro-environmental attitudes (e.g., environmental concern) moderate the relationship between perceived values (hedonic and utilitarian) and green trust which, in turn, influence guest behavior in the green hotel context (Gupta et al., 2019). Accordingly, we predict environmental concern as a moderator in the following hypothesis:

**H6.** Environmental concern significantly moderates the relationships between hedonic value and diner behavior as well as utilitarian value and diner behavior.

Drawing upon these hypotheses, the theoretically comprehensive research model is shown in Fig. 1. The research model presents the association between sustainable restaurant practices as a second-order construct of food sustainability and waste reduction practices, hedonic and utilitarian values, and diner behavior as a second-order construct of participation in reduction practices and loyalty to sustainable restaurant.

3. Methods

3.1. Measurement

The online survey used in this study originally comprised 34 items for seven constructs. The constructs represented food sustainability practices, waste reduction practices, hedonic value, utilitarian value, participation in sustainable practices, loyalty to sustainable restaurant, and environmental concern. Six items addressing food sustainability practices were generated from prior research (Sakaguchi et al., 2018; Wang et al., 2017) and six indicators to assess waste reduction practices were adapted from the literature (Jang et al., 2017; Martin-Rios et al., 2018; Tatàno et al., 2017). Four items for hedonic value and four scale indicators were derived from previous research (Babin et al., 1994; Cheng et al., 2018; Teng & Wu, 2019) to gauge utilitarian value.

To evaluate participation in sustainable practices, four questions were derived from prior literature using research from Goldstein, Cialdini, and Griskevicius (2008), Bruns-Smith, Choy, Chong, and Verma (2015), and Tatàno et al. (2017). To assess loyalty to sustainable restaurants, four questions were drawn from Perugini and Bagozzi (2001) and Teng and Wu (2019). To measure environmental concern, six items were adapted from Bamberg and Möser (2007), Bamberg and Schmidt (2003), Fransson and Gärling (1999), and Han et al. (2018).

Every item was evaluated using a seven-point Likert-type scale. General questions related to sustainable diner behavior (e.g., frequency of eating out, purpose of dining out, average spend per person, eating style, practicing waste reduction at work and home, and restaurant style and classification recently visited) were also added. Finally, seven questions related to socio-demographics were included in the survey. The survey tool was primarily written in English, which was then converted into Korean by three university language specialists, expert in both languages. The survey tool was translated into English to resolve discrepancies between expressions (Brislin, 1970).

Four academics familiar with the research topic specifically assessed the validity of the questionnaire content. Seven restaurant managers assessed the survey to ensure that it suitably evaluated sustainable restaurant practices. Based on the two processes, three items for food sustainability practices were added to the survey instrument in order to more thoroughly and clearly capture the meaning of the construct [i.e.,

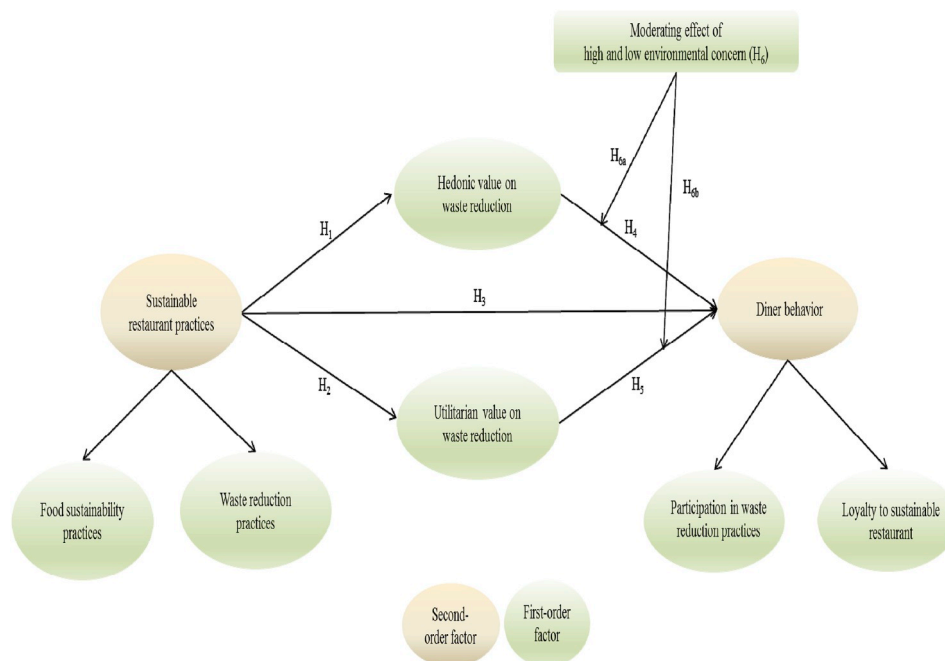


Fig. 1. Proposed research model.



“This restaurant primarily uses local foods,” “This restaurant uses meat substitutes,” and “This restaurant uses certified sustainable seafood/fish (e.g., MSC)”. One item each for utilitarian value, participation in sustainable practices, and loyalty to sustainable restaurant were deleted from the survey due to overlapping meaning (i.e., “Reducing waste at restaurants provides good value for the price,” “I am interested in almost all pro-environmental practices at restaurants to reduce waste,” and “I would like to recommend others to dine at restaurants that reduce their waste”). A pilot test of the survey was conducted on five Ph.D. candidates who had dined out in the previous month. Based upon their comments, several items addressing waste reduction practices, hedonic value on waste reduction, and environmental concern were reworded. A pre-test was conducted with 50 individuals who had eaten out at restaurants within the previous month with subjects specifically requested to offer comments on questions. This procedure resulted in a final revision that clarified questions related to sustainable restaurant practices and socio-demographic information. The modified survey was then applied to the data collection instrument.

### 3.2. Data collection

Due to their speed and cost-effectiveness (Wright, 2005), online surveys are now popular in tourism studies (e.g., Kim & Hall, 2019a; 2019c). An online survey company, Embrain, was hired to collect research samples. The online survey firm follows sample selection procedures thoroughly to ensure data quality. The survey company uses the panel registration number and the legal name of the individual to compare and verify the personal information of all respondents. Using the online survey company's standard system, all surveys that were completed too soon were removed. By selecting questions to participate in the research process, subjects who were not qualified were excluded by the survey system. All subjects had a different order of questions by being rotated in order to avoid bias in response to any multiple-choice item. Participants were requested to provide the name of a restaurant in which they had recently dined out. The name of the restaurant that the respondent provided was then presented on each item in the survey for all questions.

For this research project, all subjects were Koreans, 20 years old or over who had dined in restaurants in the month prior to completing the survey. The online survey was administered from April 25 – May 15, 2019. To provide the research background and assure confidentiality, an email was extended to invite participation in this research program. The definitions for ‘waste reduction for sustainability at restaurants’ and ‘sustainable restaurants’ were provided at the beginning of the questionnaire. A random invitation was sent to 18,245 of the 1.3 million Korean panelists on the database of the survey company via email. The number of initial invitations was based upon several considerations. First, since a typical sample size for structural equation modeling (SEM) is about 200 cases (Kline, 2011), more than 400 cases were necessary for multi-group analysis (MGA) of the two groups of high and low environmental concern respondents. Second, the survey company (Macromill Embrain, 2019), generally receives a 5% response from all total initial invitations from their panel database. Third, a quota sampling approach was applied in terms of the total population by age and gender in Korea (Korean Statistical Information Service, 2019). Of the 5229 respondents who clicked the email, 4441 respondents connected to the questionnaire. Every panelist was requested to respond to a screening inquiry intentionally created for the study, that is, “During the past month, have you eaten out at any restaurants?” Through this procedure, only 985 participants stated “yes.” From them, 667 panels finished the survey. If respondents answered the survey questions in a rapid fashion reflecting a short time frame spent on reading the statements, or if a subject's answers followed certain patterns, those subjects were excluded from the data set because rapid and patterned responses have been proven to be unreliable (Lee, Lee, & Lee, 2008). Accordingly, after eliminating some outliers, patterned answers (e.g., 3333, 4443,

5555), and rapid responses (taking far less time than expected to complete the survey questions, for example, taking less than 3 s per question), 476 samples were used for the analysis. Following the criteria of the American Association for Public Opinion Research (2016), the response rate was therefore 48.3%.

### 3.3. Data analysis

To test the proposed study framework, a partial least squares (PLS)-SEM analysis was used for the following reasons. First, according to Chin, Marcolin, and Newsted (2003), PLS-SEM needs minimum criteria to verify a research framework by a bootstrap re-sampling technique and within a model first-order indicators are analyzed by PLS-SEM including second-order constructs simultaneously. Second, for MGA and complicated models, PLS-SEM has been recommended to be more suitable than covariance-based (CB)-SEM (Hair, Sarstedt, Ringle, & Mena, 2012). Third, formatively measured constructs (i.e., sustainable restaurant practices and diner behavior) are part of the structural model (Hair, Hult, Ringle, & Sarstedt, 2017). Finally, this research model initially has quite a lot of indicators with 34 questions (Hair et al., 2017; Richter, Cepeda, Roldán, & Ringle, 2016). Consequently, SmartPLS 3.2.8 has been applied to test the measurement as well as structural models and hypotheses in the research (Ringle, Wende, & Becker, 2015).

In order to test the moderating effect of high and low environmental concern, this study applied MGA based on PLS-SEM algorithm (Hair, Sarstedt, Hopkins, & Kuppelwieser, 2014). To compare the differences in the relationships of hedonic and utilitarian values and diner behavior with high and low levels of environmental concern groups, MGA was used, as suggested by Chin et al. (2003) and Keil et al. (2000, p. 315) as follows: Where  $P_i$  is the path coefficient of the structural model of high environmental concern  $i$ ,  $n_i$  is the sample size of the data set for high environmental concern  $i$ ,  $SE_i$  is the standard error of the path in the structural model for high environmental concern  $i$ ,  $t_{ij}$  is the t statistic with  $n_1 + n_2 - 2$  degrees of freedom,  $i$  represents the high environmental concern group, and  $j$  represents the low environmental concern group (i.e., 1 = high environmental concern and 2 = low environmental concern).

### 3.4. Formative second-order factor

Based on the procedures outlined by prior literature (Hair et al., 2017; Jarvis, Mackenzie, Podsakoff, & Burke, 2004; Kim, Lee, & Contractor, 2019), this study operationalized the constructs of sustainable restaurant practices and diner behavior as formative second-order factors for the following reasons. First, direction of causality is from attributes (indicators: food sustainability practices, waste reduction practices, participation in waste reduction practices, loyalty to sustainable restaurant) to consequences (constructs: sustainable restaurant practices and diner behavior). Second, the indicators define the characteristics of the constructs. Third, the indicators do not need to have the same or similar content to share a comment theme. Fourth, the formative constructs do not require indicators to covary with each other. Finally, tourism-related studies adopting formative measurement approach provide a relatively good fit to explain consumer behavior (Ahrholdt, Gudergan, & Ringle, 2017; do Valle & Assaker, 2016; Kim et al., 2019). Therefore, this research followed the assessment of formative measurement models for the second-order factors (sustainable restaurant practices and diner behavior) based on the aforementioned two indicators for each.

## 4. Results

### 4.1. Respondents' profile

As shown in Table 1, in terms of high and low environmental concern respondents, the majority of the high environmental concern

**Table 1**  
Comparison of demographic and general characteristics of high and low environmental concern diners.

Characteristics	High <sup>a</sup> (%)	Low <sup>b</sup> (%)	Characteristics	High <sup>a</sup> (%)	Low <sup>b</sup> (%)
<b>Gender</b>			<b>Purpose of dining out</b>		
Male	41.5	52.9	Date	16.7	21.7
Female	58.5	47.1	Social gathering	28.6	30.7
<b>Age</b>			Family gathering	38.3	34.9
20–29 years old	27.2	27.5	Business meeting	5.2	1.1
30–39 years old	32.0	36.0	Celebration of special occasions	1.4	0.5
40–49 years old	22.0	26.5	Other	9.8	11.1
50–59 years old	15.3	6.3	<b>Average spend per person</b>		
60 years old and over	3.5	3.7	< 10,000 Korean Won (KRW)	7.3	6.4
<b>Educational level</b>			10,000–50,000 KRW	85.4	87.7
Less than or high school diploma	11.1	15.3	> 50,000 KRW	7.3	5.9
2-year college	12.9	20.6	<b>Eating style</b>		
University	62.1	54.6	Non-vegetarian	71.4	84.2
Graduate school or higher	13.9	9.5	Vegetarian	27.2	15.3
<b>Marital status</b>			Vegan	1.4	0.5
Single	44.9	48.1	<b>Practicing waste reduction at work</b>		
Married	52.7	50.8	Strongly disagree	0.7	1.6
Other	2.4	1.1	Somewhat disagree and disagree	4.9	15.3
<b>Monthly household income</b>			Neutral	24.4	29.6
Less than 2.00 million KRW*	6.6	11.6	Somewhat agree and agree	65.5	51.4
From 2.00 to 3.99 million KRW	33.8	28.1	Strongly agree	4.5	2.1
From 4.00 to 5.99 million KRW	28.6	33.4	<b>Practicing waste reduction at home</b>		
From 6.00 to 6.99 million KRW	16.7	15.3	Strongly disagree	0.3	0.5
7.00 million KRW and over	14.3	11.6	Somewhat disagree and disagree	5.5	12.2
<b>Occupation</b>			Neutral	17.1	28.0
Professionals	12.2	10.1	Somewhat agree and agree	71.5	55.6
Business owner	4.9	4.8	Strongly agree	5.6	3.7
Service worker	9.1	7.4	<b>Restaurant style recently visited</b>		
Office worker	46.4	49.7	Environmentally neutral restaurant	60.0	66.7
Civil servant	3.8	3.7	Environmentally friendly restaurant	35.9	28.6
Home maker	9.1	7.4	Vegetarian restaurant	2.8	2.1
Retiree	1.0	1.1	Vegan restaurant	0.3	0.5
Student	8.0	6.3	Others	1.0	2.1
Unemployed	3.1	3.2	<b>Restaurant classification recently visited</b>		
Other	2.4	6.3	Upscale full-service restaurant	2.8	2.1
<b>Residential district</b>			Casual/family full-service restaurant	67.9	75.2
Metropolitan areas	71.8	68.2	Hotel restaurant	0.7	0.5
Non-metropolitan areas	28.2	31.8	Limited service (fast food) restaurant	9.1	6.3
<b>Frequency of eating out</b>			Café	1.4	2.6
Less than 5 times per month	34.9	42.9	Buffet restaurant	17.1	12.3
5–14 times per month	47.4	40.2	Speciality food service (e.g., caterer)	0.0	0.5
15 times and over per month	17.7	16.9	Other	1.0	0.5

Note: \*US\$ 1 = KRW (Korean Won) 1147 as of April 25, 2019 by Bank of Korea. High<sup>a</sup>: high environmental concern group; Low<sup>b</sup>: low environmental concern group.

category are females (58.5%), while a majority of the low environmental concern category are males (52.9%). Approximately a third of all participants were in the 30–39 years old bracket in both categories. The majority of respondents attended a university and/or higher although those demonstrating high environmental concern (76.0%) were significantly higher than those with low environmental concern (64.1%). Approximately half of the participants were single in both categories. There was also little difference in monthly family income and the proportion of respondents in full time employment. A majority of the sample were living in metropolitan areas with the percentage of those with high environmental concern (71.8%), greater than those with low environmental concern (68.2%).

A majority of the subjects ate out over once a week with those of high environmental concern (65.1%) eating out substantially more than those with low environmental concern (57.1%). Just over a third of both samples dined out for family gatherings. Over ninety percent of both categories of subjects spent 10,000 KRW (Korean Won) and over per person for eating out on average (US\$ 1 was equivalent to KRW 1169). Significantly more vegetarians were represented in the high environmental concern category (28.6%) than low environmental concern (15.8%). A majority of the respondents participated in waste reduction at work (high environmental concern 70.0%, low environmental concern 53.5%) as well as at home (high environmental concern 77.1%, low environmental concern 59.3%). Subjects recently dined at

environmentally friendly restaurants of high environmental concern (35.9%) and low environmental concern (28.6%) and dined at casual/family full-service restaurant of high environmental concern (67.9%) and low environmental concern (75.2%) (Table 1).

#### 4.2. Grouping check

The environmental concern concept was assessed in six questions and the values of five items having over 0.7 of factor loading were validated (see Table 2). Cronbach's alpha ( $\alpha$ ) (0.922) was obtained for the environmental concern concept. A K-means cluster technique was employed to organize groupings by partitioning observations (Hair, Black, Babin, & Anderson, 2010). Respondents were separated into two groups representing high environmental concern ( $n = 287$ ; mean = 5.10) and low environmental concern ( $n = 189$ ; mean = 3.26). The difference of average mean is 1.84 between the high and low environmental concern groups, which is legitimate and appropriate to compare them.

#### 4.3. Measurement model

Confirmatory factor analysis (CFA) was used with regard to the measurement model (Kline, 2011). Four items for food sustainability practices and three items for waste reduction practices appeared to

**Table 2**  
Confirmatory factor analysis and normality assessment.

Constructs	Factor loading	Skew-ness	kurto-sis
<b>Food sustainability practices</b>			
1. This restaurant has smaller size servings of meals.*	–	–	–
2. This restaurant does not have a self-service system.*	–	–	–
3. This restaurant mainly serves vegetable dishes.	0.801	0.147	–0.925
4. This restaurant has menu labeling (e.g., calorie and/or nutrition information).*	–	–	–
5. This restaurant has a menu that states the carbon footprint of each dish.	0.747	0.091	–0.986
6. This restaurant primarily uses organic food.	0.827	0.032	–0.681
7. This restaurant primarily uses local foods.*	–	–	–
8. This restaurant uses meat substitutes.	0.828	0.289	–0.948
9. This restaurant uses certified sustainable seafood/fish (e.g., MSC).	0.882	0.058	–0.930
<b>Waste reduction practices</b>			
1. This restaurant uses recycled materials (e.g., paper, plastic, wood).*	–	–	–
2. This restaurant uses strategies for reducing food waste.	0.827	–0.347	0.247
3. This restaurant uses strategies for reducing water waste.	0.885	–0.377	0.423
4. This restaurant uses durable items rather than disposable products.*	–	–	–
5. This restaurant uses local produce in food preparation.*	–	–	–
6. This restaurant donates leftover food to food banks.	0.807	0.170	–0.549
<b>Hedonic value on waste reduction</b>			
1. I think that dining at a restaurant that reduces waste is a happy experience.	0.937	–0.258	0.113
2. I think that dining at a restaurant that reduces waste is a pleasant experience.	0.942	–0.435	0.500
3. I think that dining at a restaurant that reduces waste is an interesting experience.	0.894	–0.424	0.452
4. I think that dining at a restaurant that reduces waste is an enjoyable experience.	0.941	–0.365	0.196
<b>Utilitarian value on waste reduction</b>			
1. Reducing waste at restaurants helps offer good value for the price.	0.891	–0.475	0.874
2. Reducing waste at this restaurant helps provide a better deal as compared to other conventional restaurants.	0.918	–0.396	0.615
3. Reducing waste at restaurants helps offer benefits that I need.	0.915	–0.377	0.642
<b>Participation in sustainable practices</b>			
1. I am willing to participate in pro-environmental practices at restaurants.	0.884	–0.600	0.846
2. I try to participate in almost all pro-environmental practices at restaurants to reduce waste.	0.913	–0.449	0.229
3. I participate in reducing waste practices at restaurants.	0.921	–0.636	0.819
<b>Loyalty to sustainable restaurant</b>			
1. When I dine out in the future, I am willing to revisit a restaurant that reduces its waste.	0.927	–0.404	0.345
2. When I dine out in the future, I will make an effort to return to restaurants that reduce their waste.	0.948	–0.381	0.244
3. I am willing to encourage others to dine at restaurants that reduce their waste.	0.915	–0.365	0.053
<b>Environmental concern</b>			
1. The restaurant industry can have huge environmental impacts on the planet.	0.888	–0.262	–0.191
2. The restaurant industry contributes to environmental deterioration because it uses unsustainable food supplies.	0.893	–0.278	–0.058
3. The restaurant industry contributes to climate change by wasting food.	0.848	–0.460	0.198
4. The restaurant industry contributes to climate change by encouraging meat consumption.	0.859	–0.274	–0.202
5. The restaurant industry can contribute to fine dust problems through over use of resources and energy.	0.869	–0.423	0.159
6. I think that it is more environmentally friendly to dine at a restaurant than to eat at home*	–	–	–

Note: \*Items are deleted after factor analysis because their factor loadings are lower than 0.7.

**Table 3**  
Convergent and discriminant validity.

Construct	1	2	3	4	5	6	7	8
1. Food sustainability practices	<b>0.818</b>							
2. Waste reduction practices	0.620	<b>0.840</b>						
3. Hedonic value on waste reduction	0.244	0.320	<b>0.928</b>					
4. Utilitarian value on waste reduction	0.378	0.446	0.600	<b>0.908</b>				
5. Participation in sustainable practices	0.346	0.435	0.651	0.596	<b>0.906</b>			
6. Loyalty to sustainable restaurant	0.330	0.394	0.680	0.647	0.706	<b>0.930</b>		
7. Sustainable restaurant practice	0.938	0.852	0.306	0.450	0.424	0.395	<b>0.748</b>	
8. Diner behavior	0.365	0.448	0.721	0.674	0.918	0.929	0.443	<b>0.918</b>
AVE > 0	0.670	0.706	0.862	0.824	0.821	0.865	0.688	0.843
Composite reliability (CR) > 0.7	0.910	0.878	0.961	0.934	0.932	0.951	0.894	0.942
Cronbach's alpha (α) > 0.7	0.876	0.791	0.947	0.893	0.891	0.922	0.834	0.907
Rho_A (internal consistency reliability) > 0.7	0.880	0.797	0.951	0.934	0.932	0.961	0.839	0.947
Q <sup>2</sup> (predictive relevance) > 0	0.578	0.500	0.077	0.162	0.679	0.732	0.539	0.706
Mean	3.290	3.763	4.935	4.640	4.850	4.750	3.527	4.800
Standard deviation	1.593	1.321	1.153	1.146	1.168	1.214	1.457	1.191

Note: The bold face in the metrics denotes the square root of AVEs for each construct. The figures in italics are correlations with elements of the reflective second-order factors as loadings which are not the relations of cause and effect as weights so these corrections do not affect the discriminant validity (Hair, Sarstedt, Ringle, & Gudergan, 2018, p. 40 & 48; SmartPLSTM, 2020).

have less than 0.7 factor loadings and, thus, were eliminated (Hair et al., 2010). As demonstrated in Table 2, the test has been utilized for the qualified 21 items. As suggested by Stevens (2009), assessment of reliability, convergent, and discriminant validity has been undertaken.

As demonstrated in Table 3, the composite reliability as well as Cronbach's α of each variable were larger than 0.70, validating the reliability as well as satisfying internal consistency (Campbell & Fiske, 1959). Additionally, every construct's average variance extracted (AVE)

were larger than 0.5 and each item's factor loading was larger than 0.7, thus supporting convergent validity (Hair et al., 2010).

In addition, because the square root of AVE of all concepts is higher than correlations of the corresponding concepts, discriminant validity is guaranteed (Fornell & Larcker, 1981). For example, the lowest value of the square root of the AVE is 0.818 (food sustainability practices), which is higher than its corresponding construct correlations. The highest correlation is 0.706 between participation in sustainable practices and loyalty to sustainable restaurant, which is less than their square root of the AVEs of 0.906 and 0.930, respectively. Q<sup>2</sup> values of larger than zero for endogenous variables indicate acceptable predictive relevance (Hair et al., 2017), and the range of Q<sup>2</sup> in this study is from 0.077 to 0.732 which is satisfactory. Including second-order factor and moderator, multicollinearity of every item was tested, applying the variance inflation factor (VIF). Because every inner VIF value of the items ranged from 1.000 to 1.780, multicollinearity appears not to be a problem in this study (Hair et al., 2012).

In particular, the 2 s-order factors as reflective (i.e., sustainable restaurant practices and diner behavior) has been specified to estimate and validate AVE, composite reliability, Cronbach's alpha ( $\alpha$ ), Rho\_A (internal consistency reliability), Q<sup>2</sup> (predictive relevance), mean, and standard deviation (Hair et al., 2017, pp. 49–50; Sarstedt, Hair, Cheah, Becker, & Ringle, 2019). As shown in Table 3, the values of the two reflective second-order constructs are fully met with all the cut-off criteria, thus supporting convergent and discriminant validity.

#### 4.4. Structural model

Results from PLS-SEM that estimated the proposed study framework have been presented in Fig. 2 (Ringle et al., 2015). The target variable has been highly predicted as the R-square (R<sup>2</sup>) for diner loyalty (63.0%). Path coefficients as well as t-statistics have been assessed for five relationships by using a PLS bootstrapping approach of 5000 resamplings as recommended by Hair et al. (2012) and Stevens (2009). Results show that sustainable restaurant practices have significant effects on utilitarian value ( $\gamma = 0.450$ , t-value = 10.962), hedonic value ( $\gamma = 0.306$ , t-value = 6.671), and diner behavior ( $\gamma = 0.153$ , t-value = 5.008). Also, diner behavior is positively influenced by hedonic consumer value ( $\beta = 0.486$ , t-value = 10.515) and utilitarian consumer value ( $\beta = 0.314$ , t-value = 6.696). Hence, all the six hypotheses have been supported.

Interestingly, with respect to the 2 s-order factors, food sustainability practices were found to be more highly and significantly related to sustainable restaurant practices ( $\gamma = 0.938$ , t-value = 158.628) than to waste reduction practices ( $\gamma = 0.852$ , t-value = 59.020). In addition, diner behavior was found to be more highly and significantly related to loyalty to sustainable restaurant ( $\beta = 0.929$ , t-value = 121.624) than to participation in waste reduction practices ( $\beta = 0.918$ , t-value = 103.736). The five hypotheses effect size (f<sup>2</sup>) ranged from 0.050 to 0.407, and f<sup>2</sup>  $\geq$  0.02, f<sup>2</sup>  $\geq$  0.15, and f<sup>2</sup>  $\geq$  0.35 denote small, medium, and large effect sizes in ascending order (Cohen, 1992).

Regarding the moderating effect of high and low environmental concern, two hypotheses were tested (Table 4). The results showed that the coefficients of two relationships for the high as well as low environmental concern respondents were significantly different. Thus, hypotheses 6a and 6b have been supported. The size of the effects of hedonic value on diner behavior (high cluster = 0.541 > low cluster = 0.396) for the high environmental concern cluster was greater than for the low environmental concern cluster. On the other hand, the magnitude of the impact of utilitarian value on diner behavior was bigger in the low environmental concern respondents than in the high environmental concern respondents (high respondents = 0.270 < low respondents = 0.372).

PLS bootstrap 5000 resampling has been employed to test the mediating effects of hedonic value as well as utilitarian value in the research model. Sustainable restaurant practices significantly and indirectly influenced diner behavior ( $\gamma = 0.290$ , t-value = 8.647). Thus, hedonic value and utilitarian value played significant mediating roles in influencing diner behavior. Furthermore, to determine whether demographic variables influence the proposed framework, we analyzed gender, marital status, age, education, monthly household income, occupation, and residential district (control variables), applying bootstrap 5000 re-sampling. The seven demographic variables have been controlled to provide a precise evaluation of the hypothesis between sustainable restaurant practices as well as diner behavior which has the lowest t-value among five significant relationships. The data still supported five relationships once the control items were added. Hence, the findings support that the seven socio-demographic factors were not influenced in the present research model. Furthermore, all the path coefficients and t-values in the research model were very similar to those with seven control variables (see Fig. 3).

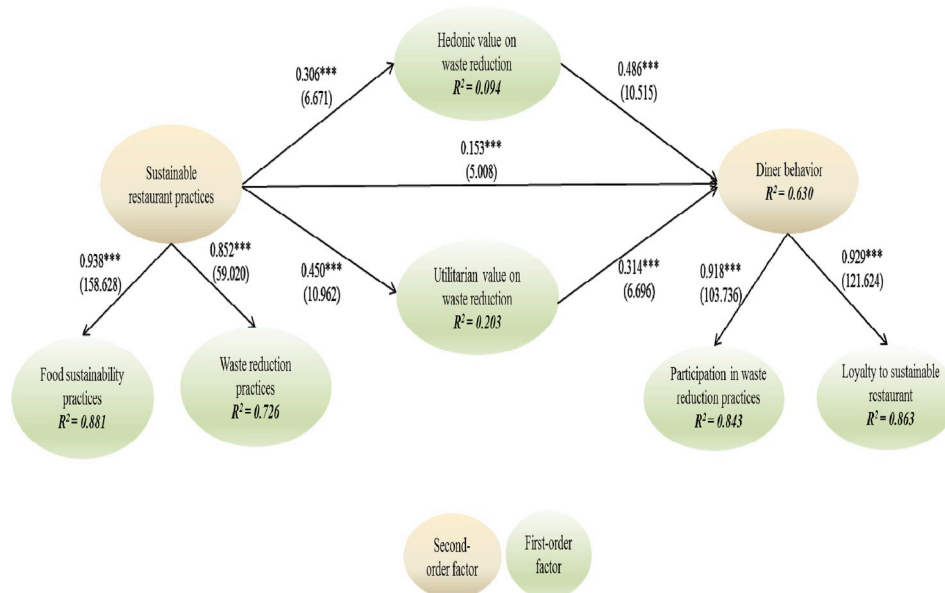


Fig. 2. Path analysis results.



**Table 4**  
Comparing high and low environmental concern groups.

H <sub>6</sub>	Path	High group (A)	Low group (B)	t-value (A-B)	p-value (A-B)	Hypothesis test
H <sub>6a</sub>	Hedonic value on waste reduction → Diner behavior	0.541***	0.396***	24.633	< 0.001	Supported
H <sub>6b</sub>	Utilitarian value on waste reduction → Diner behavior	0.270***	0.372***	-17.546	< 0.001	Supported

Note: \*\*\*p < 0.001.

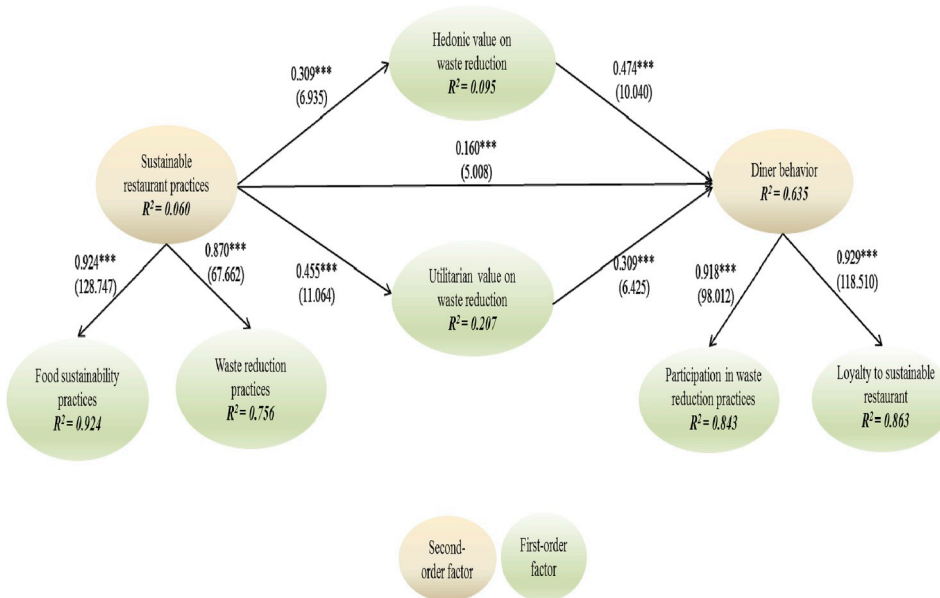


Fig. 3. Entire model considering seven control variables.

**5. Discussion and conclusion**

Although there is a growing literature on consumer dimensions of green and sustainable restaurant practices (Hu et al., 2010; Line et al., 2016; Pulkkinen et al., 2016; Salzberg et al., 2019), the vast majority of studies have focused on the environmental dimensions of restaurant sustainability (Higgins-Desbiolles et al., 2019). Little research has considered sustainable restaurant and waste reduction practices in relation to consumer value theory. In order to address this gap, we identified whether sustainable restaurant practices increased diner participation behavior and loyalty to the restaurants via the application of consumer value theory. This research therefore developed and tested an integrated theoretical model on relationships between sustainable restaurant practices with sub-constructs (food sustainability and waste reduction practices), hedonic and utilitarian values, diner behavior with sub-constructs (participation in sustainable practices and loyalty to sustainable restaurants), and environmental concern as a moderator.

Results reveal that sustainable restaurant practices as a second-order construct (e.g. food sustainability and waste reduction practices) have positive significant effects on consumer utilitarian value on waste reduction as well as, in descending order, hedonic value on waste reduction. The results imply that if restaurants undertake food sustainability practices (e.g., provide vegetable dishes, carbon footprint menus, organic food, meat substitutes, certified seafood/fish), then consumers better perceive usefulness and enjoyment during restaurant dining, which in turn leads to diners’ actual behavior. Sustainable restaurant practices also positively influence diner behavior as a second-order construct (participation in waste reduction practices and loyalty to sustainable restaurant). The findings indicate that when restaurants provide for customer participation in sustainability practices, then customer loyalty to the restaurant as well as waste reduction practices in the restaurant are increased. Moreover, diner behavior is positively affected by hedonic and utilitarian values on waste

reduction, in descending order. These results reveal that once diners have received pleasure and benefit from eating at sustainable restaurants, then diners are more likely to participate in the sustainable practices as well as being loyal to the restaurant, resulting in high restaurant revisit intentions.

Environmental concern significantly moderates the relationships between hedonic and utilitarian values and diner behavior. These findings show that customers with higher levels of environmental concern have greater enjoyment while dining at restaurants with sustainable practices with resulting increases in loyalty to the restaurant and participation in sustainable practices. In contrast, increases in loyalty from consumers with lower levels of environmental concern arise from the perceived benefits of sustainability practices during dining so that diners with low environmental concern are more likely to consider tangible rewards from participation in waste reduction practices as compared to their counterparts.

**5.1. Theoretical contributions**

This work offers several theoretical implications to hospitality literature and sustainability research particularly with respect to making dining out more environmentally friendly. First of all, the findings support the assertion that sustainable restaurant practices with the two sub-constructs of food sustainability and waste reduction play a key role in enhancing consumer perceived utilitarian values, followed by consumer perceived hedonic value. Second, the results strongly suggest that sustainable restaurant practices directly attract consumer participation in sustainable dining behavior, which leads to diners’ revisit to the restaurant. Third, this research finds that value theory highly explains diner behavior in terms of their sustainable restaurant practices (i.e., food sustainability and waste reduction practices) relevant to diner behavior (i.e., loyalty to restaurants and sustainable practices). Finally, this study validates the notion that environmental concern

(e.g., with respect to mitigating climate change and fine dust, which is an important issue in Korea) significantly moderates the influence of hedonic value, followed by utilitarian value, on sustainable dining behavior, such as environmentally friendly eating out.

The study's findings of the second strongest effect of sustainable restaurant practices on utilitarian value in this study, extends the linkage between practices of waste reduction management performances in hospitality businesses and perceived utilitarian value of guests (Han et al., 2018). The positive influence of sustainability restaurant practices on hedonic value also substantially contributes to restaurant research, highlighting the relationship between offering more climate-friendly meals and menu offerings and customers' hedonic value related to meals of sustainability in the restaurant context (Visschers & Siegrist, 2015). In particular, these results reinforce previous findings on the positive relationships between environmental practices and restaurant economic performance (Llach et al., 2013). Moreover, the significant effect of sustainable restaurant practices on diner behavior in waste reduction practices and their loyalty to the restaurants expands knowledge of consumer support for green restaurant practices as well as consumers' attitude towards restaurants that provide such sustainable practices (Line et al., 2016).

The strongest impact of hedonic value on diner behavior (i.e., participation in waste reduction practices and loyalty to sustainable restaurant) in this study substantially broadens understanding of the linkage between green restaurant consumers' perceived hedonic value and their green restaurant behavioral intention in terms of sustainability (Teng & Wu, 2019). In addition, the positive influence of utilitarian value with respect to waste reduction on diner behavior (i.e., participation in waste reduction practices and loyalty to sustainable restaurant) expands knowledge of the relationship between self-oriented green experiential value and consumer trust in green hospitality businesses for re-patronage intention (Gupta et al., 2019) as well as association between farmers' utilitarian shopping value and purchasing behavior for specialty food (Wang, 2014). The significant moderating role of environmental concern between consumer values (hedonic and utilitarian) and diner behavior (participation in waste reduction practices and loyalty to sustainable restaurant) also contributes more generally to research on the moderating role of environment concern on sustainability-related consumer behavior in a hospitality and tourism context, extending the prior findings on mediating roles of environmental concern and ecotourism experience for revisit intention (Huang & Liu, 2017). Furthermore, these findings extend the associations between environmental concern, willingness to pay, and intention to visit in restaurants for choosing organic and healthy food (Shin et al., 2019).

### 5.2. Practical contributions

This work has identified several managerial contributions for restaurants and hospitality businesses in general with respect to sustainability as follows. Given the second highest significant path coefficient of sustainable practices on diners' utilitarian value in this research model, restaurants should perceive the application of sustainable strategies as more than a cost-reduction or business commitment and as something which is valued by consumers. This can be done by providing sustainable food, restaurant services, and providing environmentally friendly products that are regarded as beneficial by diners. In addition, given the significant path coefficient of sustainable practices on hedonic value in this study, restaurant business provision of sustainability practices should also contribute to positive and pleasurable consumer experiences that serve to reinforce loyalty as well as future participation in sustainable dining practices. That could be done by offering eco-friendly food and services that are regarded as enjoyable by diners. More importantly, the positive relationship between consumers' perceived hedonic/utilitarian values and diner loyalty also provide a basis for restaurant operators to encourage customers to visit their restaurants. This suggests that restaurant industries should focus

on hedonic and utilitarian value on waste reduction in order to have customers' revisit and their loyalty. In particular, the substantial effect of hedonic value on diner behavior in this research framework suggests that restaurant businesses should create sustainable practices that provide pleasure for their guests. For example, restaurant environmentally friendly practices could include playful elements for diners (Stöckli, Niklaus, & Dorn, 2018).

Most importantly, due to the significant moderating role of environmental concern on values and behaviors, foodservice marketers need to create segmented strategies focusing on different consumer groups depending on whether they exhibit high or low levels of environmental concern. For example, if restaurant marketers target consumers with high environmental concern who are more likely to be vegetarians, females, higher educated, urbanites and frequently eating out, they should concentrate on hedonic value in relation to sustainable practices in order to encourage diner participation. This potentially could be done by designing restaurant waste reduction practices that provide interesting experiences for diners. For example, eco-friendly food performances from restaurants could prove exciting for diners having higher environmental concerns (Stöckli et al., 2018). On the other hand, in targeting consumers with low environmental concern, restaurant marketers might emphasize utilitarian value in relation to sustainable practices to encourage diner loyalty. That could be implemented by building waste reduction practices that offer better deals and customer advantages so that customers feel that they get good value for their restaurant experience.

### 5.3. Limitations and future research directions

Although the current work contributes to a better understanding of the relationship between food sustainability, waste reduction practices, environmental concern, and diner loyalty, there are some limitations which provide opportunities for future research. First, this research was undertaken within a specific restaurant culture. Accordingly, further research is needed to be conducted in different food and restaurant cultures to compare and generalize findings. Second, although this research has broadened some of the notions of sustainable restaurant practices there is substantial opportunity to develop a better understanding of diner response to social aspects of restaurant sustainability such as living wages for staff, food donations, and relationships to local communities. Finally, although this research has pointed to some clear advantages to restaurants in improving sustainability practices from a consumer perspective, significant obstacles remain in management adopting them with some actions being more achievable than others. Further research with restaurant managers and owners may suggest ways in which barriers to adoption may be overcome which, as the results of this study suggest, can provide a win-win-win situation for restaurants, consumers, and the planet.

### Declaration of conflicting interests

The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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### Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.jhtm.2020.03.004>.

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