Tackling the complexity of guests' food waste reduction behaviour in the hospitality industry

Abstract

Food waste reduction represents a significant sustainability and economic problem and is being effectively examined by researchers, organisations, and governments around the world. Yet, guests' decision formation for such sustainable behaviours has not been sufficiently investigated in the hospitality and tourism industry. This study fills such gap, utilising advanced approach to demonstrate how a combination of demographic and socio-economic, attitude and values, and anticipated feelings can stimulate guests' food waste reduction behaviour (FWRB). A conceptual framework has been developed according to complexity theory, which was tested utilising fuzzy-set qualitative comparative analysis (fsQCA) of 1295 guests. Our empirical findings revealed that no single variable is sufficient to predict guests' behaviours towards food waste reduction, but five casual recipes were identified for stimulating high FWRB. These findings help practitioners to develop new strategies and approaches to stimulate guests' behaviours towards food waste reduction.

Keywords

Food waste behaviour; Hospitality industry; Complexity theory; fsQCA; United Arab Emirates.

1. Introduction

In recent years there has been significance awareness all over the world about food waste (Cicatiello and Franco, 2020; Katt and Meixner, 2020; Kim et al., 2020; Sindhu et al., 2019) and it accounts for 20 percent of global greenhouse gas emissions (Kim et al., 2020). Food waste represents a critical sustainability and economic challenge (Filimonau et al., 2019), given its considerable effects on the environment, business revenue, and public health (Filimonau and De Coteau, 2019; Okumus et al., 2020). Food wastes encompass waste caused during storage, consumption, production, and preparation (Dhir et al., 2020; Dolnicar, 2020). Filimonau and De Coteau (2019) revealed that consumption causes third of food waste.

Waste in the hospitality industry represents a major concern due to its significant implications and contributions to total food waste and for ecosystem services that have been acknowledged (Filimonau and Delysia, 2019; Pirani and Arafat, 2016). For instance, Dhir et al (2020) pointed out that hospitality waste accounts for 12% of the total food waste. The issue of food waste in the hospitality industry continues globally as it was declared in the hospitality industry of UK (WRAP 2013), USA (Filimonau et al., 2019), Canada (Filimonau et al., 2020), Singapore (Joshi and Visvanathan, 2019), Malaysia (Zamri et al., 2020), Turkey (Okumus et al., 2020), and China (Filimonau et al., 2020). Hospitality waste is a broad context and includes different classifications as water waste (Han et al., 2020; Han and Hyun, 2018), energy waste (Kularatne et al., 2019), and food waste (Dolnicar et al., 2020; Juvan et al., 2018). Oliveira et al (2016) pointed out that over 12 million tonnes of food waste is produced by the hospitality industry in the EU. Hospitality sector produced 3 million tonnes of food waste in the UK (WRAP 2013). It also costs around £2.5 billion in 2011 which makes a critical negative effects on the financial performance of the hospitality sector (Filimonau and De Coteau, 2019).

Dubai, the capital city of the UAE, is known worldwide for its rich expectations for everyday comforts, except behind the excessive, glitzy encounters and superb structures, Dubai is confronting significant issues from enormous measures of squandered food. It has been determined that the UAE loses Dh 13 billion (about USD 3 billion) yearly due to food waste (Dennehy, 2017). The UAE Food Bank was established as an activity to settle this significant issue by proposing elective ways of life. Starting at 2017, 96 hotels, 240 food shops, and 7 beneficent associations have pursued this activity and started giving their consumable overabundance food by rearranging it to individuals in need (Zamri et al., 2020).

Despite the concerns about food waste in the hospitality industry have been frequently revealed in the media, in the UAE and globally (Dhir et al., 2020; Zamri et al., 2020), insufficient attention has been paid to this phenomenon by academic in the tourism and hospitality industry (Filimonau and De Coteau, 2019). Our critical review of the previous studies on food waste also revealed a comparatively small number of academic articles that examines this issue in the tourism and hospitality industry. The majority of these studies were published in academic journals that cover sustainability and environmental management, while the studies on food waste in the hospitality industry and published in hospitality and tourism related journals are rare (Filimonau and Delysia, 2019). Our study aims to fill this research gap by developing an integrated model that examines the influence of attitudinal and environmental variables (i.e., perceived value on sustainability, attitude on waste reduction, personal norm on waste reduction, environmental concern, and environmental awareness), demographic and socio-economic variables (i.e., age, gender, level of education, income, place of residence, and country of origin), and anticipated feelings (i.e., anticipated pride and anticipated guilt).

Prior research in the tourism and hospitality industry has given attention to factors affecting food waste reduction behaviour by examining the "net effect" of antecedents on food waste reduction behaviours without interpreting the complexity of individuals' behaviours. For

instance, Goh and Jie (2019) examined the net effects of anticipated feelings and personal moral norm on food waste behaviour without exploring the interactions between the antecedents in explaining this complex phenomena. Another study by Luu (2020) investigated the net effects of attitude and quality of communication in preventing waste food in the hospitality industry. The majority of studies in the food waste behaviour utilise variance-based techniques (e.g., "multiple regression analysis [MRA] or analysis of variances [ANOVA]") and examine net effects among constructs, which offer one single solution to explain the outcome. However, focusing on net effects may be misleading because, in the real world, the opposite relation is likely to exist between the same constructs in the sample (Jung et al., 2019). Examining the net effect does not offer rigorous findings on individuals' behaviours complex process (Olya and Akhshik, 2019). Guidelines that overlook the complex relationships of antecedents, result in unanticipated consequences that can cost greater than the problem itself. Another impediment with the present prevailing practice in individuals food waste reduction behaviour studies is to neglect demographics and socio-economic data in describing the models in this research. Demographic data were reported in these studies in an early tables and then neglect the role of these demographic variables in constructing and testing the theory. In testing and constructing configurational models of complex precursor conditions of guests' food waste reduction behaviour, scholars can test and construct complex drivers conditions of demographic and socio-economic conditions to stimulate FWRB. This perspective is adopted by our study by testing and constructing theory of complex precursor demographic and socio-economic conditions affecting guests' food waste reduction complex behaviour. Our study aims to fill the research gaps by operationalising and testing a configurational model using (fsQCA) and complexity theory, which is a state-of-the-art technique to promote guests' food waste reduction behaviour in the United Arab Emirates hotels industry.

This study provides implications for hotels and tourism organisations seeking practical methods to understand factors affecting guests behaviours towards food waste reduction and thus findings stimulate the idea that hotels and tourism organisations should invest in sustainable activates and practices. Knowledge of the determinants of guests' food waste reduction behaviour will help hospitality enterprises in developing approaches to food waste management supported by shifts to guests behaviours. This study is structured as follows. The second section covers the literature review and the conceptual framework of this study. Third section demonstrates the study methods and data collection. Fourth section shows the study results. Fifth section elaborates the discussion and the implications.

2. Literature review and hypotheses development

2.1. Food waste in the hospitality industry and theoretical insights

FAO (2015, p.1) defined food waste as "the discarding or alternative (non-food) use of food that was fit for human consumption by choice or after the food has been left to spoil or expire as a result of negligence". Food waste includes food that was essentially created for people intake however later allotted different purposes, for example, animals feed (FAO, 2015), because of it not being devoured by people (Dhir et al., 2020). Furthermore, it is characterized as food that was consumable at removal (Dolnicar, 2020). Plate waste is the easiest kind of avoidable type of food waste generated in hospitality (Juvan et al., 2021). Without affecting people's holiday pleasure, up to 92 percent of plate waste may be avoided (Dolnicar, 2020). The significant amounts of food waste created within the food supply chains were recognised globally and the significant negative impact of food waste on environmental sustainability and global socio-economic were acknowledged (Filimonau and De Coteau, 2019). Customers food waste represents the largest share, therefore justifying why researchers have paid attention to

household food waste (e.g., Hebrok and Boks, 2017; Kim et al., 2020; Schanes et al., 2018; Slorach et al., 2019). Tourists burn-through more food than at home and eat more imported food than at home (Gössling, 2015), in this manner expanding the travel industry related natural effect on the objections (Juvan et al., 2018). Given that food utilization is a key traveler experience (Juvan et al., 2018), it is likely that travelers attempt various types of food and don't care for a few of them. This prompts more food being squandered than at home. It is as of now not known, nonetheless, which division of the portion produced food squander is brought about by the tourism industry. One explanation behind this data not being accessible is that hospitality and tourism industry related food utilization and its natural ramifications have not been broadly explored to date (Gössling and Peeters, 2015).

Prior research has paid attention to the issue of food waste in agriculture context (e.g., Alfiero et al., 2019; Castrica et al., 2018) and retail and grocery context (e.g., Filimonau and Gherbin, 2017; Katt and Meixner, 2020), little attention has been given to this issue in the tourism and hospitality industry (Filimonau and Delysia, 2019; Luu, 2020). Prior research on hospitality food waste has attempted to examine the main determinants of the issue (e.g., Filimonau et al., 2020; Juvan et al., 2018) and explore the fundamental approaches to manage it (e.g., Filimonau and Tochukwu, 2020; Okumus et al., 2020). The need for an in-depth research on food waste reduction behaviour has been acknowledged (Dolnicar et al., 2020). This requires a change given that cordiality endeavours create progressively bigger measures of food squander because of the ascent in customer disposable income and the developing recurrence of food utilization out-of-home. Moreover, retail and distribution of food play a critical role as the focal point of gravity in the food supply chains by associating providers and customers (Filimonau et al., 2019). Thus, hospitality and tourism firms can impact customer decision to make it more rationale (Filimonau et al., 2019; Juvan et al., 2018). This underlines the requirement for in-

depth examination on the issue of food waste in the context of hospitality with a point of determining the factors affecting individuals' food waste reduction behaviour.

2.2. Research model and propositions

Since the issue of food waste at customer level is a genuinely new exploration point, the main drivers of this phenomenon are as yet under investigation (Hebrok and Boks, 2017; Secondi et al., 2015). Food waste behaviour is influenced by complex behaviour and variables relating to different dimensions rather than a single behaviour outcome (Diaz-Ruiz et al., 2018; Hebrok and Boks, 2017). Prior research indicated that food waste reduction behaviour is influenced by individuals' attitudes, values, motivations, environmental knowledge and concerns, demographic and socio-economic factors, and cultural variables (e.g., Filimonau et al., 2020; Han et al., 2018; Jung et al., 2019; Pirani and Arafat, 2016; Secondi et al., 2015; Quested et al., 2013). With the point of building up a model, we examined the prior research that investigated attitudinal and environmental variables affecting waste food reduction behaviour at the individual levels. Moreover, we added the context level (i.e., social, economic, and cultural variables) which has been revealed to affect food waste reduction behaviour (Secondi et al., 2015; Quested et al., 2013). This study employs the complexity theory to develop an integrated model, which examines the effect of attitudinal and environmental variables (i.e., attitude, perceived value on sustainability, environmental value, environmental concern, and environmental awareness), demographic and socio-economic variables (i.e., age, gender, level of education, income, country of origin, and place of residence), and anticipated feelings (i.e., anticipated pride and anticipated guilt) (Figure 1).

Insert Figure 1 about here

2.2.1. Demographic and socio-economic variables

Based on a critical review of the existing literature on food waste, the most related socio-economic and demographics factors were included. Both gender and age represents personal characteristics that have been found to affect consumers' waste food reduction behaviour. For instance, Buzby and Guthrie (2002) revealed that men are more likely to reduce food waste compared to women. However, prior research indicated that men waste more than women (Barr, 2007). Regarding age, previous studies found that young people waste more than old people (Jörissen et al., 2015, Jung et al., 2019). Cox and Downing (2007) pointed out that people under 45, employed full time, young families, and from a low social class waste more than others. Prior research revealed that disposable income and level of education play a significant role in influencing on waste food reduction behaviour. For instance, Koivupuro et al (2012) revealed that highly educated people with higher income waste more than others. However, Wenlock et al (1980) pointed out that income has no significant influence on food waste behaviours. Guests' place of residence also were included by differentiating between large cities, rural areas, and towns.

Elgin (1994,P.238) "pioneered the idea that effective interventions to make consumer behaviour more environmentally-benign could only succeed if scholars were to confront this challenge at a much deeper, psychological, level of understanding, such as at the level of people's national culture and consciousness". The investigation into this issue has anyway stayed scant since the time which is, to a limited extent, because of the unpredictability of the necessary components of national culture that make this idea hard to characterize (He and Filimonau, 2020). In spite of the fact that the idea of national culture can be viewed as theoretical, the impact of national culture on customer behaviours can't be overlooked (Hallikainen and Laukkanen, 2018). National culture incorporates such components as norms, shared values and beliefs that by and large recognize a specific gathering of individuals from others (Hofstede, 2001; Minton et al., 2018). These broadly shared values are modified into

people in unpretentious manners from an early age (Ayeh, Au, and Law, 2016), they are exceptionally impervious to change (Hofstede, 2001) and stay apparent when at home, yet in addition while traveling abroad (Mariani, Borghi, and Okumus, 2020). For example, prior research pointed out that Chinese buyers are bound to illustrate 'greener' buying perspectives because of a solid attribute of cooperation in their national culture Chan (2001). Juvan et al (2018) pointed out that environmental beliefs is related to environmentally sustainable behaviour in general and food waste–related behaviours in specific.

2.2.2. The theory of planned behaviour

The TPB is a theoretical framework that describes an individual's decision-making process. It is one of the most frequently used rational choice models. The TPB, first suggested by Ajzen (1985), grew out of the idea of reasoned action (Fishbein and Ajzen, 1975), which holds that one's choice is primarily influenced by volitional variables (Ajzen, 1991). The proximal driver of one's behaviour, based on the TPB, is one's intention to participate in the behaviour, which is influenced by one's attitude toward the behaviour, subjective norm, and perceived behavioural control (Ajzen, 1991; Ye et al., 2017).

In a variety of situations, the TPB's efficacy in explaining a variety of behaviours has been validated (Ajzen & Driver, 1991; Bianchi, Milberg, and Cneo, A., 2017; Wang, Wong, and Zhang, 2021). The TPB has been successfully applied to a wide range of hospitality and tourism settings, including the sharing economy (Kaplan et al., 2015), international travel (Bianchi, Milberg, and Cneo, A., 2017), destination choice (Wang, Wong, and Zhang, 2021), and pro-environmental behaviour in hotels industry (Bianchi, Milberg, and Cneo, A., 2017; Eid, Agag, Shehawy, 2021), and pro-environmental behaviour in hotels (AlSuwaidi, Eid, Agag, 2021; Yeh et al., 2021).

We included some attitudinal and environmental factors since behavioural theories pointed out that a specific behaviour is influenced by individuals' attitudes (Ajzen, 2002). Prior research revealed that attitude has a significant positive influence on pro-environmental behaviour (Teng and Wu, 2019). Quested et al (2013) found a significant relationship between attitudes and waste food reduction behaviour. In the hospitality waste food context, Filimonau et al (2020) revealed that consumers' attitudes towards restaurant food waste and the need for its mitigation play a significant role in influencing their behaviour to reduce food waste. Furthermore, Han et al (2018) pointed out that personal norm has a significant positive influence on tourists waste reduction behaviour. Agag and Colmekcioglu (2020) discovered that people' attitude, subjective norm, and perceived behavioural control enhance their desire to remain at a green hotel while travelling to tourism activities in their latest study on tourists' staying behaviour at green hotels. Moreover, Agag et al (2020) found that travellers with sufficient knowledge of green lodging operations are more likely to visit if they are confident that they are financially and physically capable, and if they have a positive attitude toward green hotel stays, whereas those with limited environmental knowledge are more likely to rely on others' recommendations when selecting a green hotel product.

Powell and Ham (2008, P.467) described environmental knowledge as "the extent to which consumers exert their awareness of the environmental implications of their own consumption choices". Stern and Dietz (1994, P. 74) defined environmental concern as "the degree to which consumers feel worried about the environmental implications of their consumption practices". Prior research indicated that environmental knowledge plays a significant role in triggering pro-environmental behaviour (Chen and Peng, 2012) while, environmental concern has a significant effect on consumers' pro-environmental behaviour (Filimonau et al., 2020). Harland et al (1999) pointed out that pro-environmental behaviour depends on an individuals' perceived value of pro-environmental behaviour. In the context for food waste, Kim et al

(2020) found that perceived value on sustainability has a significant positive influence on food waste reduction behaviour in the hospitality industry.

2.2.3. Influence of anticipated feelings

Many empirical research in the literature indicate that evoking expected feelings of pride and guilt may have a significant impact on people's desire to engage in pro-environmental behaviour (Han, 2014; Han and Hyun, 2018; Harth et al., 2013; Onwezen et al., 2013). Harth et al. (2013) stated that among numerous self-conscious emotional variables, one's expected pride and guilt are mainly linked with pro-environmental behaviour. This research supports Han and Hyun (2018) findings that enhancing anticipated feelings is a key approach for inducing food waste reduction behaviour.

Prior research revealed that anticipated emotional process is significantly associated with individuals' pro-environmental behaviours (Han et al., 2019; Han and Hyun, 2018; Harth et al., 2013). Previous studies revealed that among the diverse self-conscious emotional variables, evaluating of pro-environmental behaviour triggers feelings of pride and guilt (Han and Hyun, 2018). Consequently, prior research pays more attention to the important role of emotions in predicting pro-environmental behaviour (e.g., Han et al., 2019; Onwezen et al., 2013). These expected types of negative and positive emotions are suggested to play a significant role in the decisions of consumers for supportive pro-environmental behaviours (Song, et al., 2012). In this study, anticipated pride and guilt were utilised, which were consistent with prior studies including negative and positive aspects of emotions (Han et al., 2019; Han and Ryu, 2012). The main argument of this study is that an improved explaining of guests' food waste reduction behaviour can benefit from the complex causality analysis (Marx et al., 2014). As opposed to asking how much a solitary determinant condition such as, an individual's attitudes, the investigation here asks how numerous determinant conditions cooperate and join to

configurational causes to issue. This position infers a complexity turn in estimating and testing and includes assessment of complex causality. The essential hypothetical focal point in this paper is that of complexity theory (Jin et al., 2020; Leischnig and Woodside, 2019), which comprises of a bunch of tenets that explain how components of a framework cooperate and join to achieving outcomes (e.g., FWRB).

Regarding pro-environmental behaviour and relevant theories, previous studies on this issue have increased crucially over the past few years, with studies utilised theories such as theory of planned behaviour (TPB) (e.g., Clark et al., 2019; Esfandiar et al., 2020; Goh et al., 2017), value-belief-norm theory (VBNT) (e.g., Han, 2015; Hwang et al., 2020; Kiatkawsin and Han, 2017), norm activation model (NAM) (e.g., Kim and Hwang, 2020; Meng et al., 2020).

Prior research has criticised the adequacy and efficiency of utilising a single theory to develop a comprehensive model of pro-environmental behaviour (Agag et al., 2020). This can be justified by the complexity of consumers' pro-environmental behaviour and the complexity of contextual variables. Consequently, previous research has adopted TPB to understand the main drivers of travellers' pro-environmental behaviour (Clark et al., 2019), while other studies have extended the TPB to explain this phenomenon (e.g., Grilli and Notaro, 2019; Kaffashi and Shamsudin, 2019; Li and Wu, 2020). Furthermore, scholars have adopted multiple theories to develop an integrated model that explains pro-environmental behaviour. For instance, Esfandiar et al (2020) have developed an integrated model based on theory of planned behaviour and norm-activation model to explain pro-environmental behaviour in the context of national park. Kiatkawsin and Han (2017) have also developed a comprehensive model drawing on the expectancy theory and the VBN theory to predict travellers' pro-environmental behaviours. Although, the findings of these studies revealed that extending, modifying, and integrating these theories, yet they do not adequately explain the complexity of sustainable behavior. Furthermore, the heterogeneity in explaining and understanding pro-environmental

behavior also demonstrates the complexity of this phenomenon (Steg et al., 2014) and the need to adopt a theory that can adequately explain the complexity of pro-environmental behavior (Agag et al., 2020). Empirical and theoretical view that symmetric-based factor directional-link tests and theory neglect to catch the ingrained complexities in consumer behaviors while the configurational method do (Jung et al., 2019; Woodside, 2018). Utilizing complex determinant configurations of consumers promotes a thorough theory construction and meaningful empirical results of who, how, and when some consumers have positive and when others have negative attitudes and judgments towards specific service (Woodside et al., 2016). To adequately investigate the heterogeneity in explaining guests' food waste reduction behaviors in the hospitality industry, the complexity theory is employed by our study, which was supported for the complexity of social phenomenon (Awe et al., 2020; Hosany et al., 2020; Spivack and Woodside, 2019), and the tenants of this theory were utilized to support the results of the model.

Complexity theory suggests that causal variables via their interaction create aggregate properties (Ragin, 2009). Subsequently, outcomes rely upon various causal variables whose designing influences the outcome nature and occurrence. Theoretically, the examples of causal components are visible as configurations that share a typical theme. It follows from this that solitary causal elements are likely insufficient to achieve a result, such as food waste reduction behaviour. What is more significant is the recipe, that is, configurational causes to understand tourists' food waste reduction behaviour. Prior research indicated that pro-environmental behaviour is a complex phenomenon that is influenced by various factors (Qu et al., 2019). This viewpoint leads to proposition 1.

Proposition 1: "Single antecedent conditions (demographic and socio-economic, attitudes and value, and anticipated feelings) are insufficient to explain guests' food waste reduction behaviour consistently, but configurational causes can explain guests' food waste reduction behaviour consistently".

Equifinality is a further tenet of complexity theory, that is, various configurations of causal variables can lead to outcomes. The configurations vary in their specific arrangements, yet they inevitably lead to a similar result. Accordingly, instead of looking for one widely inclusive model that clarifies most of the variety in a result, the equifinality and complexity theory idea recommend the occurrence of various configurational reasons for food waste reduction behaviours. Based on this, the second proposition reads as follows:

Proposition 2: "No single best, but multiple configurations of demographic and socio-economic, attitudes and value, and anticipated feelings variables explain guests' food waste reduction behaviour".

Asymmetry occurrence can be proposed by the complexity theory. Urry, 2005 (p. 4) Pointed out that "relationships between causal variables can be non-linear with abrupt switches occurring and the same cause can produce different effects''. The fundamental assumption underlying this thought is the presence of supposed tipping points (Gladwell 2002), that is, minutes when a framework passes specific edges because of minor changes in its basic components, tips, and significantly changes in scope as well as composition (Ragin, 2009). The total impact of configurational reasons for a result can rise up out of configurations in which single conditions can take inverse jobs or turn out as insignificant. Therefore, the third proposition reads as follows :

Proposition 3: "Across configurational causes for guests' food waste reduction behaviour, both the presence and the negation of single antecedent conditions (i.e., demographic and socio-economic, attitudes and value, and anticipated feelings) contribute to the outcome, depending on how the single antecedent conditions form a configurational cause with other antecedent conditions".

3. Research Method

3.1. Sample and data collection

Primary data were collected during May–June 2021 via an online survey. The population of this study includes general United Arab Emirates hotels guests. The participants were randomly generated from the database of a well-known United Arab Emirates marketing research company that has access to a representative panel of the guests made up of more than 1.6 million registered guests. Prior research has confirmed the validity of this research company data for quantitative methods (Ahmad and Khalid, 2017). Online surveys are now widely employed in valuation studies and have been found to yield reliable measures (Grilli et al., 2021). An invitation was sent to a random sample of 5000 guests. The invitation includes details about the main aim of the study, the URL hyperlink, and the time to fill out the survey. We included two screening questions about frequency of hotels accommodation stay and knowledge about food waste issue during their stay at a hotel. Participants who agreed to take part in the survey were asked for survey participation. In total, 1346 participants were approached and 51 with unusable cases were excluded. Thus, 1295 useable responses were valid for further analysis.

Among the 1295 respondents, male represents the majority of the respondents (58.0%), while female represents (42.0%). The participants average age is 36.5 years old. The majority of the participants demonstrated their household income as between $25,000 - $39,999 (47.2%). The majority of the participants had a university degree (61.2%). Furthermore, participants nationalities included USA (19.0%), Austrian (17.4%), German (17.2%), Italian (15.8%), Belgian (11.4%), UK (7.3%), Russian (7.1%), and other (4.8%). A majority of the respondents

indicated that they live in small or medium-sized town (46.3%), large town-city (32.8%), and rural area or village (20.9%). Furthermore, respondents' average frequency of hotel stay per year was 4.1 times. The respondents had about 9.8 room nights per year on average.

3.2.Measures and questionnaire development

We adapted multiple-item scales from prior research to measure the constructs of this study (i.e., Ajzen, 1991; Han et al., 2019; Han et al., 2018; Han and Hwang, 2017; Lyu and Hwang, 2017; Onwezen et al., 2013; Sakaguchi et al., 2018; Untaru et al., 2016). Specifically, Attitude on waste food reduction was measured using four items (e.g., For me, reducing food waste at hotel restaurant is [1] "Foolish"– [5] "Wise". Four items were used to measure perceived value on sustainability (e.g., "I believe that sustainable practices by hotels (e.g., reducing waste of food, water, electricity, natural gas, disposable products) are vital to save the planet)". Personal norm on waste reduction was measured using four items (e.g., "I feel an obligation to reduce waste for reasons of sustainability while dining at a hotel restaurant)". Food waste reduction behavior intention was measured using three items (e.g., "The next time I stay at a hotel, I am willing to reduce food waste"),)". Environmental concern was evaluated using three items (e.g., "The balance of nature is very delicate and easily upset)". Environmental awareness was measured using three items (e.g., "The hotel industry causes pollution, climate change, and exhaustion of natural resources)". Anticipated pride was measured using four items (e.g., "Imagine that you are practicing eco-friendly activities [e.g., food waste reduction] while staying at a hotel. How would you feel? - Proud"). Three items were used to measure anticipated guilt (e.g., "Imagine that you are not practicing eco-friendly activities while staying at a hotel. How would you feel? - Guilty"). All the items were assessed using a five-point Likert scale. We conducted a pilot test with a sample of university students (30) and hotels managers (5) to assess the content reliability and validity of the research instrument. Based on the pilot feedback, we revised a few statements to enhance the clarity of expression.

4. Analysis and results

4.1. Contrarian case analysis

Focusing on the primary links between two constructs and saying that one influences an outcome positively or adversely implies that the majority of instances in a sample confirm the connection. However, in certain instances, opposite connections exist, and the data should be checked for such contrarian cases (Woodside, 2014). In other words, regardless of the primary impact of one variable on the other, two variables may link favourably, negatively, or not at all in the same set of data. As a result of conducting contrarian case analysis, such links between constructs are discovered, and the results indicate the need for configural analysis to explain them (Woodside, 2014). Creating quintiles on all constructs and conducting cross-tabulations using the quintiles is how contrarian case analysis is done. Table 1 summarises the findings. We performed a cross-tabulation analysis and the results revealed asymmetric associations among FWRB and its predictors. Two different examples of heterogeneity in determining FWRB are indicated in Table 1. For instance, 210 respondents (17%) who are minimally concerned with environmental concerns and 119 (9.5%) who are neutral on this variable, have a high level of FWRB (Table 1A). The link between anticipated guilt and FWRB is another example of contrarian cases occurrence. The results of cross-tabulation and Cramér's V are demonstrated in Table 1B. A total of 129 respondents (10%) who demonstrated low anticipated guilt, and 139 (11%) who are undecided on anticipated guilt, are willing to reduce food waste. Both environmental concern and anticipated guilt have a medium effect size (Cohen, 1977). The results of cross-tabulation and Cramér's V revealed that models for stimulating food west reduction behaviour should be performed utilising asymmetric rather than symmetric techniques. Next section discusses the heterogeneity occurrence by the results of fsQCA.

4.2. fsQCA

We utilise fsQCA, which looks for patterns of factors that contribute to a certain result rather than just looking for correlations between independent and dependent constructs. The outcome and antecedent constructs may be on a fuzzy scale (continuous) rather than a dichotomous scale when using fsQCA (binary). Additionally, fsQCA provides two kinds of configurations: necessary and sufficient requirements. These configurations may be distinguished by their “presence”, “absence”, or a "don't care" state. The difference between core and peripheral components is based on the necessary and sufficient criteria. The core components have a strong causal connection with the outcome, whereas the periphery parts have a lesser one (Fiss, 2011).

The outcome and independent variables must both be specified for fsQCA. Following that, all measurements must be calibrated into fuzzy sets with values ranging from 0 to 1 in order to be used. The number 1 indicates “full set membership”, while the value 0 indicates “no set membership”. As a result, all variables are continuous, with a scale ranging from 0 to 1, indicating their membership level. The fsQCA software converts variables into calibrated sets by defining three relevant thresholds: “full membership”, “full non-membership”, and “the cross-over point”, which indicates whether the case is more in or out of a set (Ragin and Davey, 2016). Following Ragin and Davey's method, the calibration is completed (2016). Calibration begins with the establishment of three values that correspond to three qualitative anchors that reflect the fuzzy set thresholds for complete membership (1), cross over point (0.5), and full non-membership (0). (Ragin, 2009). To convert the original Likert ratings to fuzzy set scores,

the following values were used: 1 (strongly disagree), 3 (neutral), and 5 (strongly agree) to indicate non-membership, cross over point, and complete membership, respectively.

After the calibration, the fsQCA method is used to generate a 2k-row truth table, with k being the number of outcome predictors and each row representing each potential combination. Our study utilised the fs/QCA software program (version 3.0, Ragin and Davey 2016) to analyse the truth tables. The truth table must be fine-tuned depending on consistency and frequency (Ragin, 2008). The amount of observations for each conceivable combination is described by the frequency. "The degree to which cases correspond to the set-theoretic relationships expressed in a solution is referred to as consistency" (Fiss, 2011, p.402). For the evaluation of subset links, a frequency cut-off point is chosen to guarantee that a minimal number of empirical data is obtained. A cut-off point of one is suitable for small and medium-sized samples, but for large-scale samples (e.g., "150 or more instances"), the cut-off value should be set higher (Ragin, 2008). The least permissible observation frequency is three (Fiss, 2011), while the lowest acceptable observation consistency is N > 0.85, which is greater than the minimum suggested criterion of 0.75. (Ragin, 2006).

There are three kinds of solutions reported by FsQCA (i.e., "a complex, a parsimonious, and an intermediate solution"). Each of these options shows the paths that lead to the desired outcome. However, the degree to which logical remainders have been addressed varies across the answers (Ragin 2008). Configurations with insufficient empirical manifestation are referred to as logical remainders (i.e., "they are either unobserved or they do not show enough empirical observations to pass the frequency threshold"2). Because there is no logical residual in the complex solution, the result is the most difficult. The parsimonious approach takes into account any logical remainders that will assist create a logically simpler answer, resulting in the shortest solution. The intermediate solution takes into account fewer causal circumstances than the parsimonious solution, but more than the complex solution.

The findings of the intermediate solution are therefore a compromise between the inclusion of no or any logical reminder in the counterfactual analysis. When analysing the findings, Fiss (2011) recommends concentrating on the parsimonious and the intermediate solutions. Inspection of these solutions reveals the core and periphery conditions for the desired outcome. According to Fiss (2011, p. 403), ‘‘core conditions are those that are part of both parsimonious and intermediate solutions, and peripheral conditions are those that are eliminated in the parsimonious solution and thus only appear in the intermediate solution’’. The core/periphery dichotomy elucidates the causal essentiality of particular antecedent conditions, with peripheral or elaborating factors surrounding and strengthening the fundamental characteristics of the core components in configuration (Fiss 2011).

The fsQCA calculates coverage values to determine the relative significance of solutions. Coverage is a proportionate measure of how well a solution ‘‘explains" the outcome. The proportion of instances that follow a certain route to the desired result is referred to as coverage (Fiss 2011). The raw coverage and unique coverage ratings are used to evaluate empirical significance. Unique coverage compensates for overlapping sets by dividing the raw coverage. Raw coverage refers to the amount of the overlap between the size of the antecedent combination set and the size of the outcome set relative to the size of the outcome set.

4.3. Findings of fsQCA

The results of the fsQCA are demonstrated in Table2, indicated through Arrow A. According to the Quine-McCluskey approach, the fsQCA function relies on calculating causal recipes that enable the conditions prediction which, in turn lead to high and low FWRB. Table 2 shows that a combination of demographic, attitude and values, and anticipated feelings result in five casual recipes lead to high level of FWRB indicated by A (coverage = 0.731, consistency = 0.996). For instance, M1 indicates that female, highly educated, high income, older, live in

large town-city, Europeans, high level of environmental awareness, perceived value on sustainability, personal norm, environmental concern, positive attitude, anticipated pride, and anticipated guilt lead to high levels of FWRB ("Table 2, A: M1. age*~inc*edu*gen*rsd*cor*att*pvs~enc*pnr*apr*agt"). The results also indicated two casual recipes for FWRB negation (M1. age* inc*edu*gen*att*coe~enc~agt; M2. ~ age* inc*gen*rsd*att*cor~enc) (coverage = 0.638, consistency = 0.816).

In summary, the fsQCA results revealed that no single driver condition is sufficient to predict food waste reduction behaviour, but configurations of causal recipes can sufficiently predict these behaviours with high levels of consistency. These results support proposition 1. Furthermore, the findings revealed alternative causal recipes that can lead to high level of food waste reduction behaviour. Therefore, various pathways to food waste reduction behaviour exist. These findings support proposition 2, which proposed the occurrence of different antecedent conditions for guests food waste reduction behaviour. Finally, the results indicated that asymmetrical effects occur when specific driver condition integrates with another driver condition to generate a configurational cause. For instance, a strong attitude and perceived value on sustainability is an ingredient in configurations 1–5, whereas its negation is an ingredient in configurations 1 and 2. These results support proposition 3, which suggested the asymmetrical effects occurrence.

4.4. Predictive validity

The predictive validity was assessed and the results are demonstrated in Table 3. Based on Wu et al (2014), we divided our study sample into two subsamples and assessing models that generated from subsample 1 utilising subsample 2. The results in Table 3 revealed asymmetric between FWRB and its causal recipes (i.e., demographics, attitude and values, and affective influence). According to Woodside, 2016, two casual recipes (M1 and M2) were tested utilising

subsample, and the findings indicated that M1 and M2 have high levels of coverage and consistency (coverage = 0.794, consistency = 0.982) that emphasised their predictive validity.

5. Discussion and implications

5.1.Key findings

Food waste behaviour represents major challenges for academics and practitioners in the tourism and hospitality industry. Examining and understanding the main causal variables that can explain guests food waste reduction behaviour is thus essential. Our study takes a first step in enhancing our understanding of guests food waste reduction behaviours by investigating underlying configurational causes.

Regarding the demographics and socio-economic configuration, the findings of the fsQCA enhance our understanding of demographics and socio-economic variables and their configurational influences on food waste reduction behaviours, which has been confirmed as an investigation priority in food waste studies (e.g., Secondi et al., 2015). In particular, adapting fsQCA and complexity theory as an innovative approach allows us to include the demographics and socio-economic variables for stimulating FWRB. These results about the demographics and socio-economic variables can be used to target specific segments according to guest level of education, gender, income, age, country of origin, and area of residence. For instance, our study indicated that education has a significant influence on food waste reduction behaviour. In our research, having completed secondary or high school as the highest level of education, as opposed to just elementary/intermediate/vocational levels, resulted in a substantial reduction in food waste production. This may be explained by the advanced education's greater degree of awareness (Qi and Roe, 2016). Furthermore, Abeliotis et al. (2016) found that higher levels of education improve food label reading knowledge, which reduces food waste.

Regarding attitude and values configuration, our study findings revealed that guests' perceived value on sustainability has a significant effect on their food waste reduction behaviour in the hospitality context and expands prior research addressing links of pro-environmental values to food waste reduction behaviour (e.g., Cheung and To, 2019; Han et al., 2019; Kim et al., 2019; Verma et al., 2019). Findings of this study revealed that attitude, personal norm, environmental awareness, and environmental concerns are key drivers of food waste reduction behaviour. These results are consistent with prior research findings that stress the importance of attitude (Mattar et al., 2018; Zhang, Moyle, and Jin, 2018), personal norm (Agag et al., 2020), environmental awareness (Olya and Akhshik, 2019), and environmental concerns (Han and Hyun, 2018).

The results indicated that both anticipated guilt and pride have significant influence on guest food waste reducing behaviour. These results provide significant contributions about these relationships which are missing in the prior research about food waste reduction behaviour in the hospitality industry. Prior research asserts that anticipated feelings are critical factors in explaining and understanding pro-environmental behaviour Han (2014). Our study confirmed that guests who anticipate feelings of guilt when not engaging in food waste reduction behaviour and anticipate feelings of pride when engaging in food waste reduction behaviour while staying in a hotel are more willing to reduce food waste. These meaningful variables together with attitudes and values, and demographics and socio-economic variables are key drivers of guests food waste reduction behaviour during their stay at a hotel.

5.2. Theoretical contributions

Food waste behaviours pose major challenges for firms in a wide range of contexts. Understanding the causal recipes that can explain individuals food waste reduction behaviour is thus paramount. Our study makes contributions to the food waste behaviour literature in the

hospitality context by establishing complexity theoretical hypotheses of how multiple casual recipes stimulate guests food waste reduction behaviours. This innovative approach can provide new insights into paradigms of causal variables for food waste behaviour and incorporates various theoretical sights on the topic. Complexity theory "holds that multiple factors work together and form patterns that influence the occurrence and nature of phenomena" (Woodside, 2017, P.153). The results of our study revealed alternatives casual recipes of demographics, attitude and values, and affective influence variables that were consistently sufficient for stimulating guests food waste reduction behaviours.

Woodside (2014) pointed out that knowledge about the configurations enhances the comprehension of various realities and provides meaningful insights into the causes why guests reduce food waste. For instance, Kim et al (2019) indicated that perceived value on sustainability, attitude, and personal norm are key drivers of food waste reduction behaviour. Our study also indicated that personal norm plays a critical role in influencing food waste reduction behaviour. For academics, using this moral norm to theorise guests' food waste reduction behaviour in the hotels context may be a crucial step. Our study identified configurational causes that mirror these causes and provide further insights by unravelling their interconnected forms. The results of our study revealed four models for stimulating food waste reduction behaviour. These results improve prior research about guests food waste reduction behaviour, and they contribute to the extant literature on food waste reduction (e.g., Han et al., 2020; Juvan et al., 2018; Woodside and Sharma, 2017).

Our paper expands on previous work that has used TPB and anticipated feelings to model FWRB, despite their inability to accurately predict it. To support the suggested conceptual paradigm, this research integrates and expands these variables. The use of complexity theory provides for an appropriate explanation of the complex combinations of TPB predictors and anticipated feelings, which may have non-linear connections, as well as the assessment of

causal inconsistencies. Furthermore, since behavioural disposition is predicted by an aggregation of behaviours rather than a single behaviour, the research has integrated intentional and behavioural data in the context of frequent encounters between guests and hotels, allowing higher confidence in the findings (Ajzen, 1991).

5.3. Managerial contributions

The present study provides some important implications for practitioners and the authorities in charge of tourism management who plan to promote sustainable consumption in the hospitality industry. Knowledge about causal recipes for attaining high food waste reduction behaviour aids hotels managers to understand the underlying reasons of guests food waste reduction behaviours. This knowledge frames the basis for developed segmentation approaches, the improvement of campaigns and activities to make changes in attitudes and behaviours, and for designing mechanism to reduce food waste. Our study indicated guests who are older, women, have a higher level of education and income, living in urban areas, and from developed European countries are more likely to reduce food waste.

Segmentation approaches to determine food individuals waste behaviours based on their demographics and socio-economic variables are misleading due to discriminations concerns and their insufficiency in stimulating food waste reduction behaviours. Configurational causes that comprise a combination of demographics and socio-economic, attitude and values, and affective influence variables are sufficient to predict food waste reduction behaviour. Therefore, segmentation approaches rely on demographics and socio-economic variables only are problematic and misleading and practitioners should avoid them. These results help hotels managers in identifying guests and societies with similar behaviour patterns and thus targeting them based on the instancy level of actions and interventions. Adults can assess technological possibilities. For instance, mobile apps may be used to perform beneficial tasks such as food

preparation, serving, and portion optimization in order to minimise food waste caused by public or private food initiatives. Consumers will acquire more awareness and knowledge as a result of these mobile apps, which will collect data on their past food purchasing habits and the quantity of food waste they generate.

The results of our study revealed that personal norm on waste reduction is a key predictor of guests food waste reduction behaviour. Thus, managers can utilize advertising campaigns to engrave on guests' minds that it is ethically wrong to waste food. Managers can also use various strategies such as including cards with a moral norm message and disseminate it through guests rooms, their websites, and their social networks ("e.g., saving energy and reducing food waste is the right thing to do"). A significant implication that rises up out of our study respects the significance of carrying out customers programs on food waste reduction beginning from chosen groups of people –for example, the people most at risk–may have a "cascade effect" to incorporate different groups. Prior research pointed out that using awareness campaign alone is not sufficient since consumers behave differently Quested et al. (2013). Thus, we suggest that using the 'cascade training' by training a group of individuals and then in turn train other group of individuals which can be beneficial for reduction food waste. Therefore, we recommend that hotels should invest in in community-based interventions for reduction food waste.

The results recommend that hotels can develop marketing strategies to stimulate strategies of waste reduction as a component of more extensive sustainability practices such as proposing activities as being eco-friendly. Therefore, hotels managers can promote practices for waste reduction as essential, affirmative, legitimate, and beneficial behaviours with actions for decreasing food waste ("e.g., asking for containers for leftovers") viewed as culturally acceptable behaviour in the context of middle east. Hotels can advertise their environmentally

friendly practices and products, concentrating on guests' beliefs and thoughts to promote guests' eco-friendly behaviours, thus decreasing waste.

By using fsQCA, a set theoretic technique for modelling complicated social phenomena like FWRB, this empirical research made methodological advances. Asymmetric modelling, unlike the symmetric approach, investigates causal models for predicting FWRB negation, as opposed to the mirror opposites of models for high FWRB. This has significant implications for managers and decision-makers in terms of creating preventative circumstances that correspond to the causal models that lead to FWRB negation (see ~A, in Tables 2).

6. Study limitations and directions for future research

Our study is not free from limitations. These limitations pave the road for future studies. First, our study used a cross-sectional survey research investigated attitudes and behavioural intentions and links at the specific time point. Future research can utilise a longitudinal study to analyse variations in food waste behaviours. Second, guests' waste reduction behaviours may vary according to the hotel type by service levels ("i.e., luxury, upscale, midscale, and economy"). Investigating such sustainable behaviours and examining its antecedents can be an interesting expansion of this study. Third, our study focused on the hotel industry in the UAE, but future studies can apply our proposed model in different countries to offer additional insights into the generalizability of this study findings. Fourth, our study focused on examining three main antecedents to food waste reduction behaviour, resulting in five causal recipes. Future research can consider other variables such as perceived abundance of food and perceived anonymity (Juvan et al., 2018) surrounding food waste in the hospitality industry. Finally, future studies can extend our proposed model with the inclusion of actual behaviours for more clear comprehension of hotel guests' food waste behaviours.

References

Agag, G., Brown, A., Hassanein, A., Shaalan, A., 2020. Decoding travellers' willingness to pay more for green travel products: closing the intention–behaviour gap. *Journal of Sustainable Tourism*. 26(7), 1-25.

Agag, G., Colmekcioglu, N., 2020. Understanding guests' behavior to visit green hotels: The role of ethical ideology and religiosity. *International Journal of Hospitality Management*, *91*, p.102679.

Ahmad, S.Z., Khalid, K., 2017. The adoption of M-government services from the user's perspectives: Empirical evidence from the United Arab Emirates. *International Journal of Information Management*, *37*(5), 367-379.

Ajzen, I., 2002. Perceived behavioral control, self-efficacy, locus of control, and the theory of planned behavior 1. *Journal of applied social psychology*. *32*(4), 665-683.

Alfiero, S., Christofi, M., Bonadonna, A., 2019. Street food traders, farmers and sustainable practice to reduce food waste in the Italian context. *British Food Journal*.45(9), 23-44.

AlSuwaidi, M., Eid, R., Agag, G., 2021. Understanding the link between CSR and employee green behaviour. *Journal of Hospitality and Tourism Management*, 46, 50-61.

Awe, O.A., Woodside, A.G., Nerur, S., Prater, E., 2020. Capturing heterogeneities in orchestrating resources for accurately forecasting high (separately low) project management performance. *International Journal of Production Economics*. *224(6)*, 107-556.

Ayeh, J.K., Au, N., Law, R., 2016. Investigating cross-national heterogeneity in the adoption of online hotel reviews. *International Journal of Hospitality Management*. *55(3)*, 142-153.

Betz, A., Buchli, J., Gobel, C., Müller, C., 2015. Food waste in the Swiss food service industry – magnitude and potential for reduction. *Waste Management*. 35(5), 218–226.

Bianchi, C., Milberg, S., Cúneo, A., 2017. Understanding travelers' intentions to visit a short versus long-haul emerging vacation destination: The case of Chile. *Tourism Management*, *59*, 312-324.

Castrica, M., Tedesco, D.E., Panseri, S., Ferrazzi, G., Ventura, V., Frisio, D.G., Balzaretti, C.M., 2018. Pet food as the most concrete strategy for using food waste as feedstuff within the European context: a feasibility study. *Sustainability*, *10*(6), 20-35.

Cicatiello, C., Franco, S., 2020. Disclosure and assessment of unrecorded food waste at retail stores. *Journal of Retailing and Consumer Services*. *52(3)*, 101-932.

Clark, E., Mulgrew, K., Kannis-Dymand, L., Schaffer, V., Hoberg, R., 2019. Theory of planned behaviour: predicting tourists' pro-environmental intentions after a humpback whale encounter. *Journal of Sustainable Tourism*. *27*(5), 649-667.

Cox, J., Downing, P., 2007. Food Behaviour Consumer Research: Quantitative Phase." http://www.wrap.org.uk/sites/files/wrap/Food%20behaviour%20consumer%20research%20 quantitative%20jun%202007.pdf (accessed May 25, 2020).

Dhir, A., Talwar, S., Kaur, P., Malibari, A., 2020. Food waste in hospitality and food services: A systematic literature review and framework development approach. *Journal of Cleaner Production*. *270(5)*, 122-861.

Diaz-Ruiz, R., Costa-Font, M., Gil, J.M., 2018. Moving ahead from food-related behaviours: an alternative approach to understand household food waste generation. *Journal of cleaner production*. *172(4)*, 1140-1151.

Dolnicar, S., 2020. Eat up! Prevention of plate waste in tourism and hospitality: a perspective paper. *Tourism Review*.45(7), 67-83.

Dolnicar, S., Juvan, E., Grün, B., 2020. Reducing the plate waste of families at hotel buffets–A quasi-experimental field study. *Tourism Management*. *80(5)*, 104-113.

Eid, R., Agag, G., Shehawy, Y.M., 2021. Understanding guests' intention to visit green hotels. *Journal of Hospitality & Tourism Research*, 45(3), 494-528.

Elgin, D., 1994. Building a sustainable species-civilization: A challenge of culture and consciousness. *Futures*. 26(2), 234–245.

Esfandiar, K., Dowling, R., Pearce, J., Goh, E., 2020. Personal norms and the adoption of pro-environmental binning behaviour in national parks: An integrated structural model approach. *Journal of Sustainable Tourism*. *28*(1),10-32.

Filimonau, V., De Coteau, D. A., 2019. Food waste management in hospitality operations: A critical review. *Tourism Management*. 71(8), 234–245.

Filimonau, V., Fidan, H., Alexieva, I., Dragoev, S., Marinova, D.D., 2019. Restaurant food waste and the determinants of its effective management in Bulgaria: An exploratory case study of restaurants in Plovdiv. *Tourism Management Perspectives*. *32(6)*, p.100577.

Filimonau, V., Gherbin, A., 2017. An exploratory study of food waste management practices in the UK grocery retail sector. *Journal of Cleaner Production*. *167(6)*,1184-1194.

Filimonau, V., Krivcova, M., Pettit, F., 2019. An exploratory study of managerial approaches to food waste mitigation in coffee shops. *International Journal of Hospitality Management*. *76(3)*, 48-57.

Filimonau, V., Matute, J., Kubal-Czerwińska, M., Krzesiwo, K., Mika, M., 2020. The determinants of consumer engagement in restaurant food waste mitigation in Poland: An exploratory study. *Journal of Cleaner Production*. *247(8)*, 119-125.

Filimonau, V., Tochukwu, C.O., 2020. Exploring managerial approaches to mitigating solid waste in hotels of Lagos, Nigeria. *Journal of Cleaner Productio.* p.122410.

Filimonau, V., Zhang, H., Wang, L.E., 2020. Food waste management in Shanghai full-service restaurants: A senior managers' perspective. *Journal of Cleaner Production*. p.120975.

Fornell, C., Larcker, D.F., 1981. Structural equation models with unobservable variables and measurement error: *Algebra and statistics*.

Gaskin, J., 2017. Confirmatory factor analysis. http://statwiki.kolobkreations.com/index.php?title=Confirmatory_Factor_Analysis (accessed on October 5, 2020)

Goh, E., Jie, F., 2019. To waste or not to waste: Exploring motivational factors of Generation Z hospitality employees towards food wastage in the hospitality industry. *International Journal of Hospitality Management*, *80*,126-135.

Goh, E., Ritchie, B., Wang, J., 2017. Non-compliance in national parks: An extension of the theory of planned behaviour model with pro-environmental values. *Tourism Management*. *59(4)*,123-127.

Gössling, S., 2015. New Performance Indicators for Water Management in Tourism. *Tourism Management*. 46(8), 233–44.

Gössling, S., P. Peeters., 2015. Assessing Tourism's Global Environmental Impact 1900–2050." *Journal of Sustainable Tourism*. 23(5), 639–59

Grilli, G., Notaro, S., 2019. Exploring the influence of an extended theory of planned behaviour on preferences and willingness to pay for participatory natural resources management. *Journal of environmental management*. *232(5)*, 902-909.

Grilli, G., Tyllianakis, E., Luisetti, T., Ferrini, S., Turner, R.K., 2021. Prospective tourist preferences for sustainable tourism development in Small Island Developing States. *Tourism Management*, *82*, p.104178.

Hallikainen, H. and Laukkanen, T., 2018. National culture and consumer trust in e-commerce. *International Journal of Information Management*, *38*(1), pp.97-106.

Han, H., Hyun, S.S., 2018. Eliciting customer green decisions related to water saving at hotels: Impact of customer characteristics. *Journal of Sustainable Tourism*, *26*(8), 1437-1452.

Han, H., 2014. The norm activation model and theory-broadening: Individuals' decision-making on environmentally-responsible convention attendance. *Journal of Environmental Psychology*, 40(6), 462-471.

Han, H., 2015. Travelers' pro-environmental behavior in a green lodging context: Converging value-belief-norm theory and the theory of planned behavior. *Tourism Management*. *47(3)*, 164-177.

Han, H., Chua, B.L., Hyun, S.S., 2020. Eliciting customers' waste reduction and water saving behaviors at a hotel. *International Journal of Hospitality Management*. *87(4)*, 102-386.

Han, H., Hwang, J., Lee, M.J., Kim, J., 2019. Word-of-mouth, buying, and sacrifice intentions for eco-cruises: Exploring the function of norm activation and value-attitude-behavior. *Tourism Management*. *70(2)*, 430-443.

Han, H., Hyun, S.S., 2018. Eliciting customer green decisions related to water saving at hotels: impact of customer characteristics. *Journal of Sustainable Tourism*. *26*(8), 1437-1452.

Han, H., Hyun, S.S., 2018. What influences water conservation and towel reuse practices of hotel guests?. *Tourism Management*. *64(4)*, 87-97.

Han, H., Lee, J.S., Trang, H.L.T., Kim, W., 2018. Water conservation and waste reduction management for increasing guest loyalty and green hotel practices. *International Journal of Hospitality Management*. *75(7)*, 58-66.

Harth, N. S., Leach, C. W., Kessler, T., 2013. Guilt, anger, and pride about in-group environmental behavior: Different emotions predict distinct intentions. *Journal of Environmental Psychology*. 34(3), 18–26

He, L., Filimonau, V., 2020. The effect of national culture on pro-environmental behavioural intentions of tourists in the UK and China. *Tourism Management Perspectives*. *35*, p.100716.

Hebrok, M., Boks, C., 2017. Household food waste: Drivers and potential intervention points for design–An extensive review. *Journal of Cleaner Production*. *151(3)*, 380-392.

Henseler, J., Hubona, G., Ray, P.A., 2016. Using PLS path modelling in new technology research: updated guidelines. *Industrial management & data systems*.24(7), 46-59.

Hosany, S., Martin, D., Woodside, A.G., 2020. Emotions in Tourism: Theoretical Designs, Measurements, Analytics, and Interpretations. *Journal of Travel Research*, p.0047287520937079.

Hwang, J., Kim, W., Kim, J.J., 2020. Application of the value-belief-norm model to environmentally friendly drone food delivery services. *International Journal of Contemporary Hospitality Management*.45(8), 34-62.

Jin, X.L., Zhou, Z., Tian, Y., 2020. A Configurational Analysis of the Causes of Consumer Indirect Misbehaviors in Access-Based Consumption. *Journal of Business Ethics*.45(8), 1-32.

Joshi, P.,Visvanathan, C., 2019. Sustainable management practices of food waste in Asia: Technological and policy drivers. *Journal of environmental management*. *247(5)*, 538-550.

Jung, J., Ko, E., Woodside, A.G., 2019. How shoppers' configurations of demographics, sustainability assessments, and place-attractiveness assessments impact who shops in culturally traditional mega-markets. *Journal of Business Research*.23(1), 67-81.

Juvan, E., Grün, B., Baruca, P.Z., Dolnicar, S., 2021. Drivers of plate waste at buffets: A comprehensive conceptual model based on observational data and staff insights. *Annals of Tourism Research Empirical Insights*, *2*(1), p.100010.

Juvan, E., Grün, B., Dolnicar, S., 2018. Biting off more than they can chew: food waste at hotel breakfast buffets. *Journal of Travel Research*. *57*(2), 232-242.

Kaplan, S., Manca, F., Nielsen, T.A.S., Prato, C.G., 2015. Intentions to use bike-sharing for holiday cycling: An application of the Theory of Planned Behavior. *Tourism Management*, *47*, 34-46.

Katt, F., Meixner, O., 2020. Food waste prevention behavior in the context of hedonic and utilitarian shopping value. *Journal of Cleaner Production*. *273(6)*, p.122878.

Kiatkawsin, K., Han, H., 2017. Young travellers' intention to behave pro-environmentally: Merging the value-belief-norm theory and the expectancy theory. *Tourism Management*, *59(8)*, 76-88.

Kim, J., Rundle-Thiele, S., Knox, K., Burke, K., Bogomolova, S., 2020. Consumer perspectives on household food waste reduction campaigns. *Journal of Cleaner Production*. *243(5)*, p.118608.

Kim, J.J., Hwang, J., 2020. Merging the norm activation model and the theory of planned behavior in the context of drone food delivery services: Does the level of product knowledge really matter?. *Journal of Hospitality and Tourism Management*, *42(4)*, 1-11.

Kim, M.J., Hall, C.M., Kim, D.K., 2020. Predicting environmentally friendly eating out behavior by value-attitude-behavior theory: does being vegetarian reduce food waste?. *Journal of Sustainable Tourism*. *28*(6), 797-815.

Kularatne, T., Wilson, C., Månsson, J., Hoang, V., Lee, B., 2019. Do environmentally sustainable practices make hotels more efficient? A study of major hotels in Sri Lanka. *Tourism Management*. *71(4)*, 213-225.

Leischnig, A., Woodside, A.G., 2019. Who approves fraudulence? Configurational causes of consumers' unethical judgments. *Journal of Business Ethics*. *158*(3), 713-726.

Li, Q., Wu, M., 2020. Tourists' pro-environmental behaviour in travel destinations: benchmarking the power of social interaction and individual attitude. *Journal of Sustainable Tourism*. *28*(9), 1371-1389.

Lindell,M.K., Whitney,D.J., 2001. Accounting for common method variance in cross-sectional research designs. *Journal of Applied Psychology*. 86(1), 114–121.

Luu, T.T., 2020. Reducing food waste behavior among hospitality employees through communication: dual mediation paths. *International Journal of Contemporary Hospitality Management*.46(7), 68-72.

Mariani, M.M., Borghi, M., Okumus, F., 2020. Unravelling the effects of cultural differences in the online appraisal of hospitality and tourism services. *International Journal of Hospitality Management*. *90(5)*, p.102606.

Mattar, L., Abiad, M.G., Chalak, A., Diab, M., Hassan, H., 2018. Attitudes and behaviors shaping household food waste generation: Lessons from Lebanon. *Journal of Cleaner Production*, *198*, 1219-1223.

Meng, B., Chua, B.L., Ryu, H.B., Han, H., 2020. Volunteer tourism (VT) traveler behavior: merging norm activation model and theory of planned behavior. *Journal of Sustainable Tourism*. 45(6), 1-23.

Minton, E.A., Spielmann, N., Kahle, L.R., Kim, C.H., 2018. The subjective norms of sustainable consumption: A cross-cultural exploration. *Journal of Business Research, 82(5),* 400-408.

Okumus, B., Taheri, B., Giritlioglu, I., Gannon, M.J., 2020. Tackling food waste in all-inclusive resort hotels. *International Journal of Hospitality Management*. *88(5),* p.102543.

Olya, H.G., Akhshik, A., 2019. Tackling the complexity of the pro-environmental behavior intentions of visitors to turtle sites. *Journal of Travel Research*. *58*(2), 313-332.

Onwezen, M. C., Antonides, G., Bartels, J., 2013. The norm activation model: An exploration of the functions of anticipated pride and guilt in pro-environmental behavior. *Journal of Economic Psychology*, 39, 141-153.

Ordanini, A., Parasuraman, A., Rubera, G., 2014. When the recipe is more important than the ingredients: A qualitative comparative analysis (QCA) of service innovation configurations. *Journal of service research*, *17*(2), 134-149.

Pappas, I. O., Kourouthanassis, P. E., Giannakos, M. N., Chrissikopoulos, V., 2016. Explaining online shopping behavior with fsQCA: The role of cognitive and affective perceptions. *Journal of Business Research*. *69*(2), 794-803.

Pappas, N., Papatheodorou, A., 2017. Tourism and the refugee crisis in Greece: Perceptions and decision-making of accommodation providers. *Tourism Management*. *63*(2), 31-41.

Pirani, S.I., Arafat, H.A., 2016. Reduction of food waste generation in the hospitality industry. *Journal of Cleaner Production. 132(8),* 129-145.

Powell, R.B., Ham, S.H., 2008. Can ecotourism interpretation really lead to pro-conservation knowledge, attitudes and behaviour? Evidence from the Galapagos Islands. *J. Sustain. Tour.* 16 (4), 467-489.

Qu, Y., Xu, F., Lyu, X., 2019. Motivational place attachment dimensions and the pro-environmental behaviour intention of mass tourists: A moderated mediation model. *Current Issues in Tourism*. *22*(2), 197-217.

Quested, T.E., Marsh, E., Stunell, D., Parry, A.D., 2013. Spaghetti soup: the complex world of food waste behaviours. *Resour. Conserv. Recycl*. 79(8), 43–51.

Sakaguchi, L., Pak, N., Potts, M. D., 2018. Tackling the issue of food waste in restaurants: Options for measurement method, reduction and behavioural change. *Journal of Cleaner Production*. 180(3), 430–436.

Secondi, L., Principato, L., Laureti, T., 2015. Household food waste behaviour in EU-27 countries: A multilevel analysis. *Food policy.56(9),* 25-40.

Slorach, P.C., Jeswani, H.K., Cuéllar-Franca, R., Azapagic, A., 2019. Environmental sustainability of anaerobic digestion of household food waste. *Journal of environmental management*. *236(3)*, 798-814.

Spivack, A.J., Woodside, A.G., 2019. Applying complexity theory for modeling human resource outcomes: Antecedent configurations indicating perceived location autonomy and work environment choice. *Journal of Business Research*. *102(5)*, 109-119.

Stern, P.C., Dietz, T., 1994. The value basis of environmental concern. *J. Soc. Issues.* 50(3), 65-84.

Wang, L., Wong, P.P.W., Zhang, Q., 2021. Travellers' destination choice among university students in China amid COVID-19: extending the theory of planned behaviour. *Tourism Review*.

Wenlock, R.W., Buss, D.H., Derry, B.J., Dixon, E.J., 1980. Household food wastage in Britain. *Br. J. Nutr*. 43(1), 53–70.

Woodside, A. G., 2014. Embrace perform model: Complexity theory, contrarian case analysis, and multiple realities. *Journal of Business Research*. 67(12), 2495-2503.

Woodside, A. G., 2018. Applying complexity theory: A primer for identifying and modeling firm anomalies. *Journal of Innovation & Knowledge.* 3(4), 9–25.

Woodside, A. G., Prentice, C., Larsen, A., 2016. Revisiting problem gamblers' harsh gaze on casino services: Applying complexity theory to identify exceptional customers. *Psychology & Marketing*, 32(2), 65–77.

WRAP, 2013. Overview of waste in the UK hospitality and food service sector. *Oxon: WRAP*. HFS001-006.

Ye, S., Soutar, G.N., Sneddon, J.N., Lee, J.A., 2017. Personal values and the theory of planned behaviour: A study of values and holiday trade-offs in young adults. *Tourism Management*, *62*, 107-109.

Yeh, S.S., Guan, X., Chiang, T.Y., Ho, J.L., Huan, T.C.T., 2021. Reinterpreting the theory of planned behavior and its application to green hotel consumption intention. *International Journal of Hospitality Management*, *94*, p.102827.

Zhang, Y., Moyle, B.D., Jin, X., 2018. Fostering visitors' pro-environmental behaviour in an urban park. *Asia Pacific Journal of Tourism Research*, *23*(7), 691-702.