Determinants of household’s intention of practicing sustainable food waste management in Malaysia

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Abstract. The issue of food waste continues to be a challenge especially when it comes to practicing sustainable food waste management in Malaysia. Much attention is needed to overcome the issue of food waste in order to make changes towards the current situation. Therefore, this study aims to analyze the factors related to the urban households’ intention towards sustainable food waste management in Malaysia. Data from 200 respondents was collected through an online survey using purposive sampling method. Thereafter, factor analysis was adopted to analyze the relationship between the factors influencing the intention of households to practice sustainable food waste management. Descriptive analysis showed that respondents from the survey had high intention of practicing sustainable food waste management and the majority of the respondents claimed that it would reduce environmental harm. Based on the factor analysis, the determinants related to the households’ intention of practicing sustainable food waste management were attitude, subjective norm, perceived behavioural control, and intention of reducing food waste. To curb the growing issues of food waste, local authorities have implemented various strategies and campaigns to create awareness as well as ensuring practices to reduce local food waste, such as waste segregation laws, building anaerobic digesters for food courts, composting facilities, the MY Save Food initiative, and others. However, the efforts and the efficiency of the local authority to minimize local food waste are still under observation. Perhaps, all levels of the community should increase their cooperation to provide the drive towards a zero-food waste culture in Malaysia.

1. Introduction

In Malaysia, the amount of food wastage produced shows a rapid growth and is becoming a worrisome problem. In 2005, the estimated food waste thrown by Malaysians was about 3.12 million tonnes per annum or 45% from the total solid waste [1]. SWCorp [2] reported that the estimated waste production in Malaysia is about 17 thousand tonnes per day or 6.205 million tonnes per annum by 2020. It is assumed that the waste composition in Malaysia still remains at 44.5% (based on year 2018) and the food waste being generated in Malaysia is estimated to be at least 2.761 million tonnes per annum in 2020. This huge amount of food waste produced by Malaysians should be viewed as a warning for the society to curb this growing problem urgently.
Malaysia’s food waste production shows a critical increasing trend, recording a twofold increase from 8,550 tonnes per day in 2005 to 16,688 tonnes per day in 2018. In addition, the food waste in 2018 was recorded at 55% of the total solid waste, reflecting a bad food habit in Malaysia. This alarming rate of food waste could pose a drawback to the issue of food sovereignty, economic development, and environmental sustainability [3]. According to SWCorp [2], the sources of food waste generated by Malaysians mainly originated from households, night markets, food bazaars, food courts, and other food and beverage sectors. Furthermore, SWCorp also estimated that during festive seasons such as Ramadan usually contribute to an increase in the amount of food being wasted in Malaysia, resulting in an additional 15% to 20% increase in food waste production.

According to Jereme, Chamhuri, Rawshan & Basri [4], the main contributor of food waste in Malaysia is generated from households amounting up to 38.32% from the total estimated food waste. Besides that, Abdul [5] claimed that improvements in the standard of living in Malaysia and higher purchasing power of consumers have provided wider options and a wide variety of choices in their food demand, which created the habit of making purchases beyond their need resulting in the household food waste scenario to worsen. Furthermore, Brook [6] and Jereme et al. [4] also claimed that income levels can be one of the determinants of food waste produced by households. The authors found that the food waste in urban areas is higher than its rural counterpart due to their differences in income levels. In fact, the rapid growth of population and increase of urbanisation in Malaysia are also an important factor, relating to the households’ food waste [7].

Based on SWCorp [2], the monthly food waste thrown by an average Malaysian household of five people was estimated to worth RM 225 or about 25% of their total monthly food expenditure. This amount is equivalent to about seven 10 kg-bags of rice or 130 litres of petrol. Besides that, the daily avoidable food waste thrown by Malaysian urban population was estimated to reach 3 thousand tonnes per day or can feed about 2.2 million people in Malaysia. This implies a serious need to focus on waste reduction and more effort towards curbing daily food waste generation. The society should show more appreciation towards food production and maximize food utilization. Perhaps, by increasing the household’s awareness and knowledge of food waste management can be the first step for the urban society to reduce their food waste volume. In order to reduce food waste, there is a crucial need to increase the urban households’ intention to practice sustainable food waste management. Hence, this study aims to analyze the factors related to the intention of urban households to practice sustainable food waste management.

2. Methodology and data collection
An application of analytical tools with grounded theory is well developed in the designated framework based on several variations and context. The conceptual framework of Theory of Planned Behaviour (TPB) from Ajzen [8] is to be adapted and modified to analyze the factors relating to the urban households’ intention to practice sustainable food waste management. The independent variables applied are selected factors from the literature regarding the intention in terms of social and psychological aspects. The determinants in personal norms of social aspects are included, namely individual behaviour, lack of knowledge, skills and awareness in practicing sustainable food waste management. The psychological aspects are motivation dependent and normative values that mainly focus on the ethical consideration and environmental awareness.

Figure 1 shows the factors that influence the households’ intention to practice sustainable food waste management. Firstly, the food waste attitude is related to the knowledge and the household’s assessment on food waste management behaviour. If the household evaluates the food waste behaviour as negative then it would be highly possible that they believe to have the motivation and are more likely (intention) to practice sustainable food waste management. Secondly, the subjective norms imply the feelings or thoughts of another household member or their significant others' support which encourage them to execute the behaviour. If the household is easily influenced by people whom they deem as important, they will engage in a higher intention to perform sustainable food waste management. Thirdly, the perceived behavioural control in TPB explains the barriers outside one’s
own control or as one’s perceived ability to self-manage their own action [9]. Sometimes, perceived behavioral control (PBC) is also defined as self-efficacy in which a person reflects self-confidence on their abilities to engage in the behavior [10]. In this study, the PBC is included to assess the convenience of households to manage food waste, such as “It is very easy for me to manage food waste in my home”. If the household perceived managing food waste is easy, then they will have a higher intention to practice food waste management. Lastly, the intention of reducing food waste was added to the framework. This factor is considered important to justify either the person cares about the amount of food waste they themselves generate. If the person has the intention to reduce food waste then they will most likely practice food waste management.

![Conceptual framework of factors influencing households’ intention of practicing sustainable food waste management.](image)

2.1. Data collection
This research was conducted using an online questionnaire survey through the SurveyMonkey website. A total sample size of 200 respondents were collected from October until December 2019. Purposive sampling method was adopted for this study due to the larger sampling frame in Malaysia.

2.2. Questionnaire design
In this study, the questionnaire was designed to examine the factors influencing the households’ intention to practice sustainable food waste management based on the conceptual framework as discussed in Figure 1. The questionnaire was distributed to 200 respondents with different age, gender, education level, occupation, and income level. The questionnaire was designed to have two main sections which are section A and B. Section A includes questions enquiring on the respondents’ demographic profile. Section B gathers data on the factors related to the respondents’ intention to practice sustainable food waste management as discussed in the conceptual framework and modified from the questionnaire proposed by Zainal and Hassan [11]. In Section B, there are 4 sub sections, i.e. attitude on food waste reduction, perceived behavioural control on practicing food waste management, subjective norms, and the intention to reduce food waste. All questions in section B were designed based on the 5 point Likert scale, which are 1 = strongly disagree, 2 = disagree, 3 = neither agree nor disagree, 4 = agree, and 5 = strongly agree.

3. Findings and Discussion

3.1. Demographic profile of the respondents
In this study, 54% of the total respondents were female and 46% were male respondents. The majority of respondents (59 persons) who participated in this survey were under the age group of 30 to 39 years.
old. Most of the respondents hold either a Diploma and/or a Bachelor’s degree (139 persons) in their respective education level. In the category of occupation, 38% of the respondents worked in the private sector, 25.5% worked in the public sector, and the others covered 36.5%. Besides that, 81.5% of the respondents’ household size was not more than 5 persons and only 3 respondents answered that their family size had at least 11 persons. Furthermore, 46.5% of the respondents had a household income of below RM 5,000 per month (categorized under the B40 income category in Kuala Lumpur), 36.5% within the range of RM 5,000 to RM 7,000 (M40), and 17% of the respondents had their household income above RM 7,000 per month (T20).

The questionnaire items to gauge the respondents’ intention to practice sustainable food waste management were closed-ended questions. The survey showed that 95% of the respondents had the intention to practice sustainable food waste management (190 persons). However, a small percentage of respondents (5% or 10 persons) did not intend to practice sustainable food waste management because of time-consuming factors or they have limited time to continuously involved in food waste management activities. Besides that, other respondents mentioned the process was complicated and simply had no interest.

In the survey, 79.5% or 159 respondents agreed that sustainable food waste management is capable of curbing environmental harm (Table 1). The second benefit that can be gained from sustainable food waste management is the cost-saving element. As many as 127 respondents agreed that sustainable food waste management can cut the cost of food expenditure or be able to generate side income for them. However, 36.5% of the respondents did not agree that practicing sustainable food waste management can bring any monetary benefit to them. Moreover, the majority of the respondents did not believe that sustainable food waste management could contribute to food availability. Around 68% of the respondents (136 persons) disagreed that practicing sustainable food waste management could feed hungry people and only 32% (64 persons) gave a positive response to this statement.

### Table 1. Summary of the respondents’ feedback on the benefit gained from sustainable food waste management.

| Feedback | Types of benefit | Save cost | Feed hungry people | Reduce environmental harm |
|----------|-----------------|-----------|--------------------|--------------------------|
| Agreed   | 127             | 63.5%     | 64                 | 32.0%                    | 159                      | 79.5%                   |
| Disagreed| 73              | 36.5%     | 136                | 68.0%                    | 41                       | 20.5%                   |
| Total    | 200             | 100       | 200                | 100                      | 200                      | 100                     |

### 3.2 Factor analysis

In this study, the KMO test showed 0.814 (greater than 0.6) and implies that the sample data is adequate. This was confirmed by the Bartlett’s test whereby the p-value is lower than the 5% significance level and thus, rejecting the null hypothesis. In this study, factor analysis was adopted to analyze the factors related to the households’ intention of practicing sustainable food waste management and the summary of findings is as shown in Table 2. The results showed that there are 4 main factors related to the intention of practicing sustainable food waste management, i.e. the food waste attitude, subjective norms, perceived behavioural control, and the intention of reducing food waste. The accumulated variance for these four factors is explained by about 64.703%, indicating that there remains 35.297% of variance which is not explained in the model. Each factor contribute different percentages of variance, i.e. attitude (20.646%), intention to reduce food waste (17.691%), subjective norms (13.233%), and perceived behavioural control (13.133%). This findings supported by the Zainal and Hassan [11] which also found that these four factors are significant affect to the households’ food waste behaviour.
Table 2. Summary of Factor Analysis.

| Items                                                                 | Factor loading |
|----------------------------------------------------------------------|----------------|
| 1. In my opinion, wasting food is extremely negative.                 | 0.855          |
| 2. In my opinion, loading the environment with my household’s food waste is extremely negative. | 0.750          |
| 3. In my opinion, wasting food is extremely foolish.                  | 0.657          |
| 4. In my opinion, loading the environment with my household’s food waste is extremely harmful. | 0.696          |
| 5. I think engaging in food waste behaviour is very bad.              | 0.561          |
| 6. I am very likely to reduce food waste in my home by next week.     | 0.859          |
| 7. My intention to reduce food waste in my home by next week is very positive. | 0.798          |
| 8. I intend to reduce food waste consistently.                       | 0.739          |
| 9. I will follow the important person to me and reuse all leftovers to reduce food waste. | 0.860          |
| 10. I will follow the important person to me and recycle the food waste, such as composting. | 0.729          |
| 11. I will take initiative to reduce food waste in my daily life.     | 0.810          |
| 12. I have strong self-discipline to prevent generating food waste.  | 0.659          |
| 13. I can control myself not to throw food easily.                   | 0.548          |

Variance (%) 20.646 17.691 13.233 13.133
Accumulate Variance (%) 20.646 38.337 51.570 64.703

Note: F1 = Attribute; F2 = Intention to reduce food waste; F3 = Subjective Norms; and F4 = Perceived Behavioural Control.

The factor of attribute showed that respondents agreed that food wastage brings a negative impact and harm the environment. Respondents claimed that when they are involved in food wastage behaviour, it will cause them to feel very bad. This finding is supported by Pan et al. [12] which the attitude is an important factor to determine the intention. Besides, the factor analysis also showed that the respondents are willing to reduce their food waste by next week and intend to engage in this behaviour periodically. Meanwhile, if an important person suggests the respondent should reuse their leftovers and/or should recycle their food waste (e.g. composting) to reduce their overall household food waste, the respondent is more likely to follow. Yet, the perceived behavioural control factor showed that most of the respondents can have self-efficacy to avoid generating food waste and they also feel comfortable controlling themselves not to throw food easily.

4. Policy Implications
Most of the respondents intend to practice sustainable food waste management and believe that food waste management can reduce their cost of food expenditure as well as good for reducing environmental harm. From the factor analysis result, it can be interpreted that respondents are easily influenced by their perceived important people such as friends and family. Hence, the government should organize more campaigns to influence the society at all levels to participate in sustainable food waste management activities. Since respondents have a strong perceived behavioural control to
practice sustainable food waste management, the local authorities should provide more food waste management information and facilities to encourage households to engage in this sustainable food waste management campaign. Furthermore, the different income levels, educational backgrounds, and different occupations will give a different intention towards practicing sustainable food waste management. Hence, policymakers must plan strategies based on these strata groups.

5. Conclusion
The issue of food waste management continues to be a challenge. However, the respondents from the current survey conducted proclaimed a high intention to practice sustainable food waste management. The majority of the respondents think that sustainable food waste management would be able to reduce environmental harm and can even provide monetary benefits to them. Based on the factor analysis, the determinants related to the households’ intention of practicing sustainable food waste management are attitude, subjective norms, perceived behavioural control, and the intention of reducing food waste. To curb the growing issues of food waste, local authorities have implemented various strategies and campaigns to create awareness as well as ensuring practices to reduce local food waste, such as waste segregation laws, building anaerobic digesters for food courts, composting facilities, the MYSaveFood initiative, and others. However, the efforts and the efficiency of the local authority to minimize local food waste are still under observation. Perhaps, all levels of the community should increase their cooperation to provide the drive towards a zero-food waste culture in Malaysia. In order to instill this culture, further initiatives to involve more people in the whole food system should be increased since everyone holds the responsibility to reduce wasted or lost food along the food value chain.

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