

Sustainable consumption transition model: Social concerns and waste minimization under willingness-to-pay in Indonesian food industry

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Sustainable consumption transition under willingness-to-pay values and uncertainties in Indonesian food industry

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Sustainable consumption transition under willingness-to-pay values and uncertainties in Indonesian food industry

Abstract

This study aims to identify the consumer-centered attributes that influence consumer willingness-to-pay value for a sustainable consumption transition. The Indonesian food industry has contributed to an increasing trend of waste generation in the landfill due to irresponsible consumer behaviors resulting in a failure in a consumption transition from being traditional to sustainable. Prior studies have indicated that there is a gap between consumers' intentions and their behaviors. In response, this study attempts to identify the attributes causing such a gap by focusing on consumer behaviors. The model validity is measured by the economic value using consumer WTP. In order to answer the objectives, this study uses a combination of fuzzy Delphi method and choice experiment method with an advantage of being able to assess the attributes based on the expert judgements and consumer preferences, while other studies have not used the combination of these two methods. The results show that social concerns and waste minimization perspectives contribute the most to the sustainable consumption model in which the criteria such as consumers' sustainable issue interest, responsible waste disposal and health-based products play a major role in influencing consumer WTP. Therefore, based on the perspectives and criteria assessment results, this study contributes to the literature and industry with theoretical and managerial implications.

Keywords:

sustainable consumption transition; consumer behaviors; fuzzy Delphi method; choice experiment; willingness-to-pay

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1. Introduction

A sustainable consumption transition (SCT) comprises a change of consumer behaviors in their regular consumption from traditional to sustainable (Ahamad & Ariffin, 2018; Strydom et al., 2019). There are several challenges in achieving the transition triggered by irresponsible consumer behaviors (Notarnicola, 2017; Dong et al., 2020). Tseng et al. (2020) argued that challenges existed due to the perceptual gap between manufacturers and consumers resulting in irresponsible consumption behaviors. Furthermore, Filimonau et al. (2020) found that irresponsible consumer behaviors are impactful and lead to waste production. For instance, the impact of such behaviors is evidenced by an increasing rate of waste production from food products in Indonesian landfills (Purwaningrum, 2016). In addition, the waste in Indonesian landfills is dominated by food packaging, which outnumbers the other types of waste (Hidayat, 2019). Prior studies have shown that a common shortcoming is a low level of knowledge, which affects consumers' intentions and creates negative consequences in their behaviors (Graham-Rowe et al., 2014; Schanes et al., 2018; Vega-Zamora et al., 2019). The importance of consumer role in SCT is emphasized to reach the SCT goal which is to slow down food waste generation (Bravi et al., 2020). Moreover, consumer behaviors determine product development and availability in the market despite unsustainable marketing strategies by the industry. In consequence, irresponsible consumer behaviors are accountable for ineffective product development and policy establishment as consumer-centered studies are extensions of the perspectives of manufacturers and governments to that of the consumer (Hankammer et al., 2019; Feil et al., 2020). Therefore, this study recognizes the importance of consumers thus focuses on the attributes that have an influence on eliminating the gap in consumers' intentions and behaviors toward sustainable consumption to achieve the transition.

Recent studies have called for explorations of SCT with a focus on this gap to obtain a better understanding what motivates consumers' irresponsible behaviors (Dermody et al., 2018; Coderoni & Perito, 2020; Filimonau et al., 2020). Despite the attempts by other studies to identify what motivates such behaviors, there has been no significant change in the trend of reducing food waste (Reynolds et al., 2019; Tseng et al., 2020). This study attempts to better understand SCT from the consumer point of view by using various perspectives including consumers' social concerns, waste minimization and economic considerations. Further, the study uses the so-called sustainable consumption transition model to understand how much consumers are prepared to pay for the set of the most preferred attributes and which attributes have the most significant influence on consumers' willingness to pay (WTP).

This study proposes the sustainable consumption transition model based on the economic values measured by consumers' WTP values. Generally, WTP is the maximum or minimum amount of price that a consumer is willing to pay for a product or service (Saint-Eve et al., 2020). Prior studies have explored consumers' WTP for different types of products or services (Strydom et al., 2019; Cantillo et al., 2020); however, there has not yet been a study that uniformly identified the attributes that drive WTP (Katt & Meixner, 2020). For instance, studies indicate the inconsistency with which attributes have a significant effect and no effect at all on

WTP; this is commonly affected by the attributes under social, environmental and economic perspectives (Sriwaranun et al., 2015; Zhang et al., 2018; Ankamah-Yeboah et al., 2019). From the social perspective, the inconsistency is affected by consumers' different motivations, self-identity, attitude, knowledge level, egoistic values and influencing signals (Ahmad & Ariffin, 2018; Feil et al., 2020; Sigurdsson et al., 2020). From the environmental perspective, it is affected by consumers' waste drivers, precaution activities, specific consumption stages, awareness of waste consequences and waste disposal practices (Willett et al., 2019; Bravi et al., 2020; Read et al., 2020). Lastly, from the economic perspective, the inconsistency is impacted by consumers' different perceptions of economic benefits, price consciousness, local obstacles, functional values and quality considerations (Dabbous & Tarhini, 2019; Popa et al., 2019; Ozturk & Akoglu, 2020). In summary, this study attempts to identify the best set of attributes that form the sustainable consumption transition model from the three perspectives for reaching the SCT goal by assessing consumers' WTP.

Assessing WTP to understand consumer behaviors is commonly done with the choice experiment (CE) method because the results are concentrated on consumers' preferences based on different sets of alternative situations that contain different sets of selected attributes (Gao et al., 2016; De Marchi et al., 2020). In addition, the CE is a well-established method for estimating consumers' WTP for specific attributes based on their preferences because of its closeness to the experience of making real buying decisions (Cantillo et al., 2020). The method commonly assesses attributes that were recommended from the literature or from focus group discussions to be used in the questionnaire (Birkenberg et al., 2021). The purpose of this study is to combine the CE method with the fuzzy Delphi method (FDM). The advantage of the combined method is that the attributes undergo a process of elimination conducted by experts to obtain the significant ones. First, the attributes are obtained from literature with a focus on consumers. Then, food-industry experts' opinions are used to eliminate the less significant attributes using the FDM, which justifies the practical improvement under uncertainties. In addition to allowing for an assessment of linguistic preferences from the industry point of view on the significant attributes, another advantage of using the FDM is to reduce the investigation times and decision-making costs (Bui et al., 2020; Padilla-Rivera et al., 2021). The selected attributes are then used to design sets of CE questionnaires. The combination of the methods allows this study to fulfill the objectives, which are as follows:

- To develop a set of valid SCT attributes using qualitative information to form a sustainable consumption transition model,
- To identify a set of valid criteria for WTP values, and
- To justify practical improvement under uncertainties.

The contributions of this study cover both theory and practice. The contributions consist of (1) providing a set of valid SCT attributes to form a sustainable consumption transition model, (2) providing suggestions for practical improvement for the food manufacturing industry in Indonesia, and (3) proposing a set of WTP values to authorities for policy development. The findings enable academic and industry stakeholders to identify the criteria of the transition and to resolve challenges to improving SCT.

This study is organized as follows: Section 1 focuses on the study gap and objectives; Section 2 presents the literature on SCT including the perspectives, definition, and proposed criteria; Section 3 presents the industrial background, method and data analysis; Section 4

reports the results; Section 5 discusses the theoretical and managerial implications; and Section 6 presents the conclusions and study limitations.

2. Literature review

This section includes a review of the literature on triple bottom-line perspectives and SCT, the proposed methods, the proposed criteria, and the industrial background.

2.1 Theoretical framework

In understanding the attributes that form the sustainable consumption transition model, this study incorporates three perspectives based on the triple bottom line, which includes social concerns, waste minimization and economic considerations. These perspectives represent the complexity of consumer behaviors in SCT, which are influenced by a number of aspects (Nikolaou and Kazantzidis, 2016; Lombardi et al., 2017; Mulcahy et al., 2020).

Under social perspective, social concerns are described by aspects including consumers' motivation, attitude, self-identity, signals, values and knowledge, which affect changes in consumer behaviors. Feil et al. (2020) found that having a motivation to protect the environment had a positive and direct influence on consumers' sustainable consumption behaviors. In addition, the motivation to change consumers' behaviors includes healthier product properties and features such as benefits from consuming a product (Yadav & Pathak, 2016). The influence extends to consumers' attitudes. Ahamad and Ariffin (2018) claimed that sustainable behaviors are positively affected by consumers' attitudes toward consuming environmentally-friendly products. In addition, quality signals are found to positively influence consumers' intentions and behaviors toward SCT as well as their pro-environmental self-identity (Dermody et al., 2018; Sigurdsson et al., 2019). However, there are aspects with negative effects on the transition. In particular, egoistic values tend to overwhelm consumers' intentions and result in irresponsible behaviors (Dermody et al., 2018). Moreover, in prior studies, consumers' lack of knowledge about environmental impacts or consequences has become the most common barrier to SCT (Schanes et al., 2018; Dong et al., 2020; Katt & Meixner, 2020).

The environmental perspective, however, is focused on related aspects of waste minimization including precaution activities, waste disposal activities, waste impact consciousness, specific consumption stages, and consumers' waste drivers. Barone et al. (2019) argued that food waste minimization behaviors should be understood through in-depth investigations to design effective interventions to explain why consumers' intentions to reduce waste do not always end with less food waste. Waste can be minimized by the consumers in everyday consumption through positive precaution activities activated by high awareness and demonstrated by proper activities of waste disposal (Mondéjar-Jiménez et al., 2016; Ahamad & Ariffin, 2018; Willett et al., 2019). Moreover, McCarthy et al. (2020) found that consumers with high awareness and guilt about waste impacts have a positive response to SCT in the form of consuming products advertised as environmentally friendly. However, despite these findings, it is difficult to minimize food waste at the household consumption stage as studies have found that waste is produced based on different drivers among individuals or consumers living in each household, creating inconsistencies in their intentions and behaviors (Reynolds et al., 2019; Read et al., 2020; Bravi et al., 2020).

Economic considerations, which include economic benefits, price consciousness, functional values, quality consideration and local obstacles, play a certain role in affecting

consumer behaviors to accomplish SCT (Dabbous & Tarhini, 2019). Henten & Windekilde (2016) argued that cost reductions are the most attractive aspect resulting from price consciousness. Moreover, McCarthy et al. (2020) found that consumers' purchasing trends are mostly influenced by price competitiveness when consumers make a decision to purchase a sustainable product. Other considerations are related to perceived values. According to Coderoni and Perito (2020), functional values are often another key determinant of consumer decisions apart from price as such values provide consumers with instrumental benefits. However, while functional values offer a positive influence toward SCT, the egoistic values related to consumers' financial capacity do the opposite (Dermody et al., 2018). Another aspect with a negative influence on SCT involves local obstacles. Problems are commonly encountered when products are out of the season, which negatively affects the availability of environmentally-friendly products (Ozturk & Akoglu, 2020).

Overall, the social concerns, waste minimization and economic considerations perspectives are studied and assessed to understand the contributions to the formation of a sustainable consumption transition model based on consumer behaviors. The aim of including of these perspectives is to represent the complex attributes that often affect consumers' intentions and behaviors toward SCT.

2.2 Sustainable consumption transition

Sustainable consumption comprises consumers' attention and care with regard to environmental impacts while traditional consumption tends to be based on a product's extrinsic qualities (Strydom et al., 2019). The process of change to sustainable consumption describes the transition. Ahamad and Ariffin (2018) formally defined SCT as *"a transition to improve life quality [and] resource use efficiency and fulfill the needs of future generations while protecting the environment"*. The exploration of consumer behaviors in SCT is not merely an extension of a wider discourse from the manufacturer and government point of view but also leads to an orientation toward more assertive product development and more effective regulations (Notarnicola, 2017; Hankammer et al., 2019; Feil et al., 2020). Cantillo et al. (2020) showed that consumers' behavioral preferences towards SCT attributes provide positive evidence within manufacturers' strategies not only in production but also in product distribution. Moreover, Kumar et al. (2021) argued that manufacturers demonstrate increased concern about environmental impacts in response to changes in consumer behaviors toward protecting the environment. The positive evidence extends to consumers' WTP influenced by SCT attributes.

WTP is defined as *"the affordable price for a product that a buyer is ready to pay the amount"* (Schmidt and Bijmolt, 2019). Saint-Eve et al. (2020) described it as the maximum or minimum price to be paid for a product or service, although WTP focuses on economic value and not actual prices. Studies have found that consumers with SCT attributes are found to have a tendency toward WTP for environmentally-friendly products. For instance, consumers with pro-environmental self-identity and environmental consciousness are more willing to pay for environmentally-friendly products (Powell et al., 2019; Kumar et al., 2021). Moreover, there is a positive alliance between the consumers' sustainable intentions and their WTP. Hoque (2021) claimed that the higher consumers' awareness about SCT attributes, the higher the WTP will be to support a better environment. However, despite the positive relationship, other studies have found inconsistencies and confusion due to consumers' different preferences of SCT attributes

resulting in a constant failure to reach transition goals (Ankamah-Yeboah et al., 2019; Popa et al., 2019; Binkenberg et al., 2021).

Such inconsistencies are evident in different studies in which the same WTP attributes have been found to be both significant and insignificant (Sriwaranun et al., 2015; Zhang et al., 2018). For example, Katt and Meixner (2020) reviewed the prior studies and found that price and household size are both significant and not significant influences on consumers' WTP. Such inconsistencies are in line with the gap between consumers' intentions and behaviors toward SCT (Lee & Yun, 2015; Barone et al., 2019). Studies have generally found that intentions are often affected by the level of consumers' knowledge about SCT attributes, which then affects the behaviors typically demonstrated by consumers' actions such as precaution activities to minimize waste and careful purchasing decisions in daily consumption (Dong et al., 2020; Read et al., 2020; McCarthy et al., 2020). Therefore, the lower the level of knowledge due to information inadequacy or absence, the less environmentally-friendly the consumer behaviors will become (Graham-Rowe et al., 2014; Schanes et al., 2018; Vega-Zamora et al., 2019). Consumers' intentions are aligned with their WTP because of this significant influence (Kumar et al., 2021). Thus, this study evaluates the intentions-behaviors gap using the factor of WTP.

2.3 Proposed methods

The FDM has been used in prior studies. Ocampo et al. (2018) used the FDM to decrease the number of the attributes based on expert judgements and to remove uncertainties. Tseng et al. (2020) used FDM to validate attributes before employing a second method, which was a decision-making trial and evaluation laboratory method. However, a limitation of the method combination was that consumer preferences could not be assessed fairly because the two methods were heavily based on expert judgements. Bui et al. (2020) recognized that the advantage of the FDM was its ability to address a number of attribute selections by shortening the time to make decisions based on expert opinions. The method allows for the elimination of less significant qualitative information and subjective preferences. Padilla-Rivera et al. (2021) used the FDM to achieve consensus by selecting criteria while resolving the ambiguity of expert judgements. However, if used alone, the FDM is limited to experts' qualitative assessments and lacks attribute assessments based on quantitative information from the consumers' point of view.

Gao et al. (2016) used the CE method to estimate consumer WTP and to evaluate the impact of their behaviors. Their questionnaire was designed using attributes that had been pre-selected with a validation question survey using a five-point agree-disagree Likert scale. De Marchi et al. (2020) employed a discrete CE, which had the advantage of allowing for the assessment of various scenarios about products that are not yet available on the market. The valid attributes used in the questionnaire were obtained using a pilot test involving 30 respondents. Cantillo et al. (2020) used the discrete CE method to determine the importance of attributes and levels in consumers' decision making. The attributes used in the questionnaire had been previously selected from a literature review of other studies. The method is designed to assess the value of products that do not exist on the market. Therefore, it is useful to in making predictions about nonmarket goods. Birkenberg et al. (2021) also used the discrete CE method to assess consumer preferences. The attributes were preselected using the results from three focus group discussions with a group of consumers. At the end of the discussion, the participants

were asked to rank the top five most important attributes in their buying decision, which was then be used to design the CE questionnaire.

This study engages Indonesian food industry experts to select the significant SCT attributes to be used in designing a CE questionnaire. In an FDM interview, these experts are asked to provide the level of importance for each criterion using a five-point scale with 'extremely important' being the highest to 'important' being the lowest in the scale. Prior to the FDM process, the criteria were obtained from extant study models in the literature. The CE survey is administered to 401 food product consumers in Indonesia to evaluate the WTP for SCT attributes. This combination of methods allows for the assessment of attributes both from the industry point of view as well as the consumer point of view.

2.4 Proposed criteria

The social concerns perspective includes 13 criteria. Health concerns (C1) play a role in consumers' consumption decisions. Consumers are driven by the consequences of consuming sustainably such as improvements in health (Feil et al., 2020). Consumers' readiness to reuse products (C2) is the second criterion. Consumers' readiness to practice the reuse of materials such as plastic, paper or packaging affects SCT (Ahamad et al., 2018). The effect of social power (C3) from family, friends and colleagues, on consumer behaviors is also a criterion to be considered (Dermody et al., 2018). In addition to social relations, the authority (C4) and consumers' wealth (C5) play an important role in determining consumer behaviors in consumption toward achieving sustainability. Consumers' knowledge also plays a role in achieving SCT (Dermody et al., 2018). For instance, consumers' knowledge about environmental issues (C6) is the start before having sustainable behaviors. Similarly, the knowledge about solutions to environmental problems (C7) leads to consumers' activities in attempting to help solve the problems. Additionally, consumers' knowledge about the effects of environmental problems (C8) are potentially leading to sustainable behaviors because of the awareness to not cause harmful effects. Further, ill-informed consumers with low knowledge are a major challenge in the transition toward sustainable consumption (Vega-Zamora et al., 2019). Consumers' awareness about environmentally friendly consumption (C9), interest in sustainable issues (C10) and purchasing behavior based on environmental impact (C11) are also important criteria (Dermody et al., 2018). Consumers' ratings (C12) are also considered as criteria under the social concerns perspective described as consumers' opinions based on the number of rating symbols that are given. Last, consumers' reviews (C13) are described as consumers' opinions in the form of words of mouth or recommendations (Sigurdsson et al., 2019).

The environmental perspective represented by waste minimization consists of 13 criteria. Consumers' purchasing behavior in stores (C14) and consumers' ability to properly store products in households (C15) affect waste minimization in households, leading to SCT (Bravi et al., 2020). Food product management based on expiration dates (C16) and the reuse of leftover food products (C17) are also criteria that contribute to less waste production (Bravi et al., 2020). Consumers' behavior of reusing products (C18) after consumption in households (C19) motivates waste minimization practices (Ahamad et al., 2018; Read et al., 2020). Achieving a large reduction of waste is a challenge due to various consumer considerations such as standardized date labels, smart labeling to indicate product freshness, and packaging size (Rossaint & Kreyenschmidt, 2015; Wilson et al., 2018). Another criterion includes consumers' consciousness of the

environmental impact of food waste (C20). Additionally, consumers are to be aware of the social impact caused by food waste (C21) around the world where the issue is often related to famine and malnutrition. Consumers who are conscious of food waste consequences to the environment and society tend to choose products that are sustainable (McCarthy et al., 2020). Consumers with responsible waste disposal behavior (C22) tend to minimize waste by reusing their own reusable plastic bags (C23) and water bottles (C24) when outside the household, recycling used products (C25) and avoiding overconsumption (C26) (Ahamad & Ariffin., 2018).

The economic considerations perspective proposes 6 criteria. Consumer behaviors in SCT have a financial impact, especially the ability to save money (C27) (Dabbous & Tarhini, 2019). In regard to making a decision to purchase a sustainable product, checking the price (C28) is a consideration for consumers. Price influences consumers' decision-making process, and price discounts seem to be more attractive than product sustainability (McCarthy et al., 2020). In addition, consumers tend to check product prices before purchasing (Rihn et al., 2018). Economic considerations are also related to the accessibility of local resources (C29) due to shorter distribution distances (Ozturk & Akoglu, 2020). Price is not the singular consideration for a product purchase; other considerations include the nutrients (C30) and healthy ingredients (C31) in products (Feil et al., 2020). Product quality in relation to healthy ingredients demonstrates the same strength as price in convincing consumers to make purchasing decisions (Feil et al., 2020). Therefore, product quality over price (C32) has a certain effect on purchasing behavior toward SCT.

(INSERT Table 1 here - SCT attributes)

2.4 Industrial background

SCT in emerging economies has not been adequately discussed, although there are noticeable differences in consumers' engagement in emerging economies (Dermody et al., 2018). For instance, Accenture (2014) found that consumers in emerging economies show active engagement with sustainable consumption behaviors. As an emerging market, Indonesia faces challenges related to consumers' unsustainable consumption, which leads to waste production. In other words, unsustainable consumer behaviors cause increasing waste production. Purwaningrum (2016) reported that 30.19% of packaging from food or beverage products contributes to non-biodegradable waste in Indonesian landfills; there are 64 million tons of waste, and packaging waste has outnumbered the other types of waste from consumer consumption (Jain, 2017; Hidayat, 2019). Furthermore, The Ministry of Environment and Forestry of Indonesia (2018) reported that food waste is accounting for 93% of all waste in the landfill. In addition, majority of the waste was produced in private households among others including institutions accounting for 4.45%, traditional markets for 13.18%, shopping malls for 5.86%, public waste disposing facilities for 5.19%, regional waste disposals for 3.86% and other sources accounting for 4.53%. Greenpeace Indonesia (2019) reported that between 2016 and 2019, 75% of all waste from consumer goods manufacturers was dominated by the food industry. The evidence of a high percentage of waste contributed by food products from consumers' consumption is an indicator that SCT in Indonesia has not been conducted effectively. These reports indicate that there have been constant challenges to waste reduction due to food products in the country. This study recognizes such challenges are due to irresponsible

consumption behaviors by the Indonesian consumers, although the manufacturers and the government must also be involved.

Prior studies have shown that the government and manufacturers have either individually or collaboratively attempted to raise awareness among consumers about environmental consequences, especially the increasing waste production, of unsustainable consumption behavior (Notarnicola, 2017; Tseng et al., 2020). Consumers are major contributors to environmental challenges due to a lack of knowledge and perceived values that are reflected in their behaviors (Vega-Zamora et al., 2019). For instance, Tseng et al. (2020) claimed that consumers often do not have adequate information or practical skills in recognizing which products are sustainable or how to dispose of waste, especially in the food industry. This disconnection must be addressed through an improved understanding of SCT values and practicing them through actions. This study focuses on finding solutions to changing consumer behaviors from traditional to sustainable by incorporating all three perspectives to provide effective solutions.

3. Methods

This study uses a combination of the FDM and the CE method. While the FDM is used to obtain the major criteria, the CE method is used to obtain the respondents' preferences using the selected criteria obtained using the FDM. The CE method is limited to the use of only theoretical attributes. This study proposes the use of the FDM to apply a CE method that is based on criteria attributes. The combined method allows for a deeper exploration of consumer-centered SCT studies based on expert-based ranked criteria and consumer preferences in different situations.

This study initially proposed 63 criteria based on three perspectives shown in Appendix A. The FDM managed to eliminate these to 32 criteria shown in Table 3 along with the weight and threshold. The evaluation of expert perceptions and preferences is shown in Appendix A; thus, this is the initial SCT criteria set. Table 3 shows the linguistic information that is then transformed into corresponding triangular fuzzy numbers. The FDM is used to refine the important criteria with the threshold of $\gamma = 0.5114$. After the elimination process, the final number of criteria obtained is 32.

After the FDM result is acquired, the selected criteria are ranked based on the importance level using an average as the threshold for each perspective, as shown in Appendix B. The criteria are screened based on weight; a criterion weight over the threshold is selected and identified as "strong", to be later used as a selected attribute in the CE method when creating the different situation options in the questionnaire, as shown in Appendix D. This study included 401 respondents who completed the CE questionnaires.

3.1 Fuzzy Delphi method

The FDM is a method that integrates fuzzy set theory and the traditional Delphi method (Ishikama et al., 1993). The method is applied to consider the fuzziness of expert perceptions while also improving the quality of questionnaires (Noorderhaben, 1995). The method offers the advantage of eliminating the number of interviews and time spent investigating and can provide a better expression of experts' perceptions (Bui et al., 2020). This study applies the FDM so that

qualitative perceptions are converted into figures to generate benefits in relation to time and cost in making decisions (Chen & Lee, 2013; Lee et al., 2018).

(INSERT Table 2 here - Linguistic terms transformation table)

The significance value of b is assessed by expert α as $j = (x_{ab}; y_{ab}; z_{ab})$, $\alpha = 1, 2, 3, \dots, n$; $b = 1, 2, 3, \dots, m$; then, weight j_b of element b is $j_b = (x_b; y_b; z_b)$, where $x_{ab} = \min(x_{ab})$, $y_b = (\prod_1^n y_{ab})^{1/n}$, and $z_b = \max(z_{ab})$. The linguistic terms and triangular fuzzy numbers are then transformed into linguistic values, as shown in Table 2. Subsequently, an α cut is adopted to generate the result.

$$u_b = z_b - \alpha(z_b - y_b), l_b = x_b - \alpha(y_b - x_b), b = 1, 2, 3, \dots, m$$

In general, 0.5 is used to denote α under the common situation, which ranges from 0 to 1 depending on the positive or negative nature of experts as perceivers. The exact value of D_b is generated as follows:

$$u_b = \int (u_b, l_b) = \delta[u_b + (1 - \delta)l_b],$$

where δ is used to explain the decision maker's positivity level and to establish equilibrium across the fundamental judgments among the experts. Then, $\gamma = \sum_{\alpha=1}^n (D_b/n)$ is the threshold to screen the major criteria. If $D_b > \gamma$, the criteria are accepted. Otherwise, they are rejected.

3.2 Choice experiment method

Prior studies using the CE method have indicated that the conditional logit (CL) model is a basic evaluation model for setting a benchmark and analyzing regression assessment (Juutinen et al., 2011). The assessment parameters of the respondents are assumed to be fixed. The result comes from the estimate of the respondents' average preference. This study uses a random parameter logit model to explore each of the respondents' preferences and the WTP to change attribute levels (Juutinen et al., 2011). Practically, the respondents are asked to choose one of three available sets of choices for the current situation, the 'Alternative 1' situation and the 'Alternative 2' situation in which each of the situations consists of a unique set of criteria pre-selected using FDM.

De Marchi et al. (2020) claimed that the CE method allows us to examine various alternative situations containing different criteria sets. The method offers respondents a set of hypothetical alternative options from which to choose based on personal preference by employing a random utility model (Shoyama, et al., 2013; Zong et al., 2017):

$$V_{ij} = \beta_{ij} X_{ij} + \varepsilon_{ij},$$

where the utility function ' V_{ij} ' combines the observable vector ' X_{ij} ' with desirable and undesirable variables with respect to the individual ' i ' and alternative ' j '. The model represents the observed attributes for the alternative options. ' β_i ' is a coefficient associated with the level change. The error term ' ε_{ij} ' represents the unobservable variable.

If $V_{nk} > V_{ni}$, then the alternative option ' k ' is chosen over the alternative option ' i '. Therefore, there is a probability for one of the two alternative options to be chosen over the other. In this case, alternative option ' k ' is chosen over option ' i '. The equations are as follows:

$$P_{nk} = \text{Pr ob } (V_{nk} > V_{ni}), \text{ for all } i \text{ in } C, i \neq k$$

$$P_{nk} = \text{Pr ob } (\beta_{nk}V_{nk} > \beta_{ni}X_{ni}), \text{ for all } i \text{ in } C, i \neq k,$$

where ' C ' is the set of all the alternative options including two alternatives ' k ' and ' i ' and the current state. The error terms are indicated as ' ε_{nk} ' and ' ε_{ni} '. The WTP is used to measure market products (Juutinen et al., 2011). The criteria are calculated because the ratio of the TBL perspectives to the donation attributes is statistically significant. The Marginal WTP is presented as

$$\text{Marginal WTP}_j = \frac{-\beta_j}{\beta_{dfee}}$$

where β_j is the parameter for the TBL perspective j and β_{dfee} is the parameter for the donation fee. The value function therefore shows how the criteria vary according to the different SCT attributes.

3.3 Demographic statistics and sampling method

During the FDM, this study involved 10 food industry experts ranging from CEOs to academics from different firms and universities, as shown in Appendix C. With regard to the CE method, this study managed to collect a total sample of 401 respondents using CE questionnaires. The sample concentrates on Indonesian consumers using the selection criteria of age, gender, monthly expenses and education level. In terms of the age group, the sample is dominated by an age range of 18-22, which is 61.30% of the total sample. The second dominating age group is 23-27 years old, which is 23% of the total sample. According to prior studies on food and beverage consumption in Indonesia, the consumers are dominated by young consumers up to the age of 25 years old (Basith & Fadhilah, 2018; Andriyanty, 2019). As for the gender, there were 62.47% female respondents. In terms of the average monthly expenses, almost half of the sample size spent less than US\$68.5 accounting for 49.27% of the sample size. A total of 25.87% of the sample had average monthly expenses of US\$68.5 – US\$205. In terms of educational background, a bachelor degree was the majority, accounting for 67.10%, whereas senior high school was the second most dominant, accounting for 14.67%.

The reliability coefficient is 95%, and the deviation value is 5%. It is assumed that 50% of respondents are willing or not willing to pay. As shown in the equation below, according to binary distribution, the number of samples selected for the study should be over 384 where n represents

the number of samples, z represents the standard error of confidence interval, e represents the deviation value, p represents the estimated population percentage, and q represents $1-p$.

$$n = \frac{z^2(pq)}{e^2}$$

(INSERT Table 3 here - FDM – criteria screening out)

4. Results

This section presents the results and the study's contributions to both the theory and the industry.

4.1 Results from fuzzy Delphi method

As a result, the FDM accepted 32 criteria that belong to 16 aspects under social concerns, waste minimization and economic considerations perspectives, as shown in Table 1. Specifically, the social concerns perspective results in 12 criteria belonging to six aspects including consumers' motivation, consumers' attitude, egoistic values, consumers' knowledge, pro-environmental self-identity and quality signals. The waste minimization perspective results in 13 criteria that belong to five aspects, namely, consumers' waste drivers, precaution activities, in-household management, awareness of consequences, and waste disposal activities. Last, the economic considerations perspective results in seven criteria belonging to five aspects consisting of economic benefits, price consciousness, local obstacles, functional values and personal values. The social concerns' top three criteria include sustainable issue interest at a value of 0.6710, environmentally-friendly consumer at 6.710 and readiness to reuse products at 0.6608. Waste minimization consists of the aspects of waste disposal activities, awareness of consequences, precaution activities and consumers' waste drivers. The top three waste minimization criteria include responsible waste disposal at 0.7971, environmental impact of food waste awareness at 0.6650 and social issues of food waste at 0.6650. Meanwhile, economic considerations end up with two criteria including product purchase based on healthy ingredients at 0.7805 and purchase based on nutrients at 0.5817, under the aspect of functional values. Based on the criteria weight, with regard to social concerns, the most significant aspect is consumers' pro-environmental self-identity. Under waste minimization, the most effective aspect is consumers' waste disposal activities. Last, the most significant aspect under economic considerations is functional values.

4.2 Results from choice experiment method

After conducting pretest interviews using an open-ended form with food industry experts, the financial attributes are obtained as follows: 7 USD, 18 USD, and 36 USD/person/year. These values are used to estimate the WTP to enhance SCT in the food industry through the establishment of the model. All attributes and levels are present in Table 4.

(INSERT Table 4 here - Attributes and levels of food waste policy establishment in Indonesia)

(INSERT Table 5 here - Estimated results of the conditional logit of the food waste)

This study fitted the CL model to 401 choice observations as a result of the CE method and used SPSS to obtain the number of cards required and NLOGIT 5 software to obtain the WTP results, as shown in Table 5. The model's log-likelihood of 70,69288 is higher than the chi squared indicating that the model fit is acceptable. The respondents' preferences for the SCT attributes based on the three perspectives are thereby elicited to obtain the corresponding WTP estimated values.

The results reveal the significant attributes at the 5% to 10% level as indicated by the estimated coefficient, the corresponding standard deviations and the T-values. In terms of the estimated WTP value for the perspectives, social concerns obtain 10.71 USD, waste minimization at 19.48 USD and economic considerations at 5.64 USD. In total, the consumers' estimated WTP for a sustainable consumption transition model is 35.84 USD. These economic values represent consumers' actual preferences for which attributes are more important to prioritize in order to develop the model.

5. Discussion

This section discusses the study's contributions to the theory and the industry through theoretical and managerial implications. The contributions are focused on the attempt to eliminate the gap between consumers' sustainable intentions represented by their WTP and their actual behaviors. The presentation of the theoretical implications in this section is based on the three perspectives used in the study. Meanwhile, the managerial implications' presentation is based on the top significant criteria from each perspective.

5.1 Theoretical implications

Based on the results using the CL model, this study found that the three perspectives are significant. Regardless of the socio-demographic attributes, the results show that social concerns, waste minimization and economic considerations are valid attributes to influence consumers' WTP toward the sustainable consumption transition model. In addition, there is a question as to whether socio-demographics consistently influence WTP as other attributes show higher significance (Katt & Meixner, 2020). More specifically, based on the WTP values, the social concerns and waste minimization perspectives are the significant attributes that contribute the most to the sustainable consumption transition model whereas economic considerations contribute the least. This finding indicates that the model should be improved by enhancing and focusing more on the aspects under the social concerns and waste minimization perspectives without neglecting the economic considerations perspective. Therefore, the theoretical contributions are discussed below based on the aspects under each of those perspectives.

5.1.1 Theoretical implication from social concerns perspective

Based on the results, the significance of social concerns perspective to the sustainable consumption transition model is proven and supported by several aspects. For instance, this study highlighted consumers' pro-environmental self-identity as the strongest influence, which is in line with a prior study on the positive influence of identity on consumers' intention (Dermody et al., 2018; Powell et al., 2019). Similarly, consumers' attitude is found to affect consumers' WTP and intention leading to sustainable behaviors, which is regularly found in prior studies (Ahamad & Ariffin, 2018; Feil et al., 2020). Another effective aspect is knowledge as consumers with higher

knowledge about the importance of environmental protection show a higher intention toward sustainable behaviors influencing their WTP. Conversely, a lack of knowledge is a common cause of failure in SCT as prior studies have found (Schanes et al., 2018; Dong et al., 2020). Last, consumers' egoistic values are found to also influence their WTP and intention. However, these values tend to result in negative effects resulting in the creation of a gap between consumers' intentions and actual behaviors (Dermody et al., 2018; Tseng et al., 2020). In sum, this study assumes the gap that has caused a gap between consumers' intentions and behaviors is due to consumers' egoistic values. This indicates personal values become more important than prioritizing the environmental impacts. Therefore, this study suggests the need for improvement and evaluation of the aspects with negative effects such as egoistic values and lack of knowledge to obtain better WTP toward SCT. Future studies can investigate deeper into what aspects or attributes activate consumers' egoistic values and low in knowledge.

5.1.2 Theoretical implication from waste minimization perspective

Based on the results, in contribution to the sustainable consumption transition model, waste minimization under the environmental perspective is found to be more significant as compared to other perspectives indicated by the WTP value being the highest. Prior studies support this finding and have suggested that waste minimization should be given more attention in the literature (Barone et al., 2019; Reynolds et al., 2019). More specifically, consumers' waste minimization WTP is affected the most by their waste disposal activities, which is in line with other studies on the positive influence toward consumers' intentions to reduce waste in their everyday consumption (Mondéjar-Jiménez et al., 2016; Ahamad & Ariffin, 2018; Filimonau et al., 2020). These results indicate that such activities represent consumer behaviors and require further exploration in the literature to achieve better SCT. Furthermore, this study found that consumers' awareness of the environmental consequences of their consumption affects their WTP. This result is similar to those other studies that have found a positive correlation between consumers with high awareness of waste impacts and better waste minimization behaviors (Willett et al., 2019; McCarthy et al., 2020; Hoque, 2021). A further impact from consumers' behaviors in waste minimization is also experienced by manufacturers with their concern regarding environmental impacts (Kumar et al., 2021). In sum, this study suggests that the intentions-behaviors gap is possible to be eliminated as long as consumers are made more aware of the environmental consequences which leads to engaging in proper waste disposing activities. Therefore, future studies can focus the investigation on how to increase the awareness among consumers.

5.1.3 Theoretical implication from the economic considerations perspective

The results for the economy considerations perspective show to have the least WTP value to contribute to the sustainable consumption transition model, indicating a low intention among consumers for changing economic attributes to obtain SCT. This low intention could be caused by the consumers' preference for lower prices or costs as the price attribute is still a key determinant for a decision making process (Henten & Windekilde, 2016; McCarthy et al., 2020). In contrast, this study found that price is not the most effective aspect to influence consumers' WTP. Instead, functional values are found to be the aspect with the strongest influence, which is in line with prior studies that highlighted the influence of instrumental benefits on consumers'

decisions (Yadav & Pathak, 2016; Coderoni & Perito, 2020). Functional values comprise benefits that consumers obtain from consuming a product such as health-related benefits. A recent study with a similar finding found that consumers with a juvenile's presence in the household tend to prefer functional values that provide health benefits over sustainability values (Feil et al., 2020).

In sum, from the economic considerations perspective, there is a potential to eliminate the intentions-behaviors gap by shifting the consumers' focus during a decision making process when choosing a product from the price to the functional values attached the product. Therefore, future studies should investigate how functional values of a product can synchronize with being sustainable.

5.2 Managerial implications

As a result of attempting to eliminate the gap between consumers' sustainable intentions and behaviors, the practical goal of SCT in this study is to lower the waste production rate and the amount of waste produced from food products in Indonesian landfills. The authorities, including food manufactures and the government, are fairly addressed as solution providers. As a result, this study contributes to the food industry by focusing on the top criteria from each perspective including consumers' sustainable issue interest (S1), environmentally-friendly consumers (S2), readiness to reuse products (S3), environmental impact of food waste awareness (W1), responsible waste disposal (W2), the social issues of food waste (W3) and product purchase based on healthy ingredients (E1) and nutrients (E2).

5.2.1 Solutions from the social concerns perspective

Specifically, the results indicate a high importance of raising consumers' interest in sustainable issues to reduce food waste production as it is affecting further behaviors. Practically, the authorities must ensure that consumers are first aware of environmental issues before focusing on building or raising their interest. This study suggests that the manufacturers and the government should be joined with environmental-focused communities to prepare an effective strategy, for example, in the form of a national campaign being included in the corporate social responsibility agenda. The collaboration that has been pursued with communities has mostly been philanthropic and does not offer long-term solutions. Thus, to obtain more effective results in reducing waste, in addition to building environmental awareness, such collaborative programs should concentrate on cultivating consumers' interest in sustainable issues. Programs should be focused on communicating messages related to the environmental issues such as the current situation of food waste in Indonesian landfills or involving outdoor or field activities with school students of young age to visit the local landfills. Such landfill visiting programs could potentially educate the young generations to act more responsibly with the food waste.

An effect of having sustainable interests is becoming an environmentally friendly consumer and engaging in fewer irresponsible behaviors. Generally, food waste is initiated from irresponsible intentions and behaviors among consumers, which causes SCT to fail. Therefore, this study suggests the need for consumers to change from engaging in irresponsible behaviors to engaging in environmentally friendly behaviors. However, making such a change is difficult and requires input from every other stakeholder including manufacturers, governments, private institutions and environment-focused communities. With regard to the government's role, manufacturers and consumers are under regulations that control non-environmentally-friendly

consumption behaviors such as issuing fines, the provision of environmentally friendly public facilities, license-to-operate withdrawal and legal consequences. An environmentally friendly context also influences changes in consumer behaviors. For instance, for young consumers, pursuing an education at an environmentally friendly institution from a young age potentially builds early awareness, which leads to positive behavior toward SCT. The government should also play a role by regulating that all educational institutions meet specific environmentally friendly criteria. Local focus communities can also potentially build widespread awareness through campaigns involving experts and communication strategies such as on-street movements, collaboration with social media public figures as speakers and the production of video documentaries about the reality of environmental challenges. **As for the food manufacturers, informative or instructive labelling on the product packaging should help the consumers with information on what is needed to be done with the packaging to avoid waste.**

Reusing products includes reusing a product's package instead of throwing it away as waste. Although many food products come with packages that can be reused, the manufacturers must be aware that consumers may not be ready to reuse the package. This is due to a lack of motivation and the fact that the package design may not offer a different purpose or have a pleasant look as a decorative item. The strategy that the manufacturers should take is to make changes in package designs that are versatile so that consumers will be motivated to keep or reuse them for different purposes. The government has a role in educating consumers through social marketing programs by introducing the benefits of sustainable practices based on practicality and environmental impacts. This study suggests that the practicality of reusing products can be taught through a series of workshops initiated by the government and supported by manufacturers as corporate social responsibility programs while collaborating with local communities. With regard to the environmental benefits, consumers should be educated concerning how giving a second purpose to products can potentially lower waste production rates in households.

In sum, from the social concerns perspective, this study contributes to developing a sustainable consumption transition model by suggesting that consumers' knowledge on environmental issues, consumers' sustainable interests and readiness to reuse products should be the key criteria to consider for the industry and government to make strategic programs.

5.2.2 Solutions from waste minimization perspective

Environmental impact is often dismissed by consumers when making a decision to consume a food product. This is due to a low level of awareness of the consequences of such behavior. Manufacturers are involved in the solution to increase the environmental impact awareness among consumers. For instance, product labels on product packaging should include information about how the product contributes to the environment either directly or indirectly. This can also be done by promoting social marketing campaigns about the environmental impact of each purchase of a product by placing the information clearly on the packaging. Another strategy is to educate consumers about the types of material used to package food products that have different environmental consequences. In the case of the environmental impact of food waste, consumers should be educated about various waste treatments that do not always put all types of food waste into a single bag or container before final disposal. The scope of awareness about the impact is not limited to how to dispose of a product after consumption; it also involves

not purchasing or consuming unsustainable products. There is potential to decrease food waste through a lower usage of packaging, for instance, by improving consumer awareness and education about the environmental impact of food consumption.

Responsible waste disposal by consumers is a behavior continuation of understanding a product's environmental impact. Behavior is directly related to reducing waste after consumption; therefore, this solution has significant importance in the food industry with regard to SCT. Although this solution is mostly relevant to the consumption stage, consumers are not the only stakeholders who have responsibility for waste disposal; the government also has a controlling role. A good system of waste disposal initiated by the government should motivate responsible behavior from consumers. For instance, the government should have clear restrictions for each household to separate waste prior to disposal to a waste truck provided by the government with a regular operating schedule. Each household or consumer should separate waste into different types: recyclable paper or plastic packaging and food waste or leftovers. The government can also provide two different types of waste trucks for the two different types of waste. Strict rules must be applied if consumers fail to follow the waste disposal instructions. Overall, this strategy should indirectly educate consumers over time until their behaviors eventually become more sustainable to improve SCT. Waste caused by food consumption in landfills is greatly affected by each consumer's responsible waste disposal in the household.

Food waste causes social issues within the community. The issues are related to world hunger in remote regions caused by a lack of food supplies. Therefore, wasting food that is still edible requires more attention in terms of practice. One way not to waste food is to avoid leftovers. Especially in restaurants, it is common for food leftovers to remain as there is not much of an option with regard to what to do with small amounts of food that are left on customers' plates that are too small for consumers to bring home with them. Some franchised restaurants have attempted to separate waste from leftovers and inorganic waste such as paper and plastic utensils. However, in the household, food leftovers are more difficult to control or monitor as more egoistic motivations must be taken into consideration. Many collaborative programs have been beneficial to societies with a hunger problem through food donations, especially during challenging seasons that experience crop failures. Using this awareness, future programs can focus on educating consumers and management about respecting societal hunger in restaurants through posters or social activities to inform them about food leftover avoidance.

In sum, from the waste minimization perspective, this study suggests that the sustainable consumption transition model should include raising awareness of waste consequences on the environment, encouraging responsible waste disposals and promoting social issues of food waste. The government and the industry should emphasize their programs on these three criteria in order to minimize waste.

5.2.3 Solutions from economic considerations perspective

Purchasing a product based on healthy ingredients and nutrients is another strategy to enhance SCT. Often, price comes before health considerations, which explains how waste remains an environmental problem in the food industry due to irresponsible purchases. This study shows that a health-orientation among consumers leads to a healthy lifestyle. The challenge is to motivate consumers to purchase products that are beneficial for their health. This study suggests that the solution to motivating consumers is through education. For instance,

authenticity statements from a health-centered association should be used to educate consumers to become more aware of healthy consumption. Mass media and social media are ideal ways to reach the most consumers. These statements will be perceived as unbiased because they do not represent a certain manufacturer but rather represent the entire industry. Since food consumption is a necessity for survival, the arguments should not focus on avoiding consumption but rather on being smart about consumption. Being a well-educated consumer who makes health-based decisions when purchasing products is related to having a good understanding of the importance of being an environmentally responsible consumer in general. From the production side, this study suggests that manufacturers should create products that not only provide health related benefits to consumers but also obtain environmentally-friendly impacts.

In sum, this study suggests that the authorities should focus on raising consumers' interest in sustainable issues, which would result in environmentally-friendly consumers and raise their readiness to reuse products. As an effect, consumers would become aware of the environmental consequences from their food consumption, which would in turn influence their responsible disposal of food waste and the management of their food leftovers to counter social issues. Furthermore, manufactures should produce more sustainable food products that contain healthy ingredients and nutrients so that the SCT goal can be achieved completely whereby the environment is protected and human well-being is ensured at the same time. Finally, a long-term collaboration with environmental-focused communities is also recommended for the authorities. **If done strategically, this sustainable consumption transition model can be implicated to close the consumers' intentions and behaviors gap.**

6. Conclusion

The literature has attempted to address sustainable consumption in the food industry. More often, the focus has been on production and consumption. However, this study has given great attention to the consumption side of the transition toward sustainable consumption; therefore, the focus is on consumer behaviors. By focusing on the gap between consumers' intentions and behaviors, this study assesses a set of attributes to propose a sustainable consumption transition model from the perspectives of a triple bottom line.

WTP is used to measure consumers' intentions and how far intention extends to actual sustainable behaviors. This intentions-behaviors gap has been the main reason for environmental problems, especially those related to landfill waste. Indonesia has become the second most waste-contributing country due to waste produced from food products. From year to year, Indonesian landfills generate more food waste at a higher rate. In an attempt to solve the problem based on the consumer's role, this study uses the FDM and CE method. While the FDM works to eliminate the less significant attributes from the extant literature, the CE method analyzes consumers' preferences. These preferences are based on the economic values represented by WTP values. The results indicate that the higher the WTP value, the higher the consumers' intention toward SCT.

In the findings, FDM selected 32 criteria that are the significant attributes set spread under the perspectives of social concerns, waste minimization and economic considerations. Based on the weight ranking, the top criteria under social concerns perspective include consumers' sustainable issue interest, environmentally-friendly consumers and readiness to

reuse products. With regard to waste minimization perspective, the top criteria are consumers' awareness of environmental impact, responsible waste disposal and social issues of food waste. Last, under economic considerations perspective, the top criteria relate to product purchase based on healthy ingredients and nutrients. In terms of the results from the CE method, this study found that all three perspectives are significant to influence consumers' WTP for improving SCT. More specifically, the results show that the waste minimization perspective obtains the highest WTP value of 19 USD, while social concerns and economic considerations receive WTP values of 10 USD and 6 USD, respectively.

Based on the results, the theoretical contribution comprises the aspects under social concerns, waste minimization and economic considerations perspectives. This study suggests a set of valid aspects under social concerns including consumers' pro-environmental self-identity, attitude, knowledge and egoistic values to improve SCT. Under waste minimization, the suggested set of valid aspects includes waste disposal activities and awareness of consequences. With regard to economic considerations, this study suggests the aspect of functional values. The combination of these sets is focused on the role of consumers in SCT; therefore, studies on consumer behaviors should incorporate more of the aspects set.

The practical contribution of this study consists of criteria including consumers' sustainable issue interest, environmentally-friendly consumers, readiness to reuse products, responsible waste disposal, the environmental impact of food waste, the social issues of food waste and product purchase based on healthy ingredients and nutrients. With these criteria, this study provides insights to manufacturers and the government in collaboration with focused communities to support the improvement of SCT. Furthermore, if done effectively, the combination of the valid attributes forming the sustainable consumption transition model should be able to reach the SCT goal, which is the reduction of food waste products in Indonesian landfills.

This study has a number of limitations. First, theoretical attributes are centered on social, environment and economy perspectives, which in future studies could be improved by including an extended perspective such as technology or using a different set of aspects and criteria. Moreover, the consumer point of view in this study can be extended to other stakeholders such as the manufacturer and the government. Second, the methodology is limited to measuring the attributes' significance. Future studies can analyze the relationships among all the attributes using different methodologies. Last, the industry addressed here is limited to the food industry in Indonesia. Therefore, the results cannot be used for different industries and different countries. Overall, there is room for improvement by future studies by involving multi-perspective attributes and various methods.

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Table 1.
SCT attributes

| Perspective | Aspects | Criteria | Reference | |
|--------------------|---------------------------------|----------|---|---|
| Social concerns | Consumers' motivation | C1 | Health concern | Jaeber-Erben et al. (2015); Ahamad et al. (2018); Dermody et al. (2018); Dong et al., 2020; Feil et al. (2020); Sigurdsson et al. (2019); Filimonau et al., 2020; Notarnicola, 2017 |
| | Consumers' attitude | C2 | Readiness to reuse products | |
| | Egoistic values | C3 | Social power | |
| | | | Authority role | |
| | | | Consumers' wealth | |
| | Consumers' knowledge | C6 | Knowledge of environmental issues | |
| | | | Knowledge of environmental solutions | |
| | | | Knowledge of effect of environmental problems | |
| | | | Environmentally-friendly consumer | |
| | Pro-environmental self-identity | C9 | Sustainable issue interest | |
| | | C10 | Knowledge on sustainable purchasing | |
| | Quality signals | C12 | Consumers' ratings | |
| | | | Consumers' reviews | |
| | | | | |
| Waste minimization | Consumers' waste drivers | C14 | In-store behavior | Bravi et al. (2020); Ahamad et al. (2018); Read et al. (2020); McCarthy et al. (2020); Willett et al. (2019); Tseng et al., 2020 |
| | | C15 | Storage practices | |
| | | C16 | Expiry date concern | |
| | Precautious activities | C17 | Reuse of leftovers | |
| | | | Packaging reusing | |
| | Consumption stages | C19 | Household consumption pattern | |
| | Food waste consequences | C20 | Environmental impact of food waste | |
| C21 | | | Social issue of food waste | |

| | | | | |
|-------------------------|----------------------------|-----|---|---|
| | Waste disposing activities | C22 | Responsible waste disposal | |
| | | C23 | Bring own reusable bags | |
| | | C24 | Bring own reusable water bottle | |
| | | C25 | Product recycling | |
| | | C26 | Over consumption avoidance | |
| Economic considerations | Economic benefits | C27 | Ability to save money | Dabbous & Tarhini (2019); McCarthy et al. (2020); |
| | Price consciousness | C28 | Price checking | Ozturk & Akoglu (2020); Feil et al. (2020); Coderoni & Perito (2020); |
| | Local obstacles | C29 | Accessibility to local resources | Ahamad et al. (2018) |
| | Functional values | C30 | Product purchase based on nutrients | |
| | | C31 | Product purchase based on healthy ingredients | |
| | Quality consideration | C32 | Product quality over price | |

Table 2.

Linguistic terms transformation table

| Linguistic terms (performance/importance) | Corresponding triangular fuzzy numbers |
|---|--|
| Extreme | (0.75, 1.0, 1.0) |
| Demonstrated | (0.5, 0.75, 1.0) |
| Strong | (0.25, 0.5, 0.75) |
| Moderate | (0, 0.25, 0.5) |
| Equal | (0, 0, 0.25) |

Table 3.

FDM – criteria screening out

| No. | l_b | u_b | D_b | Decisions | Aspects |
|-----|-----------|--------|--------|-----------|-----------------------------------|
| C1 | (0.3880) | 0.8880 | 0.3470 | Accepted | Consumers' motivation |
| C2 | (0.3010) | 0.8010 | 0.3253 | Accepted | Quality signals |
| C3 | (0.2975) | 0.7975 | 0.3244 | Accepted | Quality signals |
| C4 | (0.3098) | 0.8098 | 0.3275 | Accepted | Consumers' attitude |
| C5 | 0.0087 | 0.8663 | 0.4353 | Accepted | Egoistic values |
| C6 | (0.3321) | 0.8321 | 0.3330 | Accepted | Egoistic values |
| C7 | (0.2906) | 0.7906 | 0.3226 | Accepted | Egoistic values |
| C8 | 0.0672 | 0.8078 | 0.4207 | Accepted | Consumers' knowledge |
| C9 | (0.2823) | 0.7823 | 0.3206 | Accepted | Consumers' knowledge |
| C10 | 0.0373 | 0.8377 | 0.4282 | Accepted | Consumers' knowledge |
| C11 | 0.0087 | 0.8663 | 0.4353 | Accepted | Pro-environmental self-identity |
| C12 | (0.0064) | 0.8814 | 0.4391 | Accepted | Pro-environmental self-identity |
| C13 | (0.0064) | 0.8814 | 0.4391 | Accepted | Pro-environmental self-identity |
| C14 | (0.2743) | 0.7743 | 0.3186 | Accepted | Waste disposing activities |
| C15 | (0.3725) | 0.8725 | 0.3431 | Accepted | Waste disposing activities |
| C16 | 0.3293 | 0.9207 | 0.5427 | Accepted | Waste disposing activities |
| C17 | 0.0191 | 0.8559 | 0.4327 | Accepted | Waste disposing activities |
| C18 | (0.3663) | 0.8663 | 0.3416 | Accepted | Waste disposing activities |
| C19 | (0.3620) | 0.8620 | 0.3405 | Accepted | Consumers' waste drivers |
| C20 | 0.0087 | 0.8663 | 0.4353 | Accepted | Consumers' waste drivers |
| C21 | (0.2906) | 0.7906 | 0.3226 | Accepted | Consumers' waste drivers |
| C22 | (0.3026) | 0.8026 | 0.3257 | Accepted | Consumers' precautious activities |
| C23 | 0.0025 | 0.8725 | 0.4369 | Accepted | Consumers' precautious activities |
| C24 | 0.0025 | 0.8725 | 0.4369 | Accepted | Consumption stages |
| C25 | 0.3043 | 0.9457 | 0.5489 | Accepted | Waste consequences |
| C26 | 0.0274 | 0.8476 | 0.4306 | Accepted | Waste consequences |
| C27 | (0.2940) | 0.7940 | 0.3235 | Accepted | Quality consideration |
| C28 | (0.3026) | 0.8026 | 0.3257 | Accepted | Economic benefits |
| C29 | (0.2711) | 0.7711 | 0.3178 | Accepted | Price consciousness |
| C30 | (0.2857) | 0.7857 | 0.3214 | Accepted | Local obstacles |
| C31 | (0.2743) | 0.7743 | 0.3186 | Accepted | Functional values |
| C32 | (0.3189) | 0.8189 | 0.3297 | Accepted | Functional values |
| | Threshold | | 0.5112 | | |

Table 4.

Attributes and levels of food waste policy establishment in Indonesia

| Perspective | Levels |
|-------------------------|--|
| Social concerns | <ol style="list-style-type: none"> 1. Care about product quality 2. Environmentally-friendly and care about product environmental impact |
| Waste minimization | <ol style="list-style-type: none"> 1. Landfill is waste disposal and food waste is normal to happen 2. Food waste is an environmental issue which increases responsible waste disposal by the consumer |
| Economic considerations | <ol style="list-style-type: none"> 1. Price and product reputation are more attractive 2. Consumer purchases a product based on health ingredients and nutrients |
| Donation/person /year | <ol style="list-style-type: none"> 1. 0 USD 2. 7 USD 3. 18 USD 4. 36 USD |

Table 5.

Estimated results of the conditional logit of the food waste

| Perspective and Levels | Conditional Logit Model | | | |
|--|-------------------------|------------------|----------|--------------|
| | Coefficient | Coefficient Std. | T-Value | Marginal WTP |
| Social concerns | 0.2459*** | 0.0389 | 6.31*** | 10.71 |
| Waste minimization | 0.4472*** | 0.0569 | 7.86*** | 19.48 |
| Economic considerations | 0.1295** | 0.0525 | 2.47** | 5.64 |
| Sustainable consumption transition model | -0.00000*** | 0.0000 | -4.58*** | 35.84 |
| Number of choice sets | 1,203 | | | |
| Log-likelihood | 70.69288 | | | |
| Chi squared | 16.811894 | | | |

*** significance at the 1% level; ** significance at the 5% level; * significance at the 10% level.

Appendix

Appendix A. Attributes before FDM

| Perspectives | Aspects | Criteria | Description | References | |
|-----------------|-----------------------|-------------------|-----------------------------------|---|---|
| Social concerns | Consumers' motivation | 1 | Health concern | Human health is affected by the food consumption | Feil et al. (2020); Ahamad et al. (2018); Dermody et al. (2018); Dong et al. (2020); Sigurdsson et al. (2019); Filimonau et al., 2020 |
| | | 2 | Opinions from other consumers | Opinions given by other consumers | |
| | | 3 | Prior purchase by other consumers | Prior purchase by other consumers | |
| | | 4 | Effect to self-image | Effect of brand or product to self-impressions | |
| | Quality signals | 5 | Product rating | Rating given by other consumers affect future purchase | |
| | | 6 | Product review | Review given by other consumers affect future purchase | |
| | | Authority signals | 7 | Product advertising | |
| | 8 | | Product endorsement | Product endorsed by public figures | |
| | Status seeking | 9 | Name-brand purchase | Name-brand purchase is a good way to distinguish people from others | |
| | | | 10 | Mutual liking | |
| | | 11 | Sense of prestige | Name products and brands purchase bring a sense of prestige | |

| | | | |
|---------------------------------|----|--------------------------------------|---|
| Consumers' perception | 12 | Effect to society | Effect of brand or product to society |
| | 13 | Perception on organic food | Organic food is perceived to be healthy |
| Consumers' attitude | 14 | Readiness to reuse products | Consumers' readiness to reuse products |
| | 15 | Purchasing frequency | Frequency of purchasing sustainable products |
| Egoistic values | 16 | Social power | Social relations gives some influences |
| | 17 | Authority role | Authority has control over consumption |
| Consumers' knowledge | 18 | Consumers' wealth | Consumers' financial wealth |
| | 19 | Knowledge of environmental issues | Consumers' general knowledge of environmental issues |
| | 20 | Knowledge of environmental solutions | Consumers' knowledge of solutions to environmental problems |
| | 21 | Knowledge of effect to environment | Consumers' knowledge of impacts of environmental problems |
| Pro-environmental self-identity | 22 | Environmentally-friendly consumer | Being an environmentally-friendly consumer |
| | 23 | Sustainable issue interest | Having attention to the environmental issues |
| | 24 | Knowledge on sustainable purchasing | Purchasing of environmental products |

| | | | | | |
|--------------------|----------------------------|----|--|---|---|
| | | 25 | Packaging-less product purchasing | Purchasing of products with less packaging | |
| Waste minimization | Waste disposing activities | 26 | Over consumption avoidance | Avoiding the practice of overconsumption | Bravi et al. (2020); Ahamad et al. (2018); Read et al. (2020); McCarthy et al. (2020); Willett et al. (2019); Tseng et al. (2020) |
| | | 27 | Attending environmental seminars | Attending seminars about the environment | |
| | | 28 | Advise others of consumption reduction | I advise others (i.e. family, friends) to reduce consumption of resources (e.g. water, electricity) | |
| | | 29 | Bring own reusable bags | Usage of own reusable bag for shopping | |
| | | 30 | Bring own reusable water bottle | Usage of own reusable water bottle when going out | |
| | | 31 | Recyclable products purchasing | Purchasing of recycle products | |
| | | 32 | Responsible waste disposal | Waste disposal in a responsible manner | |
| | | 33 | Keeping potted plants | Keeping plants in pots in the household | |
| | | 34 | Personal involvement | Willingness to be involved in any program to care for the environment | |
| | | 35 | Organizational involvement | Involvement in environmental organizations | |
| | | 36 | In-store behavior | In-store behavior refers to all activities occurring before and during food purchasing. | |
| | | 37 | Storage practices | Storage practices are mainly | |
| | | | Consumers' waste drivers | | |

| | | | |
|-----------------------------------|----|--------------------------------------|--|
| | | | related to the consumers' abilities to correctly store and preserve food after having purchased it |
| | 38 | Food management based on expiry date | Eating habits and consumers' abilities in preparing and consuming meals based on the expiration date |
| Consumers' precautions activities | 39 | Reuse of leftovers | Reusing leftover food |
| | 40 | Planning and checking stocks | Planning and checking food stocks before making purchases |
| | 41 | Packaging reusing | Reusing products that are not sustainable |
| | 42 | Product recycling | Recycling products that are not sustainable |
| | 43 | Product reduction | Reducing products that are not sustainable |
| Consumption stages | 44 | Household consumption pattern | Regular consumption in households |
| | 45 | Restaurant consumption | Foodservice industries include restaurants |
| | 46 | Institutional consumption | Institutions include hospitals, schools, and governments |
| Convenience orientation | 47 | RTE foods consumption | Consumption of RTE foods in the household |
| | 48 | Frozen foods consumption | Consumption of frozen foods |

| | | | | | |
|-------------------------|-----------------------|----|---|--|---|
| | | 49 | Home delivery foods consumption | Consumption of foods delivered to home | |
| | Waste consequences | 50 | Environmental impact of food waste | Food waste is a big environmental issue | |
| | | 51 | Social issue of food waste | Food waste is an important social issue | |
| Economic considerations | Quality consideration | 52 | Quality of local food | Local food has good quality | Dabbous & Tarhini (2019); |
| | | 53 | Organic food purchasing | Purchasing based on quality of organic food | McCarthy et al. (2020); |
| | | 54 | Food quality over price | Purchasing based on the quality over the lower price | Ozturk & Akoglu (2020); Feil et al. (2020); |
| | Economic benefits | 55 | Ability to save money | Food waste management saves money | Dermody et al. (2018) |
| | | 56 | Price competitiveness | Price competitiveness in different markets | |
| | | 57 | Brand competitiveness | Different brands for similar products | |
| | Price consciousness | 58 | Price checking | Check on price before purchasing | |
| | Local obstacles | 59 | Local resources depending on season | Locally made food depends on the season | |
| | | 60 | Accessibility to local resources | Local resources are easy to access | |
| | | 61 | Local product purchasing preferences | Purchasing of products produced locally | |
| | Functional values | 62 | Product purchasing based on the nutrients | Purchasing products based on the nutrients contained in the food | |
| | | 63 | Product purchasing | Purchasing products based | |

based on the
healthy
ingredients

on the healthy
ingredients

Appendix C.

Experts demographics

| No. | Position | Length of work (in years) | Formal education |
|-----|-----------------------------|---------------------------|------------------|
| 1 | Chief of operation | 25 | Master degree |
| 2 | Marketing manager | 11 | Doctoral degree |
| 3 | Product development manager | 10 | Master degree |
| 4 | Marketing manager | 8 | Master degree |
| 5 | Product quality manager | 8 | Master degree |
| 6 | Purchasing executive | 6 | Master degree |
| 7 | Lecturer | 15 | Doctoral degree |
| 8 | Lecturer | 11 | Doctoral degree |
| 9 | Lecturer | 8 | Doctoral degree |
| 10 | Lecturer | 7 | Master degree |

Appendix D.

Sustainable Food Consumption Questionnaire - 1

Dear Sir or Madam,

Thank you for taking the time to fill out this questionnaire.

This questionnaire is part of research by Institute of Innovation and Circular Economy, Asia University, Taiwan, about sustainable food consumption. Your given information will not be misused other than for the research and will be kept confidential. Please feel free to fill it out.

Thank you,
Research team

I. Respondent profile

Please choose one from the options in each question.

1. Age

- < 18
- 18 – 22
- 23 – 27
- 28 – 32
- > 32

2. Gender

- Female
- Male

3. Current city to live in

4. Average expense per month

- < US\$68.5
- US\$68.5 – US\$205
- US\$206 – US\$342
- US\$343 – US\$480
- > US\$480

5. Education level

- High school
- Vocational degree
- Bachelor degree
- Master degree
- Doctoral degree

II. Preference of food waste policy criteria

Choose a situation down below based on the willingness-to-pay yearly donation by considering the social, environmental and economic criteria for assisting the authority in establishing a policy on food waste.

Set1

| Perspective | Current situation | Alternative situation 1 | Alternative situation 2 |
|--|--|---|--|
| Social concerns | Consumer who is not an environmental activist and cares more about product quality | Consumer who is not an environmental activist and cares more about product quality | Consumer who is not an environmental activist and cares more about product quality |
| Waste minimization | Landfill is waste disposal and food waste is normal to happen | Food waste is an environmental issue which increases responsible waste disposal by the consumer | Landfill is waste disposal and food waste is normal to happen |
| Economic considerations | Price and product reputation are more attractive | Price and product reputation are more attractive | Consumer purchases a product based on health ingredients and nutrients |
| How much to pay/donate for sustainable consumption transition model? | US\$0 | US\$7 | US\$18 |
| Please choose one | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

Set2

| Perspective | Current situation | Alternative situation 1 | Alternative situation 2 |
|--|--|---|---|
| Social concerns | Consumer who is not an environmental activist and cares more about product quality | Consumer who is not an environmental activist and cares more about product quality | Consumer who is being environmentally-friendly and cares about product environmental impact |
| Waste minimization | Landfill is waste disposal and food waste is normal to happen | Food waste is an environmental issue which increases responsible waste disposal by the consumer | Landfill is waste disposal and food waste is normal to happen |
| Economic considerations | Price and product reputation are more attractive | Price and product reputation are more attractive | Consumer purchases a product based on health ingredients and nutrients |
| How much to pay/donate for sustainable consumption transition model? | US\$0 | US\$7 | US\$7 |
| Please choose one | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

Set3

| Perspective | Current situation | Alternative situation 1 | Alternative situation 2 |
|--|--|---|---|
| Social concerns | Consumer who is not an environmental activist and cares more about product quality | Consumer who is not an environmental activist and cares more about product quality | Consumer who is being environmentally-friendly and cares about product environmental impact |
| Waste minimization | Landfill is waste disposal and food waste is normal to happen | Food waste is an environmental issue which increases responsible waste disposal by the consumer | Food waste is an environmental issue which increases responsible waste disposal by the consumer |
| Economic considerations | Price and product reputation are more attractive | Price and product reputation are more attractive | Price and product reputation are more attractive |
| How much to pay/donate for sustainable consumption transition model? | US\$0 | US\$7 | US\$18 |
| Please choose one | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

✘ After the questionnaire is completed, please check again to ensure that no answers are missing. Finally, thank you for your assistance, and stay healthy ✘