

## Correlation and Exploratory Factor Analysis on Awareness of Solid Waste Management in Malaysia

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### Abstract

The objective of this study is to determine the awareness on solid waste management in Malaysia using an exploratory factor analysis. A questionnaire is developed and comprised of two sections, which are Section A for the background of respondent and Section B for the awareness on solid waste management. The sample for this preliminary study is 261 respondents. An exploratory factor analysis was implemented in order to classify the 19 items into specific proposed components. Moreover, the correlation analysis is conducted to examine the relationship between the items. As a result, the study revealed that the 19 items can be classified in to five main components which are awareness, practice, knowledge, attitude and perception. Thus, the results lead to formulate a new questionnaire. In addition, the new questionnaire will be distributing in future for identify the level of awareness on solid waste management among citizen in Malaysia.

**Keywords:** Solid Waste Management, Awareness, Practice, Knowledge, Attitude, Perception, Correlation Analysis, Exploratory Factor Analysis.

### Introduction

Solid waste management (SWM) is a complex issue with political, economic, institutional, and environmental dimensions. It has become one of the most critical concerns confronting urban spaces in every country as a result of exponential urban growth. Malaysia's growing solid waste generation has reached an alarming level (Zulkipli et al., 2020). The abundance of solid waste generated by our daily activities has put our communities at risk (Zulkipli et al., 2019; Jamian et al., 2018). Growth of solid waste generation in Malaysia reach an increase annually due to an increment in the number of populations. Economic growth and rapid urbanisation are significantly influent in the increment number of solid waste generation respectively. Currently the amount of solid waste generation in Malaysia is 38,209.041 kg/capita/day in 2020 has increased by 0.4% compared to 38,051.91 kg/capita/day in 2019 as reported by Department of Statistics Malaysia. This amount of solid waste generation is predicted to rise

gradually year by year. This is the consequence of many parties' commitment and effort to carry out development projects such as new urban construction planning, infrastructural facilities, and so on. In Figure 1 is presented the total waste generation and daily waste per capita (kg) in Malaysia from 2013 until 2018 (Noor Azlina, 2018; Chu, 2019; DOSM, 2019). The trend of waste generation grows immensely every year.

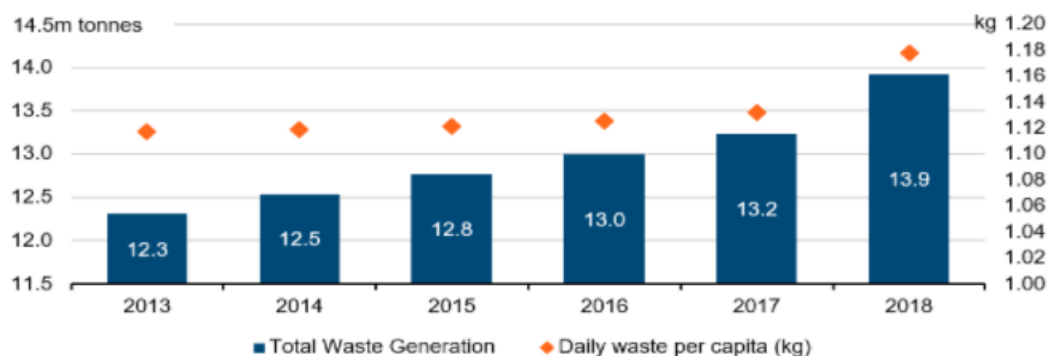


Figure 1. Total Waste Generation and Daily Waste per capita (kg) in Malaysia

Previous researchers had conducted a survey on public awareness towards solid waste management. As in Figure 2, Bashir et al (2018) investigated on public concerns and behaviors towards solid waste minimization using composting in Kampar district, Malaysia. The result shows that more than 50% respondents are willing to practice the correct ways on solid waste management, while 37.77% are not willing to practice. The unwillingness is due to lack understanding on how to manage the solid waste in a proper way with 72.9% feedback from respondents. Moreover, only 23.33% of the respondents contribute in participate to solid waste management activities conducted in Kampar, Perak.

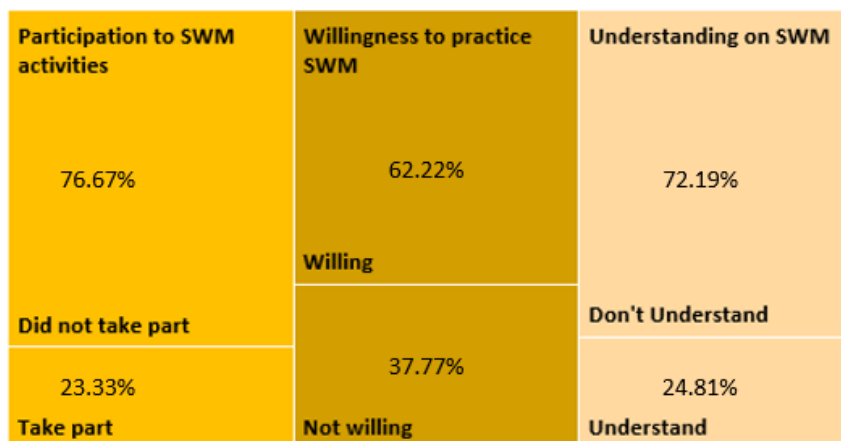


Figure 2. Respondents' Feedback

Another study conducted by Chung et al (2019) on level of recycling awareness among household in Selangor. The results show that only 16% of the respondents had the highest level of awareness on recycle. Majority 66% of the respondents had a moderate level of awareness on recycle, while the 18% of the respondent had a low level of awareness on recycle. It can be concluded that the awareness level among community in Selangor is moderate on recycle of solid waste. Thus, Lack of awareness and mismanagement on solid

waste are the main causes of present human health damage and ecosystem quality deterioration (Hassan et al., 2019).

Unfortunately, these advances and the less caring and responsible society's attitude have had serious consequences for ecosystems, the environment, and human quality of life (Sabri & Teoh, 2006). Biodiversity problems, natural resource depletion, global warming, and other forms of pollution make this a nuisance and a frightening future challenge for environmental conservation (Ferronato & Torretta, 2019). Given the growing urgency of environmental preservation, the need to establish a more environmentally responsible society is also pressing.

The young generation, who are considered as the state's heirs, should be educated in order to promote awareness about the consequences of future actions related to environmental protection. In order to attain a sustainable environmental environment, this preparation is critical in order to develop caring human capital and a more favourable attitude toward the environment. Therefore, the solid waste management should continuously efficient and sustainable. In order to overcome this problem, the awareness on solid waste management among citizen especially should be growth organically in every mind set.

These issues and problems lead to motivate the authors to further determine the public awareness on solid waste management among citizen in Malaysia. Therefore, this study is aim to conduct exploratory factor analysis on awareness among Malaysian citizen towards solid waste management. Hence, the objective of this study is to determine the awareness on solid waste management in Malaysia using an exploratory factor analysis (EFA) and correlation analysis. The following actions were taken in order to achieve this goal: (i) determined the respondents' backgrounds; ii) developed constructed factors that reflect the students' responses and feedback on awareness of solid waste management; iii) Using the exploratory factor analysis approach, classified the questionnaire questions by each component.

## **Methodology**

### **a) Development of conceptual framework**

Figure 3 shows the development of conceptual framework for awareness on solid waste management in Malaysia. This study is a preliminary survey among Malaysian citizen. A questionnaire is adopted and modified based on Hussin et al (2015). The questionnaire modified by authors was included an information on waste separation, which this policy is introduced by the government with the national aims to reduce the amount of waste generation. Based on Figure 3, the conceptual framework and comprised of two sections, which are Section A for the background of respondent and Section B for the awareness on solid waste management. The sample for this preliminary study is 261 respondents.

### **b) Exploratory Factor Analysis**

Exploratory factor analysis (EFA) is a procedure often used by researchers to identify, reduce and organize a large number of questionnaire items into specific constructs under a dependent variable in a study. In general, the EFA procedure involves three stages as shown in Figure 4 and Figure 5 based on Chua (2014).

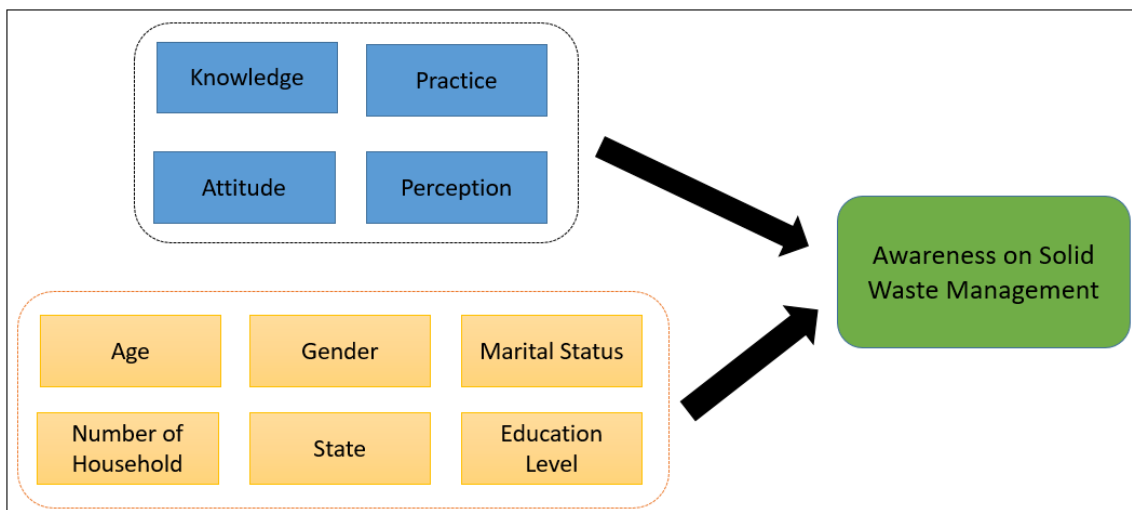


Figure 3. Conceptual Framework for Awareness on Solid Waste Management

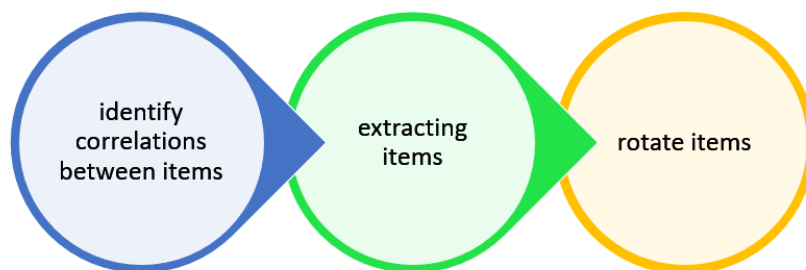


Figure 4. Procedure of Exploratory Factor Analysis

This study is used five-point Likert scale in the survey instrument where the range of agree level is beginning with 1 assigned as strongly disagree until 5 assigned as strongly agree. The process of constructing questionnaire initially reviewed by 7 experts from both academic and non-academic to evaluate the validity of every item included in term of relevancy of the items, the terms used, the sequence of questionnaire, the flow of statements, the format, the length of questionnaire in term of duration taken to response the questionnaire.

This study applied primary source and the target population is all Malaysians. There are 261 Malaysians involved in this study. The respondents are selected conveniently where they are voluntarily filled in the online questionnaire (Awang, 2010). The questionnaire is created using google form and the link are shared to multiple applications such Telegram and WhatsApp, e-mail and social media such as Facebook and Instagram. This method of data collection is currently relevant due to the COVID-19 outbreak is severe in Malaysia. The questionnaire used in this study consists of two sections. Section A consist of a background of respondent such as gender, age, marital status, number of households, states and education level. While in Section B consist of awareness, perception, attitude, knowledge and practice towards solid waste management in Malaysia. Overall, there are 19 items considered in this questionnaire.

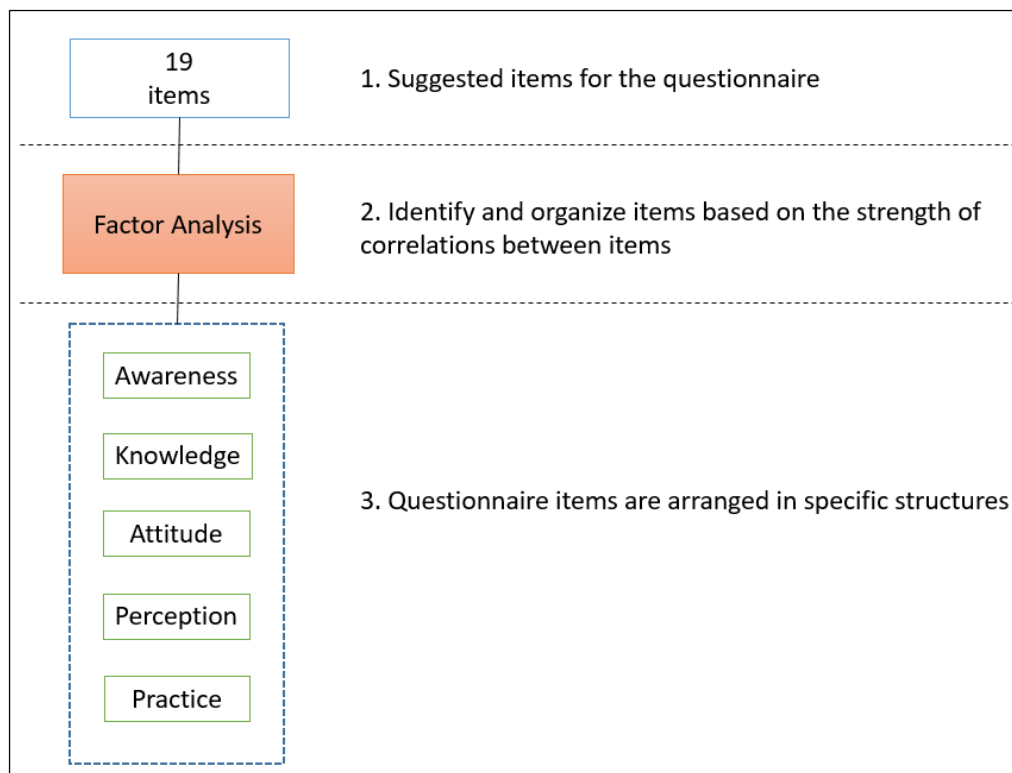


Figure 5. Concept of Factor Analysis

This study employed two analyses that are descriptive analysis for Section A and Exploratory Factor Analysis (EFA) for Section B. The descriptive analysis is used in this study to present the data in manageable and informative way in terms of frequency and percentage (Zulkipli et al., 2018). The EFA is then performed by priory presenting the normality test and correlation analysis.

## Results and Discussions

### a) Descriptive Analysis on Respondent's Background

Table 1 presented the information about respondents' demography in terms of frequency and percentage. It found that most of the respondents were female by 75.1% (196 respondents) meanwhile male was 24.9% (65 respondents). For the age group, most of the respondents were between 20 and 27 years old by 42.1% (110 respondents) followed by aged between 36 and 43 years old by 23% (60 respondents), aged 19 years old and below by 19.2% (50 respondents), aged between 28 and 35 years old by 5.8% (15 respondents) and aged 44 and above by 9.9% (26 respondents) respectively.

According to marital status, it identified that almost half of the total respondents were single by 49% (128 respondents) followed by married which was 33.4% (87 respondents) respectively. For the number of households, more than half of respondents stated that they had less than 5 number of households per family which is contributed to 53.6% (140 respondents) then 46.4% (121 respondents) stated more than 6 number of households. This study obtained that most of the respondents came from the Selangor, Kuala Lumpur and Putrajaya with 61.3% (160 respondents) followed by respondent from Perlis, Kedah, Pulau Pinang and Perak, which was 16.1% (42 respondents), Johor, Melaka and Negeri Sembilan by 8.4% (22 respondents) and Pahang, Terengganu and Kelantan also 8.04% (22 respondents) and finally there was 5.7% (15 respondents) from Sabah and Sarawak respectively. Regarding to

Educational level, most of the respondents currently doing their diploma/STPM by 36.8% (96 respondents) followed by 35.6% (93 respondents) was degree students, 8.4% (22 respondents) was master students, 5% (13 respondents) was Certificate/Matriculation students and 4.2% (11 students) was PhD students.

Table 1  
*Descriptive Analysis on Respondent's Background*

| Demography                 | Attributes                         | Frequency | Percentage (%) |
|----------------------------|------------------------------------|-----------|----------------|
| <b>Gender</b>              | Male                               | 65        | 24.9           |
|                            | Female                             | 196       | 75.1           |
| <b>Age</b>                 | 19 and below                       | 50        | 19.2           |
|                            | 20-27                              | 110       | 42.1           |
|                            | 28-35                              | 15        | 5.8            |
|                            | 36-43                              | 60        | 23.0           |
|                            | 44 and above                       | 26        | 9.9            |
| <b>Marital status</b>      | Single                             | 128       | 49.0           |
|                            | Married                            | 87        | 33.4           |
| <b>Number of household</b> | Less than 5                        | 140       | 53.6           |
|                            | More than 6                        | 121       | 46.4           |
| <b>State</b>               | Perlis, Kedah, Pulau Pinang, Perak | 42        | 16.1           |
|                            | Selangor, Kuala Lumpur, Putrajaya  | 160       | 61.3           |
|                            | Johor, Melaka, Negeri Sembilan     | 22        | 8.4            |
|                            | Pahang, Terengganu, Kelantan       | 22        | 8.4            |
|                            | Sabah, Sarawak                     | 15        | 5.7            |
| <b>Education level</b>     | SPM                                | 26        | 9.9            |
|                            | Certificate /Matriculation         | 13        | 5.0            |
|                            | Diploma/STPM                       | 96        | 36.8           |
|                            | Degree                             | 93        | 35.6           |
|                            | Master                             | 22        | 8.4            |
|                            | PhD                                | 11        | 4.2            |

b) Normality Test

The normality assumption is measured using skewness statistic for all 19 items responded by 261 individuals. Based on Table 2, the skewness statistic of each item indicated that that the

data follows normal assumption. It is due to all skewness statistics were lies within the range 3 and -3. It means that this data can proceed with Correlation and Exploratory Data Analysis.

Table 2

*Skewness Statistics of Items*

| Items | Skewness Statistics | Items | Skewness Statistics |
|-------|---------------------|-------|---------------------|
| 1     | -1.440              | 11    | -0.593              |
| 2     | -1.292              | 12    | -0.709              |
| 3     | -2.160              | 13    | -0.663              |
| 4     | -2.841              | 14    | -0.286              |
| 5     | -1.978              | 15    | -0.566              |
| 6     | -0.773              | 16    | -0.385              |
| 7     | -0.174              | 17    | -1.0351             |
| 8     | -0.716              | 18    | -1.694              |
| 9     | -0.891              | 19    | -1.119              |
| 10    | -0.259              |       |                     |

## c) Exploratory Factor Analysis

In Table 3 showed the correlation statistics between two items where most items have some correlation. Some of the correlation between two items showed relatively high ranging  $r = 0.380$  to  $r=0.860$ . This is good to perform factor analysis in order to model the interrelationships between items with fewer variables. These interrelationships can be divided into multiple components. Exploratory factor analysis (EFA) is a statistical technique to explore the underlying structure of a set of observed variables and scaling development process. The initial step in EFA is factor extraction using principal components analysis to find out the best factor structure (component) (Zulkipli et al., 2018). The crucial coefficients of the EFA, which is Kaiser-Meyer-Olkin (KMO) is considered in this study to identify the accuracy of the analysis. A Varimax rotation is carried out for all 19 items. Based on Table 4, it found that KMO value was 0.850 greater than 0.6 recommended by (Latif et al., 2013). It indicates that sampling adequacy is 0.850 where the data is suitable for principal component analysis. Similarly, the Bartlett's Test of Sphericity was significant since the Chi-square value was 2334.060 with p-value less than 0.001 indicating sufficiency correlation between all pairs of items. Since both KMO and Bartlett's Test of Sphericity measures are significant, it allows to continue the data reduction procedure. (Habidin & Yusof, 2013; Zulkipli et al., 2018).

Table 3

Correlation Analysis between Items

| Item | 1    | 2    | 3    | 4    | 5    | 6    | 7    | 8    | 9    | 10   | 11   | 12   | 13   | 14   | 15    | 16    | 17    | 18    | 19   |
|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|-------|-------|-------|-------|------|
| 1    | 1    | 0.22 | 0.41 | 0.29 | 0.34 | 0.22 | 0.14 | 0.26 | 0.12 | 0.12 | 0.24 | 0.11 | 0.21 | 0.07 | 0.07  | 0.06  | 0.31  | 0.32  | 0.10 |
| 2    | 0.22 | 1    | 0.37 | 0.31 | 0.38 | 0.32 | 0.20 | 0.25 | 0.34 | 0.22 | 0.24 | 0.20 | 0.10 | 0.14 | 0.13  | 0.14  | 0.23  | 0.19  | 0.16 |
| 3    | 0.41 | 0.37 | 1    | 0.65 | 0.65 | 0.24 | 0.17 | 0.19 | 0.19 | 0.11 | 0.17 | 0.13 | 0.16 | 0.01 | -0.02 | -0.04 | 0.35  | 0.33  | 0.23 |
| 4    | 0.29 | 0.31 | 0.65 | 1    | 0.64 | 0.33 | 0.18 | 0.25 | 0.20 | 0.18 | 0.20 | 0.18 | 0.16 | 0.05 | 0.01  | -0.06 | 0.33  | 0.39  | 0.25 |
| 5    | 0.34 | 0.38 | 0.65 | 0.64 | 1    | 0.40 | 0.17 | 0.25 | 0.24 | 0.20 | 0.31 | 0.15 | 0.19 | 0.15 | 0.10  | 0.06  | 0.30  | 0.36  | 0.20 |
| 6    | 0.22 | 0.32 | 0.24 | 0.33 | 0.40 | 1    | 0.42 | 0.36 | 0.37 | 0.38 | 0.31 | 0.26 | 0.31 | 0.17 | 0.17  | 0.20  | 0.20  | 0.25  | 0.18 |
| 7    | 0.14 | 0.20 | 0.17 | 0.18 | 0.17 | 0.42 | 1    | 0.44 | 0.39 | 0.43 | 0.18 | 0.31 | 0.34 | 0.26 | 0.33  | 0.38  | 0.09  | 0.09  | 0.11 |
| 8    | 0.26 | 0.25 | 0.19 | 0.25 | 0.25 | 0.36 | 0.44 | 1    | 0.45 | 0.52 | 0.33 | 0.36 | 0.35 | 0.38 | 0.37  | 0.41  | 0.14  | 0.16  | 0.13 |
| 9    | 0.12 | 0.34 | 0.19 | 0.20 | 0.24 | 0.37 | 0.39 | 0.45 | 1    | 0.55 | 0.21 | 0.39 | 0.32 | 0.22 | 0.27  | 0.33  | 0.21  | 0.22  | 0.22 |
| 10   | 0.12 | 0.22 | 0.11 | 0.18 | 0.20 | 0.38 | 0.43 | 0.52 | 0.55 | 1    | 0.38 | 0.52 | 0.44 | 0.36 | 0.39  | 0.45  | 0.12  | 0.17  | 0.19 |
| 11   | 0.24 | 0.24 | 0.17 | 0.20 | 0.31 | 0.31 | 0.18 | 0.33 | 0.21 | 0.38 | 1    | 0.42 | 0.43 | 0.35 | 0.33  | 0.29  | 0.17  | 0.19  | 0.05 |
| 12   | 0.11 | 0.20 | 0.13 | 0.18 | 0.15 | 0.26 | 0.31 | 0.36 | 0.39 | 0.52 | 0.42 | 1    | 0.54 | 0.41 | 0.43  | 0.49  | 0.15  | 0.15  | 0.18 |
| 13   | 0.21 | 0.10 | 0.16 | 0.16 | 0.19 | 0.31 | 0.34 | 0.35 | 0.32 | 0.44 | 0.43 | 0.54 | 1    | 0.41 | 0.38  | 0.45  | 0.09  | 0.12  | 0.13 |
| 14   | 0.07 | 0.14 | 0.01 | 0.05 | 0.15 | 0.17 | 0.26 | 0.38 | 0.22 | 0.36 | 0.35 | 0.41 | 0.41 | 1    | 0.86  | 0.67  | -0.01 | -0.00 | 0.00 |
| 15   | 0.07 | 0.07 | 0.06 | 0.31 | 0.32 | 0.22 | 0.14 | 0.26 | 0.12 | 0.12 | 0.24 | 0.11 | 0.21 | 0.07 | 0.07  | 0.06  | 0.31  | 0.32  | 0.10 |
| 16   | 0.06 | 0.06 | 0.06 | 0.31 | 0.32 | 0.22 | 0.14 | 0.26 | 0.12 | 0.12 | 0.24 | 0.11 | 0.21 | 0.07 | 0.07  | 0.06  | 0.31  | 0.32  | 0.10 |
| 17   | 0.31 | 0.23 | 0.35 | 0.33 | 0.30 | 0.30 | 0.09 | 0.41 | 0.14 | 0.16 | 0.36 | 0.35 | 0.38 | 0.37 | 0.41  | 0.41  | 0.14  | 0.16  | 0.13 |
| 18   | 0.32 | 0.19 | 0.33 | 0.39 | 0.36 | 0.36 | 0.44 | 0.52 | 0.45 | 0.52 | 0.33 | 0.36 | 0.35 | 0.38 | 0.37  | 0.41  | 0.14  | 0.16  | 0.13 |
| 19   | 0.10 | 0.16 | 0.23 | 0.25 | 0.20 | 0.18 | 0.11 | 0.08 | 0.07 | 0.09 | 0.04 | 0.05 | 0.08 | 0.04 | 0.03  | 0.06  | 0.05  | 0.02  | 0.02 |



|    |        |        |        |        |        |        |        |        |        |        |        |        |        |         |         |        |        |        |        |
|----|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|---------|---------|--------|--------|--------|--------|
| 15 | 0.076  | 0.0132 | -0.022 | 0.014  | 0.0104 | 0.0171 | 0.0337 | 0.0370 | 0.0270 | 0.0391 | 0.0333 | 0.0435 | 0.0384 | 0.0860  | 1       | 0.0712 | -0.017 | 0.009  | 0.0051 |
| 16 | 0.060  | 0.0145 | -0.049 | -0.062 | 0.066  | 0.0205 | 0.0386 | 0.0416 | 0.0336 | 0.0456 | 0.0299 | 0.0493 | 0.0451 | 0.0673  | 0.0712  | 1      | 0.001  | 0.003  | 0.0118 |
| 17 | 0.0313 | 0.0237 | 0.0359 | 0.0333 | 0.0309 | 0.0204 | 0.0094 | 0.0144 | 0.0215 | 0.0129 | 0.0175 | 0.0155 | 0.0093 | -0.0011 | -0.0017 | 0.0001 | 1      | 0.0737 | 0.0539 |
| 18 | 0.0320 | 0.0199 | 0.0336 | 0.0390 | 0.0362 | 0.0257 | 0.0096 | 0.0162 | 0.0222 | 0.0172 | 0.0198 | 0.0151 | 0.0120 | -0.0005 | 0.0009  | 0.0033 | 0.0073 | 1      | 0.0638 |
| 19 | 0.0100 | 0.0164 | 0.0239 | 0.0258 | 0.0203 | 0.0183 | 0.0118 | 0.0132 | 0.0222 | 0.0192 | 0.0059 | 0.0185 | 0.0133 | 0.0008  | 0.0051  | 0.0118 | 0.0053 | 0.0063 | 1      |

#### d) Exploratory Factor Analysis

Exploratory factor analysis (EFA) is a statistical technique to explore the underlying structure of a set of observed variables and scaling development process. The initial step in EFA is factor extraction using principal components analysis to find out the best factor structure (component) in Zulkpli et al (2018). The crucial coefficients of the EFA, which is Kaiser-Meyer-Olkin (KMO) is considered in this study to identify the accuracy of the analysis. A Varimax rotation is carried out for all 19 items. Based on Table 4, it found that KMO value was 0.850 greater than 0.6 recommended by Latif et al (2013). It indicates that sampling adequacy is 0.850 where the data is suitable for principal component analysis. Similarly, the Bartlett's Test of Sphericity was significant since the Chi-square value was 2334.060 with p-value less than 0.001 indicating sufficiency correlation between all pairs of items. Since both KMO and Bartlett's Test of Sphericity measures are significant, it allows to continue the data reduction procedure. (Habidin & Yusof, 2013; Zulkpli et al., 2018).

Table 4

Result of KMO and Barlett's Test

| Test  | Statistic |
|---|-----------|
| Kaiser-Meyer-Olkin Measure of Sampling Adequacy | 0.850     |
| Bartlett's Test of Sphericity:                  |           |
| Approximation Chi-Square                        | 2334.060  |
| Degree of freedom                               | 170       |
| p-value   | 0.000     |

Table 5 showed the list of components generated and the items extracted through principal component procedures. It was splits into five components. This study takes into account at least 0.4 factor loading to be included in a particular component (Habidin & Yusof, 2013; Hatcher, 1994). Component 1 named as Knowledge and the Component 2 named as Practice consisted of 5 items respectively. Meanwhile Component 3 named as Attitude, Component 4

named as Perception and Component 5 named as Awareness consisted of 3 items respectively.

Table 5

*Component Extraction*

| Component | Component name | Item | Factor Loading |
|-----------|----------------|------|----------------|
| 1         | Knowledge      | 1    | 0.496          |
|           |                | 2    | 0.530          |
|           |                | 3    | 0.824          |
|           |                | 4    | 0.768          |
|           |                | 5    | 0.829          |
| 2         | Practice       | 6    | 0.593          |
|           |                | 7    | 0.703          |
|           |                | 8    | 0.603          |
|           |                | 9    | 0.757          |
|           |                | 10   | 0.697          |
| 3         | Attitude       | 11   | 0.707          |
|           |                | 12   | 0.546          |
|           |                | 13   | 0.701          |
| 4         | Perception     | 14   | 0.904          |
|           |                | 15   | 0.909          |
|           |                | 16   | 0.768          |
| 5         | Awareness      | 17   | 0.815          |
|           |                | 18   | 0.856          |
|           |                | 19   | 0.841          |

## e) Reliability Test

Reliability test is performed to estimate the internal consistency in order to see how closely associated a set of items are as a group. It is considered to be a measure of scale reliability using Cronbach's alpha statistics for each component. It observed as the average inter-item correlation increases, Cronbach's alpha increases as well holding the number of items constant. Based on Table 6, the Cronbach's Alpha statistics for every component point out greater than 0.6 as recommended by (Nunnally, 1978). It means that the components extracted have a reliable measure of consistency among 261 respondents indirectly the questionnaire was reliable too.

Table 6

*Reliability Test*

| Component      | Number of items | Cronbach's Alpha statistics |
|----------------|-----------------|-----------------------------|
| 1 (Knowledge)  | 5               | 0.733                       |
| 2 (Practice)   | 5               | 0.794                       |
| 3 (Attitude)   | 3               | 0.727                       |
| 4 (Perception) | 3               | 0.898                       |
| 5 (Awareness)  | 3               | 0.830                       |

### **Conclusion**

As a conclusion, the EFA results had classified the 19 items from a questionnaire into 5 components, which consists of awareness, knowledge, attitude, perception and practice towards solid waste management in Malaysia. In addition, the questionnaire was distributed by online medium due to pandemic situation in Malaysia. Total of 261 number of respondents had return their feedback and was statistically analyzed. The results had been briefly discussed in the previous section. Hence, for future study, the authors are planning on extending the analysis on Confirmatory Factor Analysis (CFA).

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### **References**

- Awang, Z. (2010). *Research Methodology for Business and Social Science*. University Publication Centre (UPENA), UiTM Shah Alam.
- Bashir, M. J. K., Tao, G. H., Abu Amr, S. S., & Tan, K. W. (2018). Public Concerns and Behaviors towards Solid Waste Minimization Using Composting In Kampar District, Malaysia. *Global NEST Journal*, 20(2), 316-323.
- Chu, Mei Mei. 2019. Generating More Waste than Ever. Retrieved on 20 June 2021 from <https://www.thestar.com.my/news/nation/2019/07/30/generating-more-wastethan-ever>.
- Chua, Y. P. (2014). *Ujian Regresi, Analisis Faktor Dan Analisis SEM*. McGraw-Hill Education (Malaysia).
- Chung, C. Y., Yeong, W. M., Munusamy, K., Low, M. P., Nair, M., & Ung, L. Y. (2019). Government Initiatives and Public Awareness on Sustainable Environment. *Journal of Tourism, Hospitality and Environment Management*, 4(14), 40-50.
- DOSM. (2019). Current Population Estimates, Malaysia, 2018-2019. Putrajaya: Department of Statistics. Retrieved on 20 Jun 2021 from <https://www.dosm.gov.my/v1/index.php?r=column/pdfPrev&id=aWJZRkJ4UEdKcUZpT2tVT090Snpydz09>.
- Ferronato, N., & Torretta, V. (2019). Waste Mismanagement in Developing Countries: A Review of Global Issues. *International Journal of Environmental Research and Public Health*, 16(6), 1060.
- Hasan, M. J. A., Hanafiah, M. M., & Satchet, M. S. (2019). Public Awareness on Solid Waste Management: A Case Study in Al-Nassyriah City, Iraq. In *AIP Conference Proceedings*, 2111(1), 1-6.
- Habidin, N. F., & Yusof, M. S. (2013). Critical Success Factors of Lean Six Sigma for the Malaysian Automotive Industry. *International Journal of Lean Six Sigma*, 4(1), 60-82.

- Hatcher, L. (1994). *A Step-by-Step Approach to Using the SAS System for Factor Analysis and Structural Equation Modeling*. SAS Institute Inc., Cary, NC.
- Hussin, I., Rahim, M. F. A., Chenayah, S., & Hashim, H. H. (2015). Survey on the Perception of Community on the Cleanliness and Environment in Malaysia. *Solid Waste Solution Journal*, 1.
- Jamian, N. H., Zulkipli, F., Zulkifli, I. Z., & Nopiah, Z. M. (2018). Survey on Environmental Care among UiTM Campus Tapah Student on Solid Waste Management using Mean Score and t-test Analysis. *International Journal of Engineering & Technology*, 7(433), 114-118.
- Latif, S. A., Omar, M. S., Bidin, Y. H., & Awang, Z. (2013). Analyzing the Effect of Situational Factor on Recycling Behaviour in Determining the Quality of Life. *Journal of Asian Behavioral Studies*, Volume 3, Number 8, January/February 2013.
- Azlina, N. (2018). Anggaran Penjanaan Sisa Pepejal Di Malaysia Mengikut Tahunan. JPSPN. [http://www.data.gov.my/data/ms\\_MY/dataset/anggaran-penjanaan-sisa-pepejal-di-malaysia-pada-tahun-2012-2017](http://www.data.gov.my/data/ms_MY/dataset/anggaran-penjanaan-sisa-pepejal-di-malaysia-pada-tahun-2012-2017).
- Nunnally, J. C. (1978). *Psychometric Theory*. McGraw-Hill, New York, NY.
- Sabri, M. F., & Teoh, Y. Y. (2006) Tahap Keprihatinan Alam Sekitar Dan Amalan Kepenggunaan Hijau Pengguna Di Petaling Jaya, Selangor. *Pertanika Journal of Social Sciences & Humanities*, 14 (2), 95-109.
- Zulkipli, F., Jamian, N. H., Zulkifli, I. Z., & Nopiah, Z. M. (2018). Investigation on Environmental Care towards Sustainable Solid Waste Management using Exploratory Factor Analysis at UiTM Tapah Campus. *Multidisciplinary Informatics Journal*, 1(1), 1-8.
- Zulkipli, F., Jamian, N. H., & Zulkifli, I. Z. (2020). Forecasting Model for Organic Waste Generation at Administration Cafe in UiTM Tapah Campus. *International Journal of Academic Research in Business and Social Sciences*. 10(9), 1023-1032.
- Zulkipli, F., Nopiah, Z. M., Basri, N. E. A., Cheng, J. K., & Khalid, K. I. (2019). Recycle Evaluation using System Dynamics for Solid Waste Management in Malaysia. *International Journal of Recent Technology and Engineering (IJRTE)*. 8(211), 657-659.