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What Do We Know about Intention to Discard Single-Use Plastic? Empirical Evidence in Malaysia

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Abstract: ***The objective of this study is to identify the crucial factors that will influence the intention to discard single-use plastic in Malaysia. The underlying framework of this research model is based on the Theory of Planned Behavior (TPB). This empirical study is using an online questionnaire which is distributed to 364 respondents in Selangor and Federal Territories (Kuala Lumpur and Putrajaya). The research hypotheses are tested using linear regression-stepwise technique. The finding from this study revealed that for the case of Malaysia, intention to discard single-use plastic is predominantly influenced by Consumer Knowledge, Environmental Concern, Psychological Benefit, Social Influence and Willingness-to-Pay. Therefore, this paper provides valuable insight with regards to the predictors that influences the intention to discard the single-use plastics usage within the consumers in Malaysia. It offers information for policy makers with collaboration from industry players to look into better solution and appropriate policies intervention in order to embolden the usage of eco-friendly alternatives that could replace single-use plastics in Malaysia. Future study and improvements are proposed to be done to consider other possible predictors and improve the characterization of respondents by extending the survey to a wider coverage within Malaysia.***

Keywords: Theory of Planned Behavior (TPB); Intention to Discard; Single-Use Plastic; Malaysia, Consumer Knowledge, Environmental Concern, Psychological Benefit, Social Influence, Willingness-to-Pay.

I. INTRODUCTION

The increasing growth in the global population, economic development, rising incomes, and rapid urbanization had caused a drastic increase in the consumption demand and generation of wastes. This has impacted the sustainability of the resources and degradation towards the environment. [42] Along with [14] suggested that between 30 and 40 percent of environmental degradation is due to the individual's non-sustainable consumption waste generation will continue to grow due to the increase of the per capita consumption associated with economic progress particularly in the urban areas [19].

Municipal solid waste (MSW) which is the by-product of the metropolitan lifestyle is found to be rising quicker than the rate of urbanization and by 2020, it is expected that 4.3 billion urban residents will be generating about 1.42 kg/capita/day of MSW [16]. Due to the economic progress and urbanization, waste generation will continue to grow due to the increase of the per capita consumption [19].

Nowadays, the emergence of environmentally friendly products has briskly emerged and become synonymous to consumers but handling the plastic waste still posed challenges to the societies [17]. Reference [34] stated that in 2016, the world plastic production were totaled around 335 million metrics tons. Specifically for plastics bag, it is reported that globally, about 500 billion to 1 trillion plastic bag are consume annually and the average usage of plastic bags about 1.42 - 2.7 billion per day, over million per minutes [26]. If the progression in plastic manufacturing continues as the business-as–usual scenario, the industry could make up 20% of the world's total oil consumption by 2050 [48]. The plastic consumption trend will keep on growing due to its convenient usage [3], [21] and significant part of it is used specifically for packaging purposes [5], [6], [23]. Plastic bag lifespan is estimated to be used for 20 minutes and maximum up to 1-2 years if reusable [26], [28]. However, an enormous quantity of plastic is discarded daily and only part of them is recycled [46].

Based on the record from the Ministry of Housing and Local Government (MHGL) Malaysia, it is revealed that the amount solid waste produced in Selangor is the highest and followed Federal Territory Kuala Lumpur [45]. In term of waste management, Malaysia is ranked 8th out of 20 countries by mass of mismanaged waste management 2.9 percent with an average of 1.52 of waste produced by a person in a day [19]. Most of the non-recyclable waste found in the landfills consists of single-use plastic such as plastic bags, plastic bottles, cutlery, plates, cups, and food packaging [46]. Plastic wastes contain toxic and hazardous substance that will contaminate the environment if no proper waste management is in place [18], [21]and the harmful impact may even cause death for ocean life [18], [41].

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Thus, with the increased awareness towards green environment lifestyle, there is a need for a solution to reduce the waste generated from human activities and transformational change from the current consumer consumption patterns to a sustainable consumption lifestyle are crucially necessary.

The amount of non-recyclable waste can be shrinking through sustainable consumption which will help to fast-track the progress towards making societies
greener and sustainable. Many initiatives and campaigns have been undertaken by the Malaysia government to foster environmental awareness and to educate the society about the negative impact of the usage of single-use plastic. The state of Selangor has begun banning the use of single-use plastic bags on every Saturday since 2009 and starting from January 2017, the ban is applied on all the days. Consumers are required to use their own recyclable shopping bags. The Ministry of Federal Territories has introduced an initiative to restrict the use of conventional plastics products that are based on hydrocarbons since 2016 and have been enforced on 1 September 2017.

Other than that, all plastic straw will be banned across Federal Territories (Kuala Lumpur, Putrajaya, and Labuan) starting 1st January 2019 [29]. The ban of plastic straws will also be enforced in addition to the plastics bags and polystyrene food packaging, which started since 2017. The businesses proprietors may also be fined, have their deposits forfeited, trading items confiscated or even be imprisoned as stated per their business licenses condition. Awareness campaigns to educate the public about the adverse impacts of using the conventional plastic straw will be implemented through-out 2019 and stern enforcement will took place starting January 1, 2020. Many of us don't realize how something as small as a plastic straw can be so harmful to the environment. Plastic straws are difficult to recycle, not biodegradable, and can also endanger ocean wildlife. The Ministry of Energy, Science, Technology, Environment and Climate Change (MESTECC) had also introduced an initiative called "Let's Break Up with Single-Use Plastics" in September 2018 and “Malaysia’s Roadmap toward Zero Single-Use Plastics 2018-2030”.

Consistent with the Malaysia government initiative to discard the usage of single-use plastics, this study is conducted to investigate the factor that will influence the consumers’ intention to discard the single-use plastics, particularly in Selangor and Federal Territories (Kuala Lumpur and Putrajaya). This survey is useful to identify the preliminary indicators on the factors that will determine the intention to discard the single-use plastics. The result can be used as a reference by policymaker or researchers to understand the underlying factors that will influence the acceptance and to determine the practicality of a successful implementation of the initiative introduced by the government.

The continuing segments of this paper are arranged as follows: Section 2 discusses the theoretical frameworks and previous empirical findings. The research model is proposed in Section 3. Section 4 discussed the data sources and methodology. Result analysis is presented in Section 5. The conclusion and policy implications drawn from the study results are presented in Section 6.

II. LITERATURE REVIEW

Based on previous research, many researchers have undertaken countless studies to identify the influencing factors with regards to various green issues. The Theory of Planned Behavior (TPB) has been widely used and was the basic influential theory of behavior that applied in many previous studies on green and sustainable context. In this theory, there are three different types of beliefs that have been measured i.e. behavioral, normative and control between the related variables of attitudes, subjective norm and perceived behavioral control [1]. Behavioral beliefs refer to the individual’s belief with regards to the probable outcomes of an explicit behavior. Normative belief is the individual's expectations in term of how their significant others' will notice their behavior, and perceived control curtails from an individual's beliefs about predictors that may produce positive or negative perception due to the enactment of a behavior [1].

TPB is a frequently employed framework to illuminate human behaviors and to envisage individual’s intention to involve in behavior at an explicit place and time. TPB has been widely used in different researches [2], [8], [21], [25], [27], [37], [38], [42]. The intention is frequently applied as a proxy for predicting future behavior as individuals with sturdier intention will likely execute it [40].

Within the single-use plastics research literature, there are not much past-studies in similar contexts were conducted. Therefore, the reason of this study was conducted is to apprehend the context and to enrich the contribution of knowledge to the research ecosystem, particularly within the Malaysian settings.

The advantage of using TPB is that it permits the inclusion of additional predictors which can make a significant contribution to the explanation of behavior [1]. Thus, we choose to magnify the intention paradigm by incorporated predictors such as environmental concern, consumer knowledge, psychological benefit, willingness-to-pay and social influence to be explored with the aim of apprehending the theory’s richness.

2.1 Environmental Concern (EC)

In this study, Environmental Concern is termed as the consumers' awareness with regards to the environmental issues and supports the effort to minimize the problems. Several previous studies [25], [36], [37], [38] have endorsed that environmental concern has a positive impact on consumer behavior towards adopting products which are more environmentally friendly. Other previous researches have also endorsed that environmental concern has a positive impact on consumer decision towards green and sustainable consumption [15], [20], and [30]. This has advocated that environmental concern is positively associated with an affirmative attitude towards environmentally friendly products. Accordingly, the following hypothesis is suggested:

H1: Environmental Concern has a positive impact on the intention to discard single-use plastic.

2.2 Consumer Knowledge (CK)

For the purpose of this study, Consumer Knowledge is described as conversant with facts, description, information or skills obtained due to education or experience and are capable of understanding a subject. Knowledge is identified in consumer research domain as a characteristic which impacted green consumer behavior in all phases of the decision process [12]. The previous study also confirmed that consumers with a great level of knowledge will produce positive behavior [8], [25], [36], [37].

Reference [8] found that the consumer who really understands about the products would directly influence their environmentally friendly behavior.

There is an assumption that consumers with more information and awareness with regards to a product, they will be more likely and motivated to use it [20]. Therefore, it Is hypothesized that:

H2: Consumer Knowledge has a positive impact on the intention to discard single-use plastic.

2.3 Psychological Benefit (PB)

Psychological Benefit is defined by as the 'feeling better' of an individual due to the reputation and status enhancement as a result of choosing an environmentally friendly product. [15] suggested that consumers may evidently adopt environmentally product in order to enhance reputation in order to enjoy the 'feel better' benefit within them. Previous empirical studies have also found that some consumers were ready to adopt sustainable and environmentally friendly products at a premium rate with the purpose of to feel better themselves [13], [36], [37], [49]. Thus, it is hypothesized that:

H3: Psychological Benefit has a positive impact on the intention to discard single-use plastic.

2.4 Willingness-to-Pay (WP)

For the context of this study, Willingness-to-Pay is outlined as the ability to fork out additional cost due to differences in pricing between two similar or equivalent products. Generally, the price is a fundamental element on which adoption decision is made [24]. Green and eco-product are usually observed as being costlier than regular products [30], [32]. Therefore, the premium prices are always the key obstacles to the adoption of environmentally friendly products. However, based on the finding by [43] provided that if the consumers are willing to agree and pay extra charges, the higher pricing impediments will not distract green products adoption. The previous study confirmed that the consumers are willing to pay for greener products [2], [10], and [22]. Therefore, it is hypothesized that:

H4: Willingness-to-Pay has a positive impact on the intention to discard single-use plastic

2.5 Social Influence (SI)

For this paper, Social Influence is defined as the other individuals or community exerted their indirect influence or pressure towards the adoption decision of an individual. Several studies have established that social influence such as peer pressure, neighborhood effect, social networks [4], [9], [11], [33], [38] and culture i.e. the attitudinal and social factors [35], [38]played a significant role towards intention decision. Based on this discussion, it is hypothesized that:

H5: Social Influence has a positive impact on the intention to discard single-use plastic.

III. PROPOSED DISCARD SINGLE-USE PLASTIC INTENTION MODEL

Grounded on the literature reviews and hypotheses, a research framework model was established by depiction from TPB models and the present topical green intention literatures. In addition, as the tenacity of the present study is to explore the factors that will influence the intention to discard single-use plastic, pertinent and important predictors are added to the proposed research model. Intrinsically, five factors namely; Environmental Concern (EC), Consumer Knowledge (CK), Psychological Benefit (PB), Willingness-to-Pay (WP), and Social Influence (SI) are identified as shown in Figure 1 to illustrate the tested relationships.

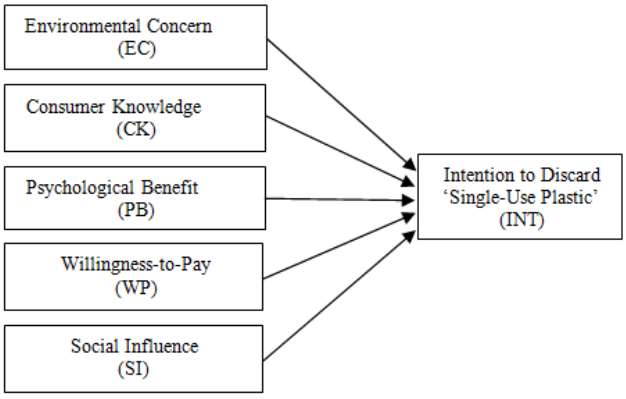

Fig. 1 Proposed Model for Intention to Discard Single-Use Plastic

IV. DATA SOURCES AND METHODOLOGY

The survey inquiry was constructed and developed to collect empirical data in order to investigate the predictors that will influence the intention to discard single-use plastic in Malaysia. This study employed a quantitative data collection via structured online questionnaires. Table 1 summarized the details of the source from where the questionnaire was adapted with minor alterations. Prior to the data collection, panel of expert had checked the questionnaire with the aim of ensuring the validity of the questionnaire content. A pilot testing was performed to check the consistency and reliability of the questionnaire. The final revised and improved questionnaire was used to the targeted respondents for data collection.

Table. 1 Instrumentation Source

Variables	Items	Source
Environmental Concern	4	[39]&[44]
Consumer Knowledge	4	[27]

Psychological Benefit	4	[39]
Willingness-to-Pay	5	[2]
Social Influence	5	[7]&[47]
Intention to Discard	4	[7]

All the respondents were chosen within Selangor and Federal Territories (Kuala Lumpur and Putrajaya). The questionnaires entailed of two sections.

Section one consisted of questions on demographic characteristics and section two covered on the predictors that influencing the intention to discard single-use plastic.

The measurement items used a 5-point Likert-type scale that array from 1=strongly disagrees to 5=strongly agree. The survey was conducted within a month started from October 2018 and ended on November 2018.

A descriptive analysis, reliability test, inter-correlation test, and linear regression-stepwise test were employed to examine the hypotheses and to realize the objectives of this research. The collected data was analyzed using Statistical Package for Social Science (SPSS) software. The preliminary analysis was carried out to ensure non-violation of the assumptions of normality, linearity, homogeneity, multicollinearity, and heteroscedasticity. Three stages of data analysis were accomplished. Firstly, the conditions of the data was reported and observed using the descriptive and frequency statistics. Secondly, the normality and reliability testing was employed. The mean value, standard deviation, skewness, and Kolmogorov-Smirnov tests were used to check the normality of the data. The Cronbach's alpha was used to determine the reliability statistics and finally, the inter-correlation and multiple regressions were applied to evaluate the strength and direction of the linear relationship between the independent variables and the dependent variable. The linear regression-stepwise technique was applied to test the hypotheses that comprised the direct effects of environmental concern, consumer knowledge, psychological benefit, willingness-to-pay and social influence on the intention to discard single-use plastic.

V. RESULTS ANALYSIS

Table 2 illuminates the demographic characteristics of the respondents who take part in this survey. In terms of gender perspective, the majority were female which consists of 51.6% while male made up of the remaining 48.4% of the total respondents. Most of the participants were within the age group of 18-28 (40.9%) and this was followed by the age group of 29-39 (37.9%). The majority of the respondents were well educated which consist of 82.7% of them being university graduates and postgraduates. In term of marital status, 50.3% of the respondents were single and followed by 49.2% were identified as married. As for the occupation, 41.5% of the respondents were working in private sectors and followed by 36.3% in the government sector. As for the monthly income, about 39% of the respondents earned about RM3, 000 – RM6, 000 per month.

Table. 2 Demographic Attributes of the Respondents

Respondents' Profile		Frequency	Percentage (%)
Gender	Male	176	48.4
	Female	188	51.6
Ethnic	Malay	225	61.8
	Chinese	82	22.5
	Indian	46	12.6
	Others	11	3.1
Age Group	< 18	8	2.2
	18-28	149	40.9
	29-39	138	37.9
	40-50	57	15.7
	> 50	12	3.3
Education	Primary / Secondary School	25	6.9
	Certificate / Diploma	38	10.4
	Bachelor Degree	217	59.6
	Master / PhD	84	23.1
Marital Status	Single	183	50.3
	Married	179	49.2
	Others	2	0.5
Occupation	Private	151	41.5
	Government	132	36.3
	Self-Employed	30	8.2
	Student	34	9.3
	Others	17	4.7
Monthly Income	< 3000	120	33.0
	3000 – 6000	142	39.0

	6001 – 9000	54	14.8
	> 9000	48	13.2
Locality	FT (Kuala Lumpur/Putrajaya)	186	51.1
	Selangor	178	48.9

Notes: Klang-Valley population = 7.21 million.

5.1 Reliability, Descriptive and Inter-Correlation Analysis

For the descriptive analysis, the mean value was within 3.64 – 4.05, a standard deviation within 0.65 – 0.93 and skewness within -0.184 to -0.724, suggesting good indicators of the factors investigated in this study. Normality was explored using the Kolmogorov-Smirnov Test and revealed a significant result (P-value > 0.05) for all domains (Table 2). Reliability was evaluated by measuring the Cronbach's α coefficient to check the internal consistency among the items. In this study, the Cronbach's α value for the overall scale of each predictor was within 0.67 – 0.89, advocating good consistency among the items for each variable (Table 3).

Table. 3 Descriptive Statistics & Reliability Analysis

2	No of Items	Mean	Standard Deviation	Skewness	Kolmogorov-Smirnov	Cronbach α
EC	4	4.00	0.65	-0.184	0.093	0.672
CK	4	3.72	0.68	-0.411	0.102	0.683
PB	4	3.94	0.68	-0.604	0.130	0.698
WP	5	3.68	0.93	-0.724	0.119	0.896
SI	5	3.64	0.86	-0.466	0.091	0.885
INT	4	4.05	0.70	-0.694	0.142	0.714

Notes*:* EC, CK, PB, WP, SI, INT as defined in Fig 1.

The Pearson correlation coefficient was executed on the predictors to determine the strength and direction of the linear relationship between the independent variables and the dependent variable. In general, the correlation coefficient of < 0.2 is considered irrelevant, 0.2 - 0.4 is considered low, 0.40 - 0.70 is moderate and 0.70 - 0.90 is considered high correlation. The result of this study shows that EC, CK, PB, WP, and SI had a moderate correlation with the dependent variable, INT (Table 144). The correlation coefficient of each factor in Table 4 is lower than 0.4, which indicates that the probability of multi collinearity is non-existence in this study.

Table. 4 Correlation Matrix

Factors	INT	EC	CK	PB	WP	SI
INT	1.000					
EC	0.553	1.000				
CK	0.560	0.312	1.000			
PB	0.500	0.366	0.368	1.000		
WP	0.625	0.217	0.389	0.354	1.000	
SI	0.644	0.190	0.332	0.391	0.318	1.000

Notes*:* Correlation is significant at P-value < 0.01

5.2 The relationship between predictors and intention to discard.

A multiple regression model with five (5) predictors was proposed. These predictors were coded as EC, CK, PB, WP, and SI. The equation of the proposed multiple linear regression models is articulated as equation (1):

$$INT = \beta_0 + \beta_1 EC + \beta_2 CK + \beta_3 PB + \beta_4 WP + \beta_5 SI + \varepsilon \quad (1)$$

Where
β_0 = constant,
EC, CK, PB, WP and SI = predictors and,
ε = error.

Established by the method used, five (5) predictors' domains were found to be significant in clarifying the intention to discard the usage of single-use plastic (P-value < 0.05). As shown in Table 5, the adjusted R2 of 0.607 indicates that the five predictors domain describe about 60.7% of the variance in intention to discard single-use plastic. As the model is a cross-section comprising five constructs, multi co linearity does not exist as the value of the VIF test is < 5. The ANOVA table also shown that the F-value of 113.91 is large enough to be recognized statistically and the conforming P-value is highly significant at < 0.05. Table 5 shows the largest β coefficient (0.320) for Social Influence (SI), which indicated that this predictor makes the strongest unique influence in explaining the Intention to Discard the usage of Single-Use Plastic when the variance explained by all other predictors are controlled for. The ranking of the five domains is as follows: SI, WP, CK, EC, and PB. All the five predictors that were investigated were found to be supported the hypotheses (Table 6).

Table. 5 Measurement Model Result

Constructs	Unstandardized coefficient β	SD error	Standardized coefficient β	t-Value	P-value	VIF
Constant	0.522	0.179	-	2.916	0.004	-
EC	0.133	0.039	0.124	3.430	0.001	1.198
CK	0.228	0.041	0.222	5.590	0.000	1.459
PB	0.084	0.043	0.081	1.968	0.050	1.581
WP	0.238	0.030	0.317	8.000	0.000	1.448
SI	0.259	0.034	0.320	7.559	0.000	1.658

Notes: R = 0.783, R^2 = 0.613, Adjusted R^2 = 0.607, F = 113.191, significant = 0.05

Table. 6 Results of the Hypothesis Testing

Hypotheses Path	Standardized Path Coefficients	P-value	Result
EC → INT	0.124	0.001*	Supported
CK → INT	0.222	0.000*	Supported
PB → INT	0.081	0.050*	Supported
WP → INT	0.317	0.000*	Supported
SI → INT	0.320	0.000*	Supported

Notes: statistically significant at the 5% level (P-value < 0.05)

The findings from this study were found to support the previous literatures. Even though not every past studies were applied in the same research domain, the empirical analysis has shown that these predictors are applicable and significant in this single-use plastics research context.

VI. CONCLUSIONS & POLICY IMPLICATIONS

The validation of this study is to determine the main predictors that will influence the intention to discard single-use plastic in Malaysia and was executed using a theoretical framework that was centred on the prior literatures outcomes. The empirical analysis pointed out that Environmental Concern, Consumer Knowledge, Psychological Benefit, Willingness-to-Pay and Social Influence are very essential elements of the intention to discard single-use plastics. An understanding towards identifying these key predictors is indeed invaluable in supporting the Malaysians government initiatives towards the zero single-use plastic.

This study was expected to contribute substantially to the government efforts towards zero single-use plastic for a cleaner and greener environment. By surveying Malaysian's intention to discard single-use plastic, this paper was capable of gathering first-hand data and information which allows an empirical and realistic result. This finding highlight several ideas that may help in developing sound strategies for discarding single-use plastic in terms of Environmental Concern, Consumer Knowledge, Psychological Benefit, Willingness-to-Pay and Social Influence surfacing as the key predictors in discarding single-use plastic usage intention. This research also reveals five significant predictors of the intention to discard single-use plastic in Malaysia.

Firstly, the government should invest in a good solid waste management system which will reduce the quantity of wastes especially the single-use plastic and increase the environmental concern level within the consumers. Policy-makers should develop suitable policies and interventions for the local industries and consumers to embrace cleaner and greener alternatives that could enable diffusion to a broader target groups as part of the strategy to reduce single-use plastic usage. There should also be a better implementation of laws and regulations to increase the recycling rates of plastic wastes in the future. Secondly, public awareness and education vis-à-vis the harmful effects caused by single-use plastics will definitely aid to elevate the consumer's knowledge level with regards to the environmental issues underlying the continuous use of single-use plastics.

Thirdly, Malaysia's Roadmap towards Zero Single-Use Plastics 2018-2030 should be used as the focal strategy document to discontinue the usage of single-use plastics in a holistic manner towards a sustainable future. In addition, the existing National Green Technology Policy, 2009 and National Solid Waste Management Policy, 2016 should also serve as important references with the same regards. Government ministries such as the Ministry of Energy, Science, and Technology,

Environment and Climate Change (MESTECC) and all the industries players in the plastic value-chains should be working in coherence in order to boost up the wider usage of eco-friendly and fit-for-purpose alternatives that does not cause more destruction to the environment.

This study offers preliminary investigation that enlightens 60.7% of the variance in intention to discard single-use plastics in Malaysia. It also delivers a basis for other single-use plastics research and inspires the future investigation and incorporation of additional predictors. The outcome from this study may possibly be applied as a starting point to further corroborate and construct a better model to enlighten the intention to discard the single-use plastics in Malaysia.

In the future, subsequent research should emphasis on a larger scale and diversified cross-sectional samples to validate the findings of this study. Accordingly, it is also imperative to test the intention to discard the usage intentions in a different cross-cultural studies and possibility of using other modified diffusion model.

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