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ASSESSING RESIDENTS' INTENTION TOWARDS MUNICIPAL SOLID WASTE SOURCE SEPARATION: A CASE STUDY OF MALAYSIA

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Abstract

This study investigates factors affecting Malaysian residents' municipal solid waste source separation behaviour. An extension of the theory of planned behaviour was applied by including the situational factor and perceived policy effectiveness in the model. A sample of 410 respondents was collected using convenient sampling methods. Data were analysed using the structural equation modelling-partial least-square (SEM-PLS) method on the hypotheses in the study. The findings revealed that attitude, subjective norms, perceived behavioural control, and perceived policy effectiveness significantly influenced residents' municipal solid waste source separation intention. On the other hand, situational factors negatively impacted the municipal solid waste separation intention. Results further revealed that moral obligation and environmental knowledge positively influenced attitudes towards solid waste source separation. Thus, it is important for the government to increase Malaysian residents to perform solid waste source separation by providing adequate physical waste separation facilities with effective regulation enforcement.

Keyword: Intention, Solid Waste Source Separation, Theory of Planned Behaviour, Environment Knowledge, Moral Obligation, Policy Effectiveness, Sustainability

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INTRODUCTION

Rapid urbanization development and population growth with high consumption has accelerated the generation of solid waste. Municipal solid waste management is a growing issue and critical challenge faced by all countries especially developing countries. Inadequate waste disposal and management creates serious environment degradation and human hazard. Every year, the amount of waste has been recycled less than 20 percent globally with huge amounts of wasted being dumped at of landfill sites or hazardous open dump sites. Landfill is one of the most common methods to manage waste disposal and it results in negative externalities to the environment through methane generation and permeation of leachate. In Malaysia, most of the landfills have attained maximum capacity (United National Development Program, 2014).

One of the useful approaches to managing and reducing waste is recycling (Tee & Low, 2016; Chen & Lee, 2020). The establishment of recycling starts with waste segregation as the recycling rate and recyclable quality can be improved with segregate waste at the source prior to recycling (Otitoju & Seng, 2014; Tee & Yee, 2016) and households' involvement in the recycling process. The 3R principles of reduce, reuse, and recycle have been implemented to encourage waste segregation and waste reduction worldwide, including in Malaysia. A series of plans have been initiated by the Malaysian government to increase and encourage households' involvement in recycling activities as they are the main generator of solid waste. (Teo, Abdul Karim, Mamud, & Wan Abdul Hamid, 2018). However, the Malaysian waste recycling rate is not sufficient as only 10% of waste was recycled and about 90% was dumped into sanitary landfills (Lacovidou & Ng, 2020), which does not reach the target set in Malaysia's National Strategic Plan of 22% recycling rate and divert 40% of waste from landfill in 2020.

Municipal solid waste management is a major challenge for local governments in Malaysia. Malaysians are generating approximately 33,000 tonnes of municipal solid waste per day with an average of 1.17kg per person per day (Lacovidou & Ng, 2020). Adequate and efficient municipal solid waste management is important in creating a 'zero waste' society (Cheng, 2020) and waste separation at source is one of the underlying elements in closing the loop of material, the Malaysian government has introduced the Separation at Source Initiative under Solid Waste and Public Cleansing Management Act 2007 (Act 672) in September 2015 that managed by the Solid Waste Management and Public Cleanliness Corporation (SWCorp) in cultivating households' waste separation behaviour. However, the effectiveness of the policy implementation and various programs of separation at waste and recycling are not significant in fostering waste separation at source practices and waste segregation still remained low among Malaysian households and not bringing observable improvement in municipal solid management practices.

The success of waste separation at the source is subject to the residents' participation willingness and attitude towards waste separation at the source. The effectiveness of households' participation in community recycling activities and waste separation at source is related to individual's behavioural and psychological factors (*Al Mamun, Ramayah, Mahmud, Musa, & Anika., 2018;* Xu, Ling, Lu & Shen, 2017a; Teo et al., 2018). Therefore, it is important to understand the factors influencing an individual's waste separation behaviour. This information provides useful insights for the government to draw out waste management strategies and policies that could bring about residents' behavioural change on waste separation. Past studies have examined residents' waste separation behaviour using the Theory of Planned Behaviour (TPB) as it provides a theoretical framework to examine psychological factors that affect an individual's intention to perform a specific behaviour (Chan, 2013; Karim Ghani, 2013; Zhang, Huang, Yin & Gong, 2015; Teo, et al., 2018; Toan, 2021; Wang, Lu & Liu, 2021). The three psychological factors in TPB are attitudes toward the behaviour, subjective norms, and perceived behavioural control (Ajzen, 1991). This study extends the TPB model by adding the variables of behavioural beliefs of moral obligation and environmental knowledge in influencing attitudes towards waste separation. To date, the Malaysian government has implemented a waste separation policy in encouraging waste separation at source, but the effectiveness of policy implementation depends on the residents' participation in the activities. As such, they can also be affected by external environmental situations and government policies to engage in a specific behaviour. In addition, this study is also looking into situational factors and perceived policy effectiveness as means towards predicting residents' behavioural intention to perform waste separation at source.

LITERATURE REVIEW

Theory of Planned Behaviour

The theory of planned behaviour (TPB) is a psychological theory to predict an individual's intention to engage in a behaviour. The individual's behavioural intention is determined by three factors: attitude, subjective norm, and perceived behavioural control. TPB model has been adopted by past studies to investigate individual waste behaviour such as recycling behaviour (Ramayah, Lee, & Lim, 2012; Chan & Bishop, 2013; Al Mamun et al., 2018), food waste behaviour (Karim Ghani, Rusli, Biak & Idris, 2013; Stefan, van Herpen, Tudoran & Lähteenmäki, 2013) and waste separation behaviour (Zhang et al, 2015; Ma, Hipel, Hanson, Cai & Liu, 2018, Pakpour et al., 2014; Stoeva & Alriksson, 2017; Xu et al., 2017a; Xu et al., 2017b; Carol et al., 2018). The TPB model is extended by including variables of moral obligation and environmental knowledge to predict the attitude towards waste separation, and situation factor and perceived policy effectiveness to predict the waste separation intention. This study

examines factors that influence residents' waste separation intention in Klang Valley, Malaysia. The proposed research model is illustrated in Figure 1 following the hypotheses stated in the study.

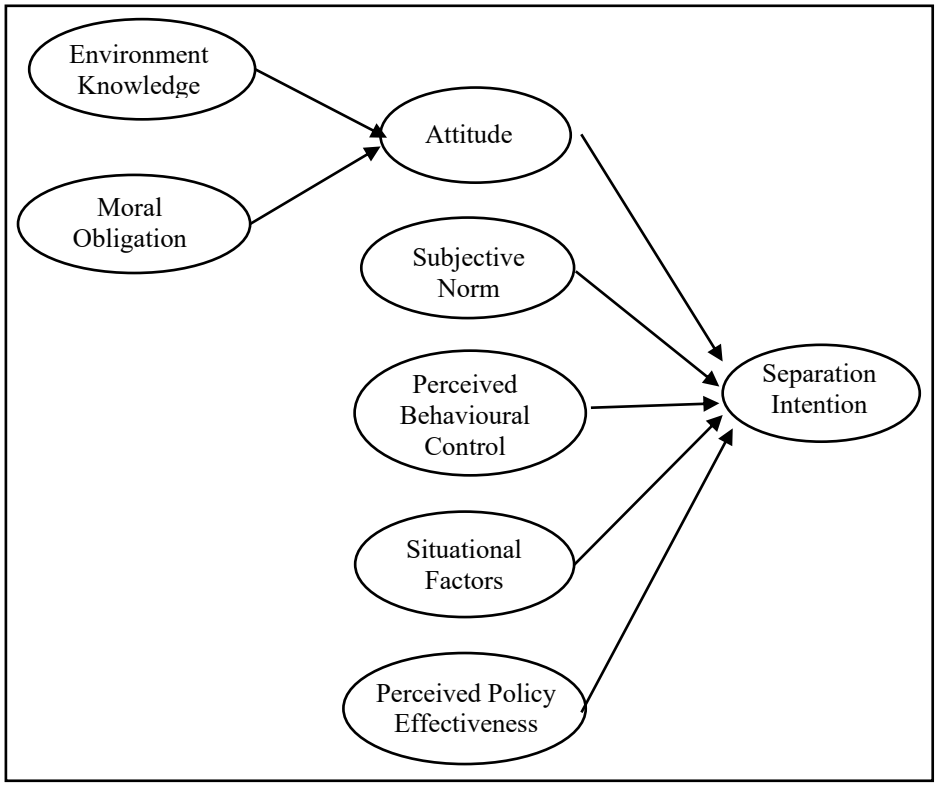

Figure 1: *Proposed research model*

Moral Obligation

Moral obligation towards the environment is an individual's perception to perform positively and to be responsible (Barr et al., 2010). An individual with a high perceived value of the moral obligation is likely to be controlled by his or her beliefs and behaviours and subsequently shape an ethically environmental attitude. Moral norm was found significantly influence recycling attitude (Botetzagias, Dima & Malesios, 2015; Chan and Bishop, 2013) and household waste separation attitude (Chen & Lee, 2020). Zhang et al. (2015) and Xu et al. (2017a) found a positive impact of moral obligation on the attitude towards waste separation in China. Thus, the following hypothesis is proposed:

H1a: Moral obligation has a positive impact on attitude towards waste separation

Environmental Knowledge

Environmental knowledge is defined as "the general knowledge of facts, concepts, and relationships concerning the natural environment and its major ecosystems" (Fryxell & Lo, 2003, p.48). This knowledge of ecological development and information about environmental issues which is referred to as system knowledge (Schahn & Holzer, 1990; Heo & Muralidharan, 2017). Studies supported the significant role of environmental knowledge towards pro-environmental attitudes, for example, attitudes towards green products (Jaiswal & Kant, 2018; Chuah & Lu, 2019); recycling attitudes (Kelly, Mason, Leiss & Ganesh, 2006); and waste separation (Zhang et al., 2015, Liao & Li, 2019). An individual with adequate environmental knowledge may have performed progressive attitude towards the environment. Therefore, the hypothesis is hypothesized as:

H1b: Environmental knowledge has a positive impact on attitudes towards waste separation

Attitude towards Waste Separation

Attitude towards a specific behaviour refers to "the degree to which a person has a favourable or unfavourable evaluation of the behaviour in question" (Ajzen, 1991, p.188). If an individual possesses a positive attitude towards a behaviour, they are likely to have a higher intention to engage in the behaviour and vice versa. In the context of eco-friendly behaviour such as recycling behavioural intention (Ramayah et al., 2012; Wan et al., 2017) and food separation intention (Ng, Ho & Sia, 2021). Karim Ghani et al. (2013) found a significant positive relationship between individual attitudes and source separation of food waste participation intention in Malaysia. There were studies that have a positive effect of attitude towards waste separation intention in China (Zhang et al., 2015; Xu et al.,2017; Wang et al., 2021), in Vietnam (Bui, Nguyen, Phan & Nguyen, 2020) and in Malaysia (Ng et al., 2021; Teo et al., 2018).

H2: Attitude toward waste separation has a positive impact on waste separation intention

Subjective Norm

Subjective norm is defined as "the perceived social pressure to perform or not to perform the behaviour" (Ajzen, 1991, p.188). It refers to the social influence of family, peers, or community. Several studies have confirmed the significant positive effect of subjective norms on pro-environmental behavioural intention including recycling intention (Ramayah et al., 2012), waste separation intention (Zhang et al., 2015; Xu et al., 2017a; Wang et al., 2021; Ng et al., 2021; Bui et al., 2020), and food waste separation (Karim Ghani et al., 2013). Thus, the proposed hypothesis is as follows:

H2: Subjective norm has a positive impact on waste separation intention

Perceived Behavioural Control

Perceived behavioural control refers to "the perceived ease or difficulty of performing the behaviour of interest" (Ajzen, 1991, p.183). It is an individual's perception of his or her self-efficacy to perform the undertaking action needed to engage with the underlying situation. Individual's more likely to perform an underlying behaviour if they perceived more opportunities and resources and fewer expected obstacles on it. Various studies have examined the effect of perceived behavioural control on pro-environmental behavioural intention such as recycling intention (Wan et al., 2017) and specifically in waste separation (Zhang et al, 2015; Xu, et al., 2017a; Liao, Zhao & Chen, 2018; Bui et al., 2020; Carol et al., 2018). This study predicts that individuals with higher perceived behavioural control would be having a higher intention to separate waste. Therefore, the following hypothesis is proposed:

H3: Perceived behavioural control has a positive impact on waste separation intention

Situational Factors

Situational factors are defined as "having the ability and easy access to facility" (Davis, Philips, Read & Iida, 2006, p.124). It refers to physical conditions that may influence pro-environmental behaviour. In other words, situational factors are the extent of assessment by the respondents on the physical conditions such as limited space, time, convenience, and cooperation as obstacles to influence their waste separation behaviour. Davis et al. (2006) and Latif, Omar, Bidin and Awang (2012) found a significant positive influence of situational factors on recycling intention in the UK and in Malaysia, respectively. Situational factors also positively influenced food waste separation intention in Malaysia by Karim Ghani et al. (2013). Meanwhile, Zhang et al. (2015) findings indicated a negative relationship between situational factors and waste separation intention in China. The hypothesis can be concluded as follow:

H4: Situational factors *have a positive impact on waste separation intention*

Perceived Policy Effectiveness

Perceived policy effectiveness refers to "an individual's favourable or unfavourable evaluation on the clarity, adequacy and facilitation of policy measures (e.g., the sufficiency of waste separation bins, clarity of guidelines and promotion, etc.)" (Wan et al., 2014, p.56). It is a means by which government facilitates waste separation by providing infrastructure and facilities, education, campaign, and techniques in waste treatment. Government facilitators stimulate

residents to react and evaluate government policies' effectiveness. Wan et al. (2014) and Liao et al. (2018) found a positive relationship between perceived policy effectiveness and intention to separate waste in Hong Kong and rural areas in China, respectively. Effective public policy may motivate an individual's intention to perform a specific behaviour (Wan and Shen, 2013). Therefore, the following hypothesis is proposed:

H5: Perceived policy effectiveness *has a positive impact on waste separation intention*

METHODOLOGY

The population of this study are households from Klang Valley, Malaysia. Klang Valley is an urban conglomeration located in Central of Malaysia, it covers the area of the capital city Kuala Lumpur and the state of Selangor with a high-density of population (Department of Statistics Malaysia, 2020). The questionnaire of this study was designed by adopting past studies (Zhang et al, 2015; Xu et al., 2017b). The questionnaire consisted of 2 parts; the first part is regarding respondents' demographic characteristics, and the second part contains question items about the variables in the study.

The minimum required sample size was calculated using the GPower software (Faul et al., 2007) with a predictive power of 0.95 and effect size of 0.15 as suggested by Cohen (1992) and Ahmad et al. (2019). The calculation showed that a minimum sample size of 153 is required with seven predictors. A total of 410 questionnaires were collected using the convenience snowball sampling method from households in Klang Valley.

Structural equation modelling-partial least squares (PLS-SEM) was applied to analyse the data collected using SmartPLS software version 3.2.8 (Ringle et al., 2015). The PLS-SEM analysis comprises both the measurement model and structural model respectively.

Multivariate normality was assessed by applying Web power websites (Cain et al., 2017). The Mardia's multivariate skewness ($b = 6.557, p < 0.01$) and kurtosis ($b = 93.029, P < 0.01$) results indicating the non-normality of the data. Common Method Bias was tested as a single source approach was applied in data collection.

DATA ANALYSIS

A. Descriptive Statistics

Table 1 presents the demographic profile of respondents in the study. Almost 60% of the respondents were female. Most of the respondents were between the

age 18–25 years old. Majority of the respondents were Malay (85%). Respondents were with tertiary education level.

Table 1: Demographic Profile

	Frequency (n=410)	Percent
Gender		
Male	173	42.2%
Female	237	57.8%
Age		
Less than 17 years old	52	12.7%
18–25 years old	263	64.1%
26–40 years old	51	12.4%
41–65 years old	39	9.5%
66 years old and above	5	1.2%
Ethnicity		
Malay	348	84.9%
Chinese	40	9.8%
Indian	17	4.1%
Others	5	1.2%
Academic qualification		
SPM or below	104	25.4%
Diploma	180	43.9%
Degree	119	29.0%
Postgraduate	7	1.7%
Occupation		
Employee	117	28.5%
Student	260	63.4%
Housewife	20	4.9%
Retiree	7	1.7%
Others	6	1.5%

B. Multivariate statistics

1. Measurement Model

An assessment of the measurement model includes convergent validity and discriminant validity as suggested by Hair, Hult, Ringle & Starstedt (2017). The measurement model examines loadings, average variance extracted (AVE), and composite reliability (CR) and the results are presented in Table 2. The results of this study measurement model satisfy the criteria requirements of reliability and convergent validity as the item loadings exceeded 0.5, AVE values were greater than 0.5 (range from 0.613 to 0.771) and CR values were above 0.7 (range from 0.792 to 0.910). Two items were dropped from the model due to low factor loading (MO2 and PBC1).

Table 2: Measurement model

Construct	Item	Loadings	AVE	CR
Moral obligation	MO1	0.826	0.677	0.863
	MO3	0.875		
Environmental Knowledge	EK1	0.795	0.724	0.84
	EK2	0.842		
	EK3	0.831		
Attitude towards waste separation	ATT1	0.820	0.613	0.826
	ATT2	0.790		
	ATT3	0.736		
Subjective norm	SN1	0.848	0.771	0.910
	SN2	0.898		
	SN3	0.886		
Perceived behavioural control	PBC2	0.706	0.659	0.792
	PBC3	0.905		
Situation factors	SF1	0.916	0.722	0.885
	SF2	0.928		
	SF3	0.684		
Perceived policy effectiveness	PPE1	0.781	0.616	0.889
	PPE2	0.828		
	PPE3	0.825		
	PPE4	0.753		
	PPE5	0.734		
Waste separation intention	SI1	0.876	0.767	0.908
	SI2	0.892		
	SI3	0.858		

The discriminant validity was assessed with a heterotrait-monotrait ratio of correlations HTMT as proposed by Henseler, Ringle, & Sarstedt (2015). All HTMT ratio values are less than 0.85 indicating the discriminant validity of the measures was confirmed (Table 3).

Table 3: Discriminant validity (HTMT)

	1	2	3	4	5	6	7	8
1. Attitude towards waste separation								

2. Environmental knowledge	0.717						
3. Moral obligation	0.785	0.708					
4. Perceived behavioural control	0.687	0.593	0.828				
4. Perceived policy effectiveness	0.535	0.357	0.462	0.536			
5. Situation factors	0.242	0.271	0.348	0.332	0.102		
6. Waste separation intention	0.674	0.481	0.698	0.824	0.533	0.318	
7. Subjective norm	0.437	0.34	0.743	0.847	0.393	0.357	0.531

2. Structural equation model

The structural equation model measures of path coefficients, standard errors, t-values, and p-values were examined with a 5000-sample resampling bootstrapping procedure as suggested by Hair et al. (2018). The results of the hypotheses testing criterions are presented in Table 4. As shown in Table 4, Environmental Knowledge ($\beta = 0.351, p < 0.01$)and Moral Obligation ($\beta = 0.347, p < 0.01$) had positive effect on attitude towards waste separation, supporting hypotheses H1a and H1b. The results revealed that Attitude towards Waste Separation ($\beta = 0.249, p < 0.01$), Subjective Norm ($\beta = 0.101, p < 0.01$), Perceived Behavioural Control ($\beta = 0.307, p < 0.05$), Situation Factor ($\beta = 0.114, p < 0.01$) and Perceived Policy Effectiveness ($\beta = 0.101, p < 0.01$) had positive effect on Waste Separation Intention and Situation Factor ($\beta = 0.114, p < 0.01$) had a negative effect on Waste Separation Intention. Therefore, hypotheses H2, H3, H4, H5, H6 in the study were supported.

Table 4: Hypothesis testing

Hypotheses Relationship	Std beta	Std error	t-value	p-value	BCI LL	BCI UL	Decision	f^2	R^2
H1a: MO -> ATT	0.347	0.048	7.183	0.000	0.258	0.414	supported	0.147	0.360
H1b: EK -> ATT	0.351	0.049	7.142	0.000	0.274	0.429	supported	0.144	
H2 : ATT -> SI	0.249	0.052	4.830	0.000	0.163	0.330	supported	0.086	0.471
H3 : SN -> SI	0.101	0.054	1.867	0.031	0.018	0.199	supported	0.013	
H4 : PBC -> SI	0.307	0.057	5.427	0.000	0.205	0.398	supported	0.112	
H5 : SF -> SI	-0.114	0.037	3.031	0.001	-0.175	-0.052	supported	0.022	
H6 : PPE -> SI	0.199	0.048	4.140	0.000	0.129	0.278	supported	0.057	

Note(s): MO = moral obligation, EK = environmental knowledge, ATT = attitude towards waste separation, SN = subjective norm, PBC = perceived behavioural control, SF = situation factors, PPE = perceived policy effectiveness, SI = waste separation intention

The R^2 value of Attitude towards Waste Separation and Waste Separation Intention was 0.360 and 0.471, respectively indicating relatively moderate in-sample exploratory power of the model. The effect size, f^2 was determined followed Cohen guideline that effect size of 0.02, 0.15 and 0.35 are considered as small, medium, and large. The f^2 values of Environmental Knowledge ($f^2 = 0.147$) and Moral Obligation ($f^2 = 0.144$) on Attitude towards Waste Separation, and Perceived Behavioural Control ($f^2 = 0.112$) on Waste Separation Intention indicating moderate affect. Attitude towards Waste Separation ($f^2 = 0.086$), Perceived Policy Effectiveness ($f^2 = 0.057$) and Situation factor ($f^2 = 0.022$) had relatively small effect on Waste Separation Intention.

The data in this study was single sourced. The issue of Common Mathos Bias was tested using partial correlation method using unrelated marker variables as suggested by Podaskoff, MacKenzie, Lee, and Podsakoff (2003). In this method, the model was regressed with and without marker variable. If the difference of the R^2 value is not more than 10%, it will then indicate a no bias problem from the single data source. The difference of the R^2 values of the endogenous constructs before and after partially out the marker variable in the model is shown in Table 5, and the difference of R^2 values is less than 10%, indicating that common method bias is not substantial in the study.

Table 5: Partial correlation method: Compare R^2

Construct	Without Marker Variable	With Marker Variable
Attitude towards waste separation	0.360	0.362
Waste separation intention	0.471	0.471

The predictive relevance of the model was examined using the blindfolding procedure (Hair Risher, Sarstedt & Ringle, 2018). As the Q^2 values for Attitude towards Waste Separation ($Q^2 = 0.215$) and Waste Separation Intention ($Q^2 = 0.351$)are greater than 0, indicating the model has sufficient predictive relevance.

The model's out-of-sample predictive power was examined using the PLSpredict with 10 folds as suggested by Shmueli et al. (2019). Comparing the root mean square error (RMSE) values of PLS-SEM with the naïve LM benchmark is shown in Table 6. Results revealed that two of the six PLS-SEM's RMSE values were lower than LM's RMSE values, indicates a medium out-of-model predictive power as recommended by Shmueli et al. (2019).

Table 6: PLS predict assessment

	PLS-SEM		LM		PLS-SEM – LM
	RMSE	Q^2 predict	RMSE	Q^2 predict	RMSE
ATT1	0.667	0.237	0.67	0.228	-0.003
ATT2	0.773	0.221	0.767	0.233	0.006
ATT3	0.71	0.177	0.707	0.185	0.003
SI1	0.701	0.358	0.703	0.355	-0.002
SI2	0.668	0.339	0.672	0.332	-0.004
SI3	0.705	0.292	0.706	0.289	-0.001

DISCUSSION AND IMPLICATIONS

The findings of this study support the relevance of an extended TPB behavioural model on waste separation intention. The results revealed a significant positive effect of attitude towards waste separation on waste separation intention, which was in line with previous studies (Zhang et al., 2015; Xu et al., 2017a; and Bui et al., 2020). This shows that the environment-related specific attitude would indicate higher intention to separate waste. The findings also revealed that attitude was positive significantly determined by moral obligation and environmental knowledge, providing support to findings by Zhang et al., 2015 and Wang et al. (2018). This explains that individual who with adequate knowledge on environment issues are likely to hold constructive attitude towards waste separation. Residents' responsibility and increased knowledge regarding waste separation and recycling can be cultivated through effective channels such as communication and education (Ramayah et al., 2012).

The findings also revealed the significant impact of Subjective norms on waste separation intention and are consistent with past studies by Zhang et al (2015) and Xu et al. (2017a) in China, Khanh et al. (2020) in Vietnam and Razali et al. (2020) in a Malaysian context. The influence of subjective norm was different from other factors in the model. Malaysia is a collectivist society whereby peers, family members and community have considerable influence on a person's life practices (Ramayah et al., 2012) and social pressure may stimulus people's waste separation intention and in turn likely to participate in the waste separation behaviour.

Perceived behavioural control was also found to have a positive significant impact on waste separation intention. It supports past findings such as Zhang et al. (2015) and Razali et al. (2020). It was also found to be the most influential factor in affecting the waste separation intention. As stated by Ajzen (1991), adequate opportunities and resources may motivate people to have higher perceived self-control over behaviour which increased the probability to perform a specific behaviour.

The situational factor was found to be negatively significant in influencing the waste separation intention in line with Zhang et al. (2015). Inconvenient conditions have restricted residents to perform waste separation behaviour as they need to spend more time on waste separation. Physical conditions with adequate facilities for waste separation generally make consumers easy access and a sense of convenience. However, the results indicate that the accessibility of waste disposal physical conditions do not stimulate residents' intention to perform the waste separation. This is because they may not be concerned and enthusiastic enough about separating waste, perhaps due to low awareness about waste separation even if their surrounding environment is equipped with adequate physical waste separation facilities such as collection points, and separate waste bins.

The results also supported hypothesis H_6 which showed a significant positive impact of perceived policy effectiveness on waste separation intention, consistent with Xu et al. (2017b). Effective public authority policy with aggressive facilitation and persuasion through waste separation and recycling campaign and comprehensive education may encourage and facilitate public to perform waste separation intention and behaviour. This indicates that individual's waste separation behaviour is intensely motivated by policy measures (Wan, Shen & Choi, 2014).

The implementation of waste separation at source could be improved through waste management campaigns or education programmes in schools and the community. This is aimed to instil residents' environmental knowledge and increase moral obligation in promoting residents' attitude towards waste separation at source and recycling. As subjective norm has a significant impact on the intention to separate waste at source, strong social norm pressure can be cultivated through community programs to effectively foster the residents' intention towards it.

Relevant campaigns should highlight the importance of solid waste management. The residents should be educated on how to practice waste separation at source, and to consider their moral obligation as responsible residents in the community to contribute towards environmental sustainability. Creating awareness and cultivating the right attitude towards waste separation at source is important as adequate situation factor is unfavourable in influencing intention to perform waste separation among the residents in Klang Valley, Malaysia. The effective implementation of the policy has to be comprehensively well planned with continuous effort and strict execution and enforcement of the Solid Waste and Public Cleansing Management Act 2007 (Act 672) to enhance the waste separation at source among residents and facilitate a sustainable environment.

CONCLUSION AND LIMITATION

This study validates the TPB model application n predicting the intention to separate waste at the source. Attitude, subjective norms, and perceived behavioural control were found to significantly influence the waste separation intention. The additional two variables of situation factors and perceived policy effectiveness have further increased the model's validity and were also found to have a significant negative and positive impact on waste separation intention, respectively. However, this study is not without limitations. The use of the self-report method in data collection may lead to overestimation that may not reflect the resident's actual perception.

Furthermore, the cross-sectional method of the study is restricted to residents' perception at a point in time. Thus, future study can utilise longitudinal data in reflecting behavioural changes. This study investigates the residents' waste separation intention in the urban area of Malaysia which may not be generalized by residents in other regions and rural areas. Future study is recommended to include other variables that are not captured in the said. Furthermore, future investigation of actual waste separation behaviour may be potentially considered as behavioural intention may or may not results in performing waste separation behaviour as depicted by the intention-behaviour gap.

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