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The influence of attitude, perceived behaviour control, subjective norms and self-identity towards zero waste behaviour of consumers in the Klang Valley

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Abstract

Managing solid waste is essential to safeguard the environment to ensure its sustainability and consumer quality of life. Consumers can achieve a systematic waste management plan through a strategic zero waste framework. This far-sighted concept is based on the hierarchy of waste management that advocates avoiding excessive consumption, minimizing waste, maximizing recycling and practicing composting so that landfill disposal will be the last option. This study aims to determine the attitude, perceived behaviour control, subjective norms and self-identity as the predictors of zero waste behaviour of consumers. A total of 400 respondents in the Klang Valley area were chosen through stratified random sampling. A self-administered questionnaire was used in collecting the data. The Pearson correlation analysis found that attitude, perceived behaviour control, subjective norm and self-identity had significant relationships with zero waste behaviour. The multiple regression analysis showed that self-identity is the strongest predictive factor in consumer zero waste behaviour. The findings are beneficial, especially to the relevant agencies that manage solid waste to improve relevant policies and programs. The programs should strengthen consumer self-identity while enhancing their responsibility and commitment to behaviour towards zero waste.

Keywords: attitude, consumers, perceived behavioural control, self-identity, subjective norms, zero waste behaviour.

Introduction

Environmental degradation is one of the global challenges addressed by the United Nations Sustainable Development Goals (SDGs). Rapid urbanization, industrialization, growth in population and relocation to the city have caused a significant burden on solid waste management (SWM) in terms of metropolitan progress. Among the targets under SDG Goal 11 is to lessen the environmental burden of cities by giving particular consideration to the improved waste management system (Ritchie & Roser, 2018). Nevertheless, as urbanization continues to occur, solid waste disposal has become a critical issue in the cities. Statistics show that the world population reached 7.6 billion in 2018, with 55% of this population residing in these city zones, and its percentage is anticipated to ascend to 68% in 2050 (United Nations, 2019). Asia retains 54% of the urban populace worldwide, far leaving behind the European and African continents with 13% correspondingly (United Nations, 2019). The worldwide

generation of municipal waste per year is 2.01 billion tons; however, at least 33% of this is not being treated in an environmentally sustainable manner (Kaza et al., 2018).

Malaysia generated about 38,000 tons of waste per day in 2018 due to exponential growth and a population of over 32 million people, or 14 million tonnes per year, compared to 19,000 tons in 2005 (SWCorp, 2019). The significant increase posed a primary concern as the nation has surpassed the government's expected waste generation in 2020 of 30,000 tons a day. SWCorp, the government agency dealing with solid waste in Malaysia, confirmed that Malaysia's solid waste production has recently reached a tipping point, both in regard to volume and components (SWCorp, 2019). The generation of waste can be associated with the consumers' consumption and disposal behaviour (Ahmad Hariza et al., 2018). Out of the amount of waste generated, only 30% are separated to be recycled, while the remaining 70% goes to landfill (Bernama, 2020). Reliance on the landfill as the primary disposal system has directly created major environmental issues, for example, air contamination, soil erosion, gas emissions and leachate (Alias et al., 2018; Agamuthu & Fauziah, 2011; Shekdar, 2009; Fauziah et al., 2007).

As a country heading towards a developed nation status, Malaysia strives to implement effective strategies and initiatives in the physical, economic and social aspects (SWCorp, 2019). Environmental sustainability is one of the features that should be noted. Despite starting its sustainable development journey in the 1980s, Malaysia faces many challenges in managing municipal solid waste. Among them are finance, technology, human resources, enforcement and the attitude as well as the mindset of society, whereby these issues must be addressed strategically and effectively (SWCorp, 2019). Malaysian citizens are often characterized as having an indifferent attitude toward waste and recycling management, despite the fact that waste can only be minimized with proper management and consideration in handling resources (Chu, 2019).

SDG Goal 12 addresses sustainable consumption and production patterns, whereby the United Nations has defined 11 targets and 13 indicators to be achieved (UNDP, n.d.). The notion of zero waste is included under this goal, and the target for 2030 is that waste generation should be drastically minimized through prevention, reduction, recycling and reuse (Ahmad Hariza et al., 2018; UNDP, n.d.). The concept of zero waste supports the ground-breaking method in managing waste, which is described as another option to manage waste issues (Connett, 2013; Zuroni et al., 2018). As stated in the Scotland Zero Waste Plan, zero waste would not suggest that waste stops; rather, it implies removing unwarranted utilisation of raw products, focusing on green invention, besides concentrating on the waste management hierarchy (Scottish Government, 2009).

Waste is a sign of every industrial society's incompetence and the reflection of misaligned resources (Zaman & Lehman, 2013). Zero waste questions the conventional meaning of waste in acknowledging that waste is a material transition that takes place during the interim process of resource use (Zaman, 2015). The European Union Waste Framework Directive presented a zero waste hierarchy in 2008 that listed the approach of waste management regarding its impact on the environment. The waste hierarchy is a five-step process in which the strongest approach is prevention, preceded by reuse, recycling and additional ways of regeneration, while landfills are only used as a last resort for disposal (European Commission, 2008). Thus, it can be concluded that behavioural changes are fundamental in ensuring zero waste hierarchy implementation.

To address the barriers to managing solid waste effectively, the federal government has resorted to mandatory solid waste segregation at the source since 2015. The government has identified it as one of the most effective measures in reducing waste generation and delivery of solid waste to landfills (NSWMD, n.d). As stated by the Solid Waste Management and Public Cleansing Act 2007 (Act 673), it is compulsory for households to segregate waste into several

categories, such as plastic, paper, cardboard, metal and food waste, prior to concessionaire companies picking up solid waste. This requirement applies to the households in Perlis, Kedah, Pahang, Negeri Sembilan, Melaka, Johor, Kuala Lumpur and Putrajaya. This attempt has shown some improvement, where a 13% increase in the collection of recyclable items was observed for waste separation at source in 2017 in contrast to 2016 (Lim, 2018). The year 2020 has shown a more positive development whereby the target of 30% of the recycling rate has been achieved (Bernama, 2020). Despite the challenges of the COVID-19 pandemic to the whole nation, SWCorp (2020) has reported a significant positive trend of reducing solid waste generation during the Movement Control Order since March 2020. This progress has prompted the government to target the recycling rate to 40% by 2025 (Bernama, 2020). On the basis of this optimistic development, this paper intends to determine the predictors of consumer zero waste behaviour in Klang Valley.

Literature review

The Theory of Planned Behaviour (TPB) by Ajzen (1991) is applied to form the framework to identify consumer behaviour towards zero waste. The TPB presumes that individuals have a firm base for their behaviour by considering the consequences of their conduct (Davis & Morgan, 2008). According to the TPB, behaviour is dictated by intention, and three key factors have an effect on it; attitude, subjective norms and perceived behavioural control. Several meta-analysis studies showed that the three factors of the TPB predict behavioural intention, but the variance of prediction ranges from just 28% to 40% (Armitage & Corner, 200; Rise et al., 2010). Therefore, researchers have proposed an additional predictor. Self-identity signifies individual self-perception to describe themselves in a particular behaviour. The rationale for incorporating self-identity in the TPB as a further predictor arose from the theorists who have proposed that identity processes should be considered to predict individual behaviours (Nigbur et al., 2010; Rise et al., 2010).

The TPB has successfully measured the behavioural impact in environmental studies comprising both developed and developing countries. Such studies include waste recycling in Malaysia (Ramayah et al., 2004); the United Kingdom (Tonglet et al., 2004); Iran (Pakpour et al., 2014); South Africa (Strydom, 2018); sustainable agriculture in the United Kingdom (Beedell & Rehman, 2000); green purchasing behaviour in India (Yadaw & Pathak, 2017); sustainable hotel practices in Taiwan (Chung-Te et al., 2019); household food waste in Switzerland (Visschers et al., 2016); and green transportation in Ghana (Acheampong, 2017).

Although TPB rendered intention as a vital role in predicting behaviour, this study seeks to establish the predictors' direct relationship towards zero waste behaviour. The TPB acknowledged that participants' intentions can change before the performance of behaviour and that, consequently, the original intention measure may not provide an accurate behaviour prediction (Ajzen, 1991; Ajzen & Fishbein, 1980). Hence, this research seeks to determine the factors of attitude, subjective norms, perceived behavioural control and self-identity that predicts consumer zero waste behaviour.

Zero waste behaviour

The results of the study conducted by Ahmad Hariza et al. (2018), Marshall and Farahbakhsh (2013), Guerrero et al. (2013), Swami et al. (2011), Klöckner and Oppedal (2011), Nordlund and Garvil (2002), and Oskamp (2000) found that majority of the current sustainable issues are driven by individual behavioural factors, including the generation and consumption of resources and disposal of waste. However, according to Zaman (2015), a large percentage of

waste can be reduced and eliminated by sustainable consumption and responsible behaviour. For example, zero waste behaviour can support solid waste management to be more efficient and environmentally friendly (Lehmann, 2011).

Lately, many researchers have been inspired to examine innovative waste management methods and consumer behaviour on the basis of zero waste. These researches include those conducted by Ahmad Hariza et al. (2018), Curran & Williams (2012), Zaman and Lehmann (2011), Kinuthia and Nidzam (2011), Phillips et al. (2011), Matete and Trois (2008), Braungart et al. (2007), Colon and Fawcett (2006), Fujita and Hill (2007), and Mason et al. (2003). These studies have recognized the main critical topics in zero waste study, including resource use, individual consumption behaviour, product design (environmentally friendly system and product design), solid waste removal from landfills and optimum resource recovery. Changing towards a more sustainable society requires consumer commitment regarding resource consumption and behaviour by applying sustainable consumption practices. Therefore, the waste management hierarchy included in this study is to avoid excessive consumption, minimize waste, maximize recycling and practise compost.

Attitude

Previous research was directed at the association between attitude and behaviour. The research findings by Pe're et al. (2007) have indicated a positive yet moderate association between attitude towards the environment and behaviour. Tonglet et al. (2004) reported that the significant contributors to recycling behaviour are pro-recycling attitudes. Fraj and Martinez (2007) concluded that environmental attitudes have a major impact on environmental behaviour. However, the studies conducted in Malaysia have yielded different results. Syaidatina Akila and Norazah (2013) found that the attitude towards the environment among consumers was high, while Norazah and Norbayah (2015) determined that consumer attitude towards the environment was moderate. However, Jamilah et al. (2011) reported a low level of attitude towards the environment.

Subjective norms

Past studies have shown that subjective norms are crucial factors in household solid waste management behaviour and waste segregation (Karim Ghani et al., 2013; Ramayah et al., 2012). Zhang et al. (2015) and Nguyen et al. (2015) argue that peer involvement has an effect on the waste management behaviour of the household. The results of the analysis by Sidique et al. (2010) have shown that pressure from other individuals or groups is an essential motivating factor in recycling behaviour. Similarly, an analysis performed by Park and Ha (2014) indicated that residents are more likely to be involved when they see their neighbours or friends practicing recycling at home.

Perceived behaviour control

Individual capacity to implement particular conduct is subject to several factors. These include internal factors, for example, knowledge, skills, willpower, and mind control, while external factors include time, available facilities, opportunities and cooperation from others (Kraft et al., 2005; Tonglet et al., 2004). If the individual has no control over these factors, then the perceived behaviour control will decrease. On the contrary, individual behaviour will increase if they have control over these factors. Previous studies have concluded that perceived behavioural control influenced waste reduction behaviour among households (Zhang et al., 2015; Bortoleto et al., 2012).

Self-identity

A person's identity is the characterisation applied to portray a person (Cook et al., 2002). For example, an individual with a sound environmental identity would most likely see himself as a person who will behave towards the environment. Environmental studies have revealed self-identity as a major environmental behaviour determinant (Carfora et al., 2017; Gatersleben et al., 2014; Van der Werff et al., 2013). Recycling self-identity, for example, is linked to recycling behaviour (Nigbur et al., 2010), environmental activism self-identity is associated with environmental activism (Fielding et al., 2008), while green self-identity impacts the purchase of environmentally-friendly goods, reduction of waste, water conservation and household energy management (Whitmarsh & O'Neill, 2010).

Methodology

A cross-sectional quantitative design was employed to examine the predictors of consumer zero waste behaviour in the Klang Valley. The study location covers the Federal Territory of Kuala Lumpur, Selangor and Putrajaya. Klang Valley has a high population density, especially in Selangor, compared to other states. Klang Valley also produces the highest amount of solid waste compared to other states. The sample size of respondents has been determined by using the formula developed by Salant and Dillman (1994). The recommended number of samples was 384 respondents. However, to reduce the sampling error and increase confidence in the study findings, the sample size has been set to 400 (Cohen et al., 2018). The respondents were selected using a stratified random sampling method, while a self-administered questionnaire was utilized to gather the data.

On the basis of past studies, the questionnaire was developed. A pre-test on the completed questionnaire was conducted among 20 selected consumers to ensure the reliability of the items. The result was a Cronbach alpha value greater than .700, which passed the suggested value by Nunnally (1978). For the measurement of all factors, a five-point Likert scale from 1=strongly disagree to 5=strongly agree was employed.

The respondents' background was described by the descriptive analysis. The inferential data analysis involving Pearson correlation was utilised to ascertain the correlation between the independent variables and the zero waste behaviour, whereas the multiple linear regression analysis was employed to ascertain the influence of predictor variables in consumer zero waste behaviour.

Findings

Table 1 summarized the demographic profile of the respondents. The result shows that 56% of the respondents were female, and 44% were male. The age of respondents was between 21 and 50 years. Most of the respondents were between 31-40 years (44%), and the least were 51 years and above (10.2%). More than half of the respondents (53.6%) held a certificate/diploma. The respondents' major types of employment were with the government sector (44%), and 31% were from the private sector. In addition, respondents had dependents from 1-9 persons, with the majority of 1-3 persons (50.3%). A majority of the respondents comprised of Malays (83.2%), followed by Chinese (10.8%) and Indians (6.0%). In terms of income, the household income ranged between RM2000-RM2999 (36.1%), followed by RM3000-RM3999 (20.7%). Only 14.7% of the respondents have a monthly income of more than RM5000.

Table 1. Demographic profile of the respondents (n=400)

Variables	Frequency (n)	Percentage (%)
Gender		
Male	176	44
Female	224	56
Age		
21-30	110	27.5
31-40	176	44
41-50	73	18.3
51 >	41	10.2
Ethnicity		
Malay	333	83.2
Chinese	43	10.8
Indian	24	6.0
Education		
Lower Secondary	42	10.6
Post-Secondary	215	53.6
Tertiary	143	35.8
Number of dependants		
1-3	201	50.3
4-6	102	25.5
7-9	97	24.2
Income		
RM1000-RM1999	72	18.1
RM2000-RM2999	144	36.1
RM3000-RM3999	83	20.7
RM4000-RM4999	42	10.4
>RM5000	59	14.7

Pearson correlation analysis

Table 2 demonstrates the outcome of Pearson correlation analysis. All four independent variables, namely, attitude (r=0.388), subjective norms (r=0.463), perceived behaviour control (r=0.494), and self-identity (r=0.490), have a significant and positive relationship with zero waste behaviour. The results also show a moderate level of correlation between all the independent variables and zero waste behaviour. The findings are also consistent with previous literature. For example, past studies have shown that attitude correlates with environmental behaviour (Fah & Sirisena, 2014; Osman, Jusoh & Amlus, 2014). Glassman and Albarracin (2006) found that the association between attitude and behaviour was best shown when attitudes were assertive and when respondents formed their attitudes on information awareness. Hence, attitude can better influence consumer zero waste behaviour when consumers are convinced of the positive information on zero waste behaviour.

Table 2. Pearson correlation analysis

Variable	r-value	p-value
Attitude	0.388**	0.000
Subjective norms	0.463**	0.000
Perceived behaviour control	0.494**	0.000
Self-identity	0.490**	0.000

**Correlation is significant at 0.01 level

The significant correlation between subjective norms and behaviour is also in line with previous findings. Zuroni et al. (2018) discovered a significant correlation between subjective norms with household solid waste management behaviour, whereas Farhah (2016) reported

that subjective norms influenced individual behaviour in recycling waste. Pakpour et al. (2013) also described that subjective norms show a significant positive relationship to behaviour. Previous literature on perceived behaviour control also yielded similar findings. Wang et al. (2014) concluded that perceived behaviour control has a significant impact on sustainable consumption behaviours. In this present study, intervention programs should focus on increasing consumer perceived behavioural control over zero waste behaviour since consumers can only perform zero waste behaviour if the consumers have control over it and perceive that they had got the capability, means and opportunity to accomplish zero waste behaviour.

Finally, the findings of environmental self-identity in past studies have explained a significant relationship between environmental self-identity and environmental behaviour. Gatersleben et al. (2012) reported that environmental self-identity was shown to be correlated with several pro-environmental behaviours, such as buying fair trade goods and recycling. Since environmental self-identity directly reflects pro-environmental behaviour hence, environmental self-identity can motivate zero waste behaviour. However, Gatersleben et al. (2012) pointed out that self-identity can either form a barrier or motivate pro-environmental behaviour. Furthermore, self-identity is almost certainly affected by previous behaviour (Van der Werff, 2013). Therefore, relevant programs and campaigns should focus on zero waste behaviour, such as the segregation of waste or recycling. When consumers realize they are doing zero waste behaviour, they most definitely consider themselves environmental stewards and increase their motivation to engage in zero waste behaviour.

The influence of predictor factors on zero waste behaviour

The multiple linear regression analysis was undertaken to determine the four predictor factors that influence consumer zero waste behaviour in Klang Valley and ascertain the most influential factor affecting zero waste behaviour.

Table 3. Result of multiple regression

Variable	B	Beta	t	Sig
Attitude	0.132	0.064	1.223	0.222
Subjective norms	0.486	0.197	3.839	0.000
Perceived behaviour control	0.474	0.222	3.972	0.000
Self-identity	0.721	0.230	4.231	0.000

R^2=.339; Adjusted R^2=.332; F= 50.564; Sig.F=.000*p<0.05

Table 3 shows the regression analysis result between attitude, subjective norms, perceived behaviour control and self-identity with zero waste behaviour. The findings revealed that, in addition to self-identity, the extended TPB constructs were significant behaviour predictors and explained 33.2% of the model's variance. The value of variance means that 33.2% of the zero waste behaviour can be explained by attitude, subjective norms, perceived behaviour control and self-identity. The findings are also parallel to previous studies on environmental behaviour in Iran (Pakpour et al., 2013), the United Kingdom (Nigbur et al., 2009), and Malaysia (Zuroni et al., 2018), proving the TPB universal acceptance to determine environmental behaviours in developed and developing countries.

Attitude, however, was found to be insignificant when the interaction effects with other predictors were counted. The result can be explained by Pearson correlation analysis results, which indicated that attitude had the least r-value than the other predictors. The findings also suggested the three predictors for zero waste behaviour, which were subjective norms ($\beta = 0.197$, $p \leq 0.05$), perceived behaviour control ($\beta = 0.222$, $p \leq 0.05$) and self-identity ($\beta = 0.230$, $p \leq 0.05$). The findings revealed that the strongest predictor for consumer zero waste behaviour is self-

identity. The results correspond to past research (Whitemarsh & O'Neill, 2010; Van der Werff, 2013). Therefore, it is suggested that strategies that emphasize consumer self-identity in zero waste behaviour would play a significant role in fostering zero waste behaviour. Furthermore, the expanded TPB's increased capability to predict zero waste behaviour in this study highlights the value of employing additional factors besides attitude, subjective norms, and perceived behaviour control.

However, as previously mentioned, self-identity can either form barriers to behaviour or motivate behaviour. Furthermore, self-identity is also capable of changing over time (Van der Werff, 2013). Therefore, to keep consumers motivated in engaging zero waste behaviour, consumers should acknowledge the current environmental problems and link those problems to individual actions. Consumers also should be reminded persistently to practice zero waste behaviour to increase engagement in zero waste behaviour.

Implications

Understanding the factors that influence consumer zero waste behaviour is critical for both theoretical and practical purposes in guiding consumers to participate in zero waste behaviour actively. The critical aspects that influence the zero waste behaviour of consumers were investigated in this study by extending the TPB to include the self-identity variable. Multiple regression analysis results of this study, supported by a critical literature review, demonstrate that attitude, subjective norms, perceived behavioural control and self-identity influence the zero waste behaviour of consumers. The TPB has been widely used in behaviour studies across various fields locally, such as investment, pesticide use, solid waste management and sustainable behaviour (Ahmad Fauzi et al., 2017; Hashim et al., 2020; Zuroni et al. 2018, 2020; Norhasliza et al., 2018). The findings of this study also supported the applicability of the TPB in understanding the zero waste behaviour of consumers.

The study's results also indicate that the most significant factor in predicting zero waste behaviour is self-identity. Hence, the practical implications indicate that effective strategies in increasing consumer self-identity towards zero waste behaviour need to be implemented. Consumer education and awareness programs, for example, could be an excellent platform to encourage consumer participation in zero waste behaviour. Consumer involvement may be improved through zero waste campaigns to further enhance consumer self-identity in encouraging zero waste behaviour. The campaigns should emphasize the benefits of participating in zero waste behaviour so that consumers can see themselves as the type of person who engages in zero waste behaviour. Consumers should also be educated that waste management should be addressed according to the hierarchy of waste management by managing waste sustainably by avoiding excessive consumption, minimizing waste, maximizing recycling and practicing composting, and disposing of waste in the landfill should be the last resort.

Conclusion

The concept of zero waste was designed as an alternative option to manage waste management according to the waste hierarchy. This study has extended the TPB framework to include self-identity in investigating the influencing factors of consumer zero waste behaviour in Klang Valley. This study's waste management hierarchy includes avoiding excessive consumption, minimizing waste, increasing recycling and practicing composting. The findings show that the relationships among attitude, subjective norms, perceived behavioural control, self-identity and

zero waste behaviour were statistically significant. These four predictors explained 33.2% of the variance in zero waste behaviour. Furthermore, self-identity was found to be an important factor in determining zero waste behaviour among consumers. The outcome of this study shows that individual behavioural factors are fundamental in ensuring zero waste hierarchy implementation. Waste disposal can be managed through sustainable practices and responsible behaviour. Hence, zero waste behaviour has the potential to drive today's waste management concerns in the country, as well as improve solid waste management efficiency.

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