

Predictors of intention to use reusable drinking straw: A case study in Selangor

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ARTICLE INFO

Article history:

Received 11 March 2021

Accepted 18 May 2021

Published 31 May 2021

Keywords:

Reusable drinking straw

Intention to use

Theory of planned behavior

OLS regression

DOI:

10.24191/jeeir.v9i2.12739

ABSTRACT

Single-use plastic drinking straws is difficult to recycle and is one of the main causes of water pollution and marine animal destruction. An option for single use drinking straws is reusable ones. This study applies the theory of planned behavior (TPB) to determine the factors affecting the intention to use reusable drinking straw using a survey method in Selangor, Malaysia. Based on an OLS multiple regression result, the study concluded that attitude and perceived behavioral control are significant predictors for the intention to use reusable drinking straws. Government campaigns towards encouraging consumers to use reusable drinking straws should be focused on promoting positive aspects reusable drinking straws and make it accessible and plausible for the consumers to use it.

1. Introduction

There has been a great deal of concern about environmental issues throughout the world today (Scherer et al., 2020). Although Malaysia has experienced an excellent development following government efforts to encourage investment in green product development, the environmental behavior practices among certain groups of consumers in the country are still low (Hassan et al., 2011).

One of the main polluters to the environment is plastic pollution. Plastic in primary form is dominantly used for packaging, with 42 percent of plastics reaching the use phase (Ritchie & Roser, 2018). Plastic production is rising globally and in turn there is an increase of plastic waste lost into the marine environment. From the production of 270 million of tonnes of plastic production, it can generate from 10,000 to 100,000 tonnes of marine waste, from which mostly will end up on or close to the seafloor (Ritchie & Roser, 2018). A lot of plastic waste end up as mismanaged waste, which means they are either

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<https://doi.org/10.24191/jeeir.v9i2.12739>

littered or inadequately disposed (Ritchie & Roser, 2018). To counter this issue, there is an increase in government policies to protect the environment which target certain types of plastic waste. An example is the No Plastic Bag campaign in Malaysia which aims at reducing the use of single use carrier shopping bags (Zen, 2018). Plastic waste is the main constituent of municipal and industrial waste in towns and cities after food waste and paper waste.

Single use plastics, including plastic stem cotton buds, plastic drinking straws and plastic drink stirrers, have negative environmental effects if they are littered or incorrectly discarded after use. There are costs associated with cleaning and external costs incurred by littering and the transfer of littered plastics to the environment for tourism and fishing industries. Single use plastic straws can damage marine and terrestrial life. Study outcomes summarized by Rocham et al (2016) illustrate that plastic waste that ended in the ocean cause entanglement, ingestion, suffocation, obstruction and substrate, which lead to death, reduced population size, external and internal wounds and gastric rupture to a variety of small and large marine animals. There is also widespread public concern about plastics and litters. Resources and greenhouse gas emissions are also linked to the manufacture and disposal of plastics, as they depend on fossil fuels.

Among the irresponsibly-discarded single-use plastic waste items are plastic drinking straws. Straws have been used to facilitate drinking of water for a long time. Paper straws were introduced in 1888; however, it was the plastic version of the straw that was popularly used since the 1970's (Nunez, 2020). Straws increase convenience from drinking from a cup or glass, especially for a beverage with ice. It also improves hygiene as it does not require the mouth to directly touch the beverage container. (Nunez, 2020). In order to reduce the environmental burden caused by plastic waste, in particular, plastic straw, without reducing the convenience and hygiene a straw brings during drinking beverage, a reusable drinking straw is recommended. Reusable drinking straws can be made of more environmental-friendly materials, such as stainless steel, paper, bamboo and glass.

In the United States, 500 million single-use plastic drinking straws are used every single day, while in Europe, the figure is a staggering 25.3 billion annually (Tembo Paper, 2020). In Malaysia, 30 million drinking straws are used every day (Boon, 2019). Approximately 8.3 billion plastic straws pollute beaches around the world (Geyer et al, 2017). The littered straws pose a number of problems -- they cause hazards to animal life, they pollute beaches litter and toxic with chemicals they are made of, and they contaminate landfills and waterways (Goddard, 2020). These plastic straws are also too light to be sorted by a mechanical recycler. They drop through sorting screens and mixed with other materials and are too small to be separated, contaminating recycling loads or getting disposed as garbage. Plastic straws are used almost everywhere particularly in the food and beverage industry such as restaurants, cafes, food trucks, kiosks and many others. They are also used in many events including concerts, festivals, sports and weddings. According to Jambeck et al. (2015), 8 million metric tonnes of mismanaged plastic waste entered the oceans in 2010. It is also estimated that 50 per cent of plastics produced are discarded after a single-use (Geyer et al., 2017) and these single-use plastics include plastic bags, cutlery, polystyrene food and drink containers and drinking straws. Plastic waste, when swallowed by aquatic and terrestrial species can result in starvation and mortality (Liu et al., 2013). As for plastic straws, scientists predict that if we allow plastics to enter the ocean at the current rate, there will be more plastic (by weight) compared to fish in the ocean by 2050 (Tembo Paper, 2020). Thus, given that plastic wastes have adverse environmental impacts, identifying effective reduction policies is important in order to reduce waste and litter before it enters the ocean and other waterways.

In Malaysia, plastic waste is a major environmental problem, as the nation has been ranked as the eighth from the top ten nations with mismanaged plastic waste in the world, with 0.14 to 0.37 million tons of plastic wastes may have drifted into the oceans (MESTECC, 2018). In 2017, a couple of concerned local people launched the 'Tak Nak Straw' campaign via the Face book social media (Face book, 2021) and talks in schools and eco-friendly events (Brown, 2017).

Realizing the need to address plastic waste issue in a sustainable manner, the Malaysian government has embarked on a three-phase action plan that moves the nation towards zero single-use plastics by the year 2030 (MESTECC, 2018). With regard to the use of plastic straws, it involves two phases. The first phase (2019-2021) involves the implementation of the 'no straw by default' practice in fixed premises, where straw is given by request without no additional charge. In the second phase (2022-2025), the 'no straw by default' practice will be extended to non-fixed premises. In addition, bio straws will be introduced including for packet drinks.

By the first of January 2020, the government banned the use of plastic straws by licensed traders and food outlet operators (Malay Mail, 2018). The public however, are not banned from using these straws. And in order to avoid discomfort to consumers who are used to having straws in their drinking glasses, alternative straws were provided for consumers.

Reduction in the use of plastic drinking straws might occur if consumers avoid using it (Straw less Ocean, 2021). Given that straws may still be desired by the general public or by certain groups in the population who needs straws for drinking (such as those with stroke or autism), consumers need to have the intention to shift to using the plastic straw substitute. There is a need to understand the factors that can affect the intention to use alternatives of the plastic straw for drinking so that the actual behavior of using the reusable drinking straw can be realized. A theoretical model that explains pro-environmental behavior is suitable for understanding what triggers pro-environmental intention and behavior.

There are many studies that investigate pro-environmental behavior of consumers, especially using the Theory of Planned Behavior (TPB). Some examples are Hamzah and Tanwir (2021) which studies green purchase intention of hybrid vehicles, Wang and Mangmeechai (2021) which studies waste sorting and management behavior in China and Aboelmaged (2021) which studies e-waste recycling. However, very few studies were found so far on straw use behavior. In TPB, attitude, perceived behavioral control and subjective norm is said to affect the intention to behave in a certain way. This intention may lead to the actual intended behavior.

This study is conducted to analyze if attitude, perceived behavioral control and subjective norm as described in the TBP affect the intention of consumers to use reusable drinking straw. This study extends the examination in the literature by focusing on determination of intention to use reusable drinking straw using a cross-section regression analysis on a sample of consumers in Selangor.

2. Literature review

The most commonly used theoretical model to predict behavior has been the theory of planned behavior (TPB) which relates an individual's beliefs to his or her behavior (Ajzen, 1985). The TPB is an extension of the theory of reasoned action (TRA), which suggests that one's behavior is determined by his or her intention to conduct the attitude, and the intention is a function of attitude towards the behavior and subjective norms (Fishbein & Ajzen 1975). This behavioral model has been extensively used to investigate environmental related behavior and has been proved to be effectively used to many studies (Xu et al., 2020).

The TPB states that attitude toward behavior, subjective norms, and perceived behavioral control, together, shape an individual's behavioral intentions and behaviors. TPB is often used to study the intentions and behavior of recycling (Davies et al., 2002; Taylor & Todd, 1995). TPB is considered to be one of the most influential models in predicting social behaviors (Hasbullah et al, 2014).

TPB has shown to be a potent theoretical model in determining household waste recycling intention and behaviors in the Eastern cultural environment (Chan, 1998; Cheung et al., 1999; Chu & Chiu, 2003). Chan (1998) found that attitudes are the major predictor of intention and the actual usage of recycling receptacles and subjective norms were second to attitudes. Meanwhile, Chu & Chiu (2003) affirmed the significant role of the three TPB predictors in determining household waste recycling; perceived behavioral control

was the strongest predictor, followed by attitudes and subjective norms. Cheung et al. (1999) discovered that the TPB model is powerful in predicting behavioral intentions of college students to recycle wastepaper. This is also true in the Western cultural context where Taylor & Todd (1995) found the TPB model to be influential in predicting recycling intention, with attitude and perceived behavioral control positively influencing intention to recycle, while subjective norm having a negative effect on intention.

Literature relating to behavior and intention to behave that relates to reducing the use of plastic drinking straw or changing to the use of reusable drinking straw is scant, though the research interest in this area is growing, such as Kadir et al., (2018). Hassan et al (2020) reported the outcome of a Partial Least Squares regression using the TPB for a group of student respondents in Johor, Malaysia. The study focuses only on biodegradable drinking straw. This study will be an extension to the current literature on the intention to reduce the use of plastic drinking straw by analyzing the aspect of a reusable option.

3. Theoretical basis

3.1 Intention

Intention can mean aim, goal or plan. Intention or instrumentality refers to the belief that the behavior will lead to the intended outcome (Silverman et al., 2016). Intentions are supposed to capture the motivational factors that influence a behavior where they indicate how hard people are willing to try and how much effort they plan to make to perform the behavior. Generally speaking, the stronger the intention of conduct, the more likely its performance should be. It should be clear, however, that a behavioral intention can find expression in behavior only if the behavior in question is under volitional control, for example, if the person can decide at will to perform or not perform the behavior (Defrancet al., 2008). A meta-analysis of experimental studies found that a change in behavioral intentions bring about behavioral change (Webb & Sheeran, 2006)

3.2 Attitude

Attitude refers to the extent to which a person has a favorable or unfavorable assessment of his or her behavior. Attitude is formed by beliefs or opinions about the likely results of the behavior and the assessments of those results. Therefore, people automatically acquire behavioral attitudes. Attitude also refers to 'a relatively enduring organization of beliefs, feelings and behavioral tendencies towards socially significant objects, groups, events or symbols' (Hogg & Vaughan, 2005). Attitude may represent evaluation or preference of a person on something.

Altitude can be described in several components -- cognitive, affective and behavioral. The cognitive part is the knowledge or information that is relevant to a particular behavior. The affective part is the feelings of a person towards the behavior. The behavioral part is the tendency for a person to behave in a particular way to something. The TPB postulates that people form favorable attitude toward the behavior that they believe to have desirable consequences, and negative attitude toward the behavior that is associated with undesirable consequences (Mohammed et al., 2017).

In many studies, attitude towards a product is found to be strongly associated with intention to use or purchase the product. An example is Nguyen et al. (2019). This also applies to intention towards pro-environmental behavior (Levine & Strube, 2012). In the study of behavioral intention for the use of drinking straws, one study is found that concludes a strong relationship between attitude and the intention to use biodegradable drinking straws (Kadir et al., 2018). This study uses a TPB model, and uses the PLS-SEM in its analysis.

3.3 Perceived behavioural control

Perceived behavioral control can be defined as the extent of control that a person perceives to perform the behavior. It can also be influenced by second-hand information, acquaintances, friends or other factors that could increase or decrease the perceived difficulty to perform the behavior (Ajzen, 1991). Performance of a behavior is influenced by the presence of adequate resources and ability to control barriers to behaviors. The more resources and the lesser obstacles individuals perceive, the greater their perceived behavioral control and the stronger their intention to perform behaviors (Ajzen, 1985).

The perceived behavioral control (PBC) constructed in TPB significantly accounted for intention and behavior (Armitage & Conner, 2001). PBC was found to be the strongest determinant of household recycling intentions when recycling programs were not well established and participation rates were relatively low, as in the case in Taiwan (Chu & Chiu, 2003). Kadir et al. (2018) found PBC to be significant in determining intention to use biodegradable straw.

3.4 Subjective norm

Subjective norm relates to the individual's perception of social pressure from others who are important to them (for example family, friends, colleagues, and others) to behave (or not) in a certain manner and their motivation to comply with those people's views (Ham et al., 2015). The influence of subjective norms on recycling actions has been inconsistent. However, subjective norm was found to be an immediate predecessor of recycling intentions (Chan, 1998; Cheung et al., 1999; Chu & Chiu, 2003). Social influence of family members, neighbors, friends and others may or may not influence the formation of norms of a person.

4. Research methodology

4.1 Research framework, method and measurement

The theoretical framework for this study (Figure 1) closely follows the TPB (Ajzen, 1985). The intention to use reusable drinking straw is hypothesized to be influenced by attitude, perceived behavioral control and subjective norms.

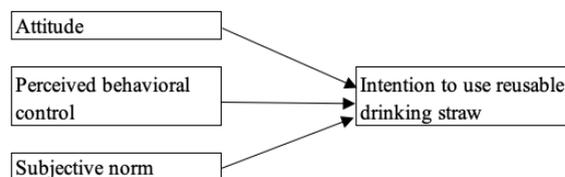


Figure 1. Research framework for the intention to use reusable drinking straw

The intention to use reusable drinking straw is subjected to an Ordinary Least Squares regression analysis. Prior to the regression, descriptive analysis and Pearson Product-Moment Correlation test will be conducted on data.

To measure attitude, perceived behavioral control, subjective norm and intention, a structured questionnaire comprising of 16 items was adapted and modified based on previous studies (Al-Swidi et al., 2014). Al-Swidi et al. (2014) uses TPB to analyze organic food consumption and it has a number of items used for the different constructs used for the study, which includes attitude towards buying organic food,

PCB, SN and INT. The current study adapts the item statements from Al-Swadi et al. (2014) to the same construct (or variables) but for use and purchase of reusable drinking straw.

Five-point liker scale responses were used to measure all items for this study and they range from “Strongly Disagree (1)” to “Strongly Agree (5)”

Table 1. Items for variables

Variable	Items
Attitude	(ATTD1) I prefer reusable straw because it is environmental-friendly
	(ATTD2) I prefer reusable straw because it is less polluting than single use plastic straw
	(ATTD3) I believe that price of reusable straw is quite justified
	(ATTD4) It is exciting for me to buy reusable straw.
Perceived behavioural control	(PBC1) I can take the decision independently to buy reusable straw
	(PBC2) I have the financial capability to buy reusable straw
	(PBC3) I have the time to go for buying reusable straw.
	(PBC4) I have completed information and awareness regarding where to buy reusable straw
Subjective norm	(SN1) The trend of buying reusable straw among people around me is increasing
	(SN2) People around me generally believe that it is better to use reusable straw for environment
	(SN3) My close friends and family member would appreciate it if I buy reusable straw
	(SN4) I would get all the required support (money, time, information) from friends and family to buy reusable straw)
Intention	(INT1) I would buy a reusable straw from online shopping website
	(INT2) I am willing to buy reusable straw in future.
	(INT3) I am willing to buy reusable straw on regular basis.
	(INT4) I would also recommend others to buy reusable straw

4.2 Sampling Design

The study employed a cross-sectional design via a survey conducted in the Selangor. Selangor is the most developed state in Malaysia with a population exceeding 6.7 million in 2020. The state's economic growth is propelled by industrialization, commercialization and urban growth. There are numerous universities and colleges in the state of Selangor. There are also many government agencies that fall under the jurisdiction of state and federal government in Selangor.

This study gathered its data from a survey conducted on selected groups of people in the population. Due to limitation in time, manpower and funding, the study has employed a most commonly used non-probability sampling method that is convenience sampling. While convenience sampling method of data gathering lacks 'clear generalizability', it is found to be 'less expensive, more efficient and simpler to execute' than probability sampling (Jager et al., 2017). Convenience samples are also the norm in published prestigious journals in the area of behavioral study (Jager et al, 2017). Study decided that it will accept a 10 percent margin of uncertainty for its outcome; thus, a minimum of 100 respondents would be sufficient for this study (Conroy, 2015).

5. Findings

Questionnaires were distributed where it was most convenient for a student-researcher to distribute it during the time of study, which is around a campus area. Most of the respondents were students and some were workers. The rationale for selecting these group of respondents was based on the belief that respondents with tertiary education would be well aware of and familiar with the waste issue in general and the concept of reuse for environmental reason. Respondents answered the questions on their own and returned the questionnaire to the student-researcher. A total of 120 questionnaires were distributed and 101 of them (or 84.17%) were returned.

5.1 Respondent characteristics

The samples for study consist of 38 male (37.6%) and 63 female (62.4%) respondents. respondents' age is categorized between teenagers who are below 18 years old (9 respondents or 8.9%, 56 respondents (55.4%) who are between 18-35, 28 respondents (27.7%) who are between 36-50 and 8 respondents (7.9%) who represent the elderly (above 50) (Table 2).

Table 2. Respondent characteristics

		Frequency	
		N	%
Gender	Male	38	37.6
	Female	63	62.4
Age	Under 18	9	8.9
	18-35	56	55.4
	36-50	28	27.7
	Above 50	8	7.9
Ethnic	Malay	79	78.2
	Chinese	13	12.9
	Indian	8	7.9
	Others	1	1
Marital status	Single	48	47.5
	Married	45	44.6
	Divorced	5	5
Highest education	Prefer not to say	3	3
	Secondary school	28	27.7
	Diploma	38	37.6
	Bachelor Degree	28	27.7
	Master degree	6	5.9
Working status	Doctoral degree	1	1
	Government	8	7.9
	Private	53	52.5
	Self employed	7	6.9
	Unemployed	5	5
	Student	28	27.7

In terms of ethnicity, 79 respondents (78.2%) were Malay, 13 respondents (12.9%) were Chinese and 8 participants (7.9%) were Indians. When analyzing profile of respondents based on marital status, 48 respondents (47.5%) are single, 45 respondents (44.6%) are married and 5 respondents (5.0%) are divorced.

In terms of respondents' highest level of education, 28 of respondents (27.7%) graduated from secondary school, 38 respondents (37.6%) from Diploma; 28 respondents (27.7%) from Bachelor Degree, 6 respondents (5.9%) from Master Degree and 1 respondent (1.0%) from Doctoral Degree. Analyzing from career background, 8 respondents (7.9%) work in the government sector, 53 respondents (52.5%) are

private sector workers, 7 respondents (6.9%) are self-employed, 5 respondents (5.0%) are unemployed and 28 respondents (27.7%) are currently full-time students. Sample characteristics are depicted in Table 1.

5.2 Reliability test

A reliability test is conducted to check for internal consistency of each variable with items. On the table above, the value of Cronbrash's Alpha for independent variable which are attitude, perceived behavioral control and subjective norm are 0.855, 0.852, 0.879 respectively (Table 3). It indicates that the results obtained are reliable (very good) as it is above 0.8. The value of Cronbrash's Alpha for dependent variable which is intention is 0.930 which indicates that the results obtained are reliable (excellent) as it is above 0.9. The overall items for attitude, perceived behavioral control, subjective norms and intention were found to be reliable as the value exceeds than the standard acceptable value of 0.7. Thus, it shows that the instruments used were reliable.

Table 3. Reliability analysis and mean of variables

Variable	Cronbach's Alpha
Attitude	0.855
Perceived behavioural control	0.852
Subjective norm	0.879
Intention	0.93

5.3 Correlation coefficient

The Pearson Product-Moment Correlation Coefficient is used to examine the relationship of variables in this study. Correlation value of 0.5 to 1.0 indicates a strong relationship, correlation value of 0.30 to 0.49 indicates moderate relationship and value of 0.10 to 0.29 indicates a weak relationship between two variables. In Table 4, strong relationships are found between ATT and INT ($r = 0.861$, $p < 0.01$), and PCB and INT ($r = 0.733$, $p < 0.01$ and SN and INT ($r = .788$, $p < 0.01$).

Strong relationship between ATT and INT means that if consumers have a positive attitude towards the intention, then they would likely choose to use reusable drinking straw. As for the strong relationship between PCB and INT, it shows that respondents' perception on advertisements, the price of products, testimonies of products, products' effectiveness and products knowledge may affect their decision to use or buy reusable drinking straw.

Table 4. Pearson correlation analysis

Item	ATT	PCB	SN	INT	Min	Max	Mean, M	Std Dev, SD
ATT	1				1	5	3.931	0.918
PCB	0.738**	1			1	5	3.802	0.886
SN	0.809**	0.743**	1		1	5	3.743	0.896
INT	0.861**	0.733**	0.788**	1	1	5	3.881	1.015

Note: **correlation is significant at the 0.01 level (2-tailed)

Mean values are based on likert scale response from 1 as the lowest to 5 as the highest value of responses. Result show respondents having moderate positive attitude as indicated in Table 4 (for ATT, M = 3.931, SD = .918). This means that respondents' have a neutral attitude towards buying reusable straw. Attitude towards the products and its side effects, peers, acquaintances such as salesperson and awareness status on buying single use plastic straw is slightly affecting the respondents' decision making.

5.4 Multiple regression

This study analyzes the determinants of intention to use reusable drinking straw under the TPB model. Intention to use reflects willingness to purchase and use the drinking straw now and in future, recommending the usage to another person and using it on a regular basis.

Collinearity diagnostic was performed and the VIF values are below the threshold value of 5 indicating there is no multi collinearity issue among the determining variables. D-W is close to 2 indicating there is positive autocorrelation among variables; however, the level is acceptable.

The overall model has a good fit based on relatively high adjusted R-squared value of 0.767 and significant F-statistics (Table 5). ATT, PCB and SN are found to have positive effects on the intention to use reusable drinking straw.

Table 5. OLS result of determinants of intention to use reusable straw

Variables	Coef.	Std Err.	t-stat	Sig	VIF
ATT	0.648	0.097	6.694	0.000	3.296
PBC	0.172	0.088	1.956	0.053	2.54
SN	0.228	0.1	2.282	0.025	3.353
Constant	-0.177	0.233	-0.761	0.449	
F-stat (Sig 0.000)	110.774				
Adj R-squared	0.767				
D-W	1.926				

It is understandable that with optimistic environmental, economic and social attitudinal perspective (ATT) towards using reusable drinking straw, the intention to switch to this environmental-friendly option is also high. Similarly, perceived behavioral control variable (PCB) which looks at the capability of a person (financial, time and purchase knowledge) to buy and use reusable drinking straw is expected to be positively associated with intention to use it. A for subjective norm (SN), the positive relationship with intention to use reusable drinking straw reflects that trend and social support (such as financial, opinion, social acceptance) is important in promoting the intention to use it.

All of the three independent variables -- ATT, PCB and SN -- are found to be significant variables explaining the intention to use reusable drinking straw. ATT is most significant at 1% level (p-value = 0.000). SN is significant at 5 % level (with p-value = 0.025) and PBC is the least significant at 10% level (p-value = 0.053). Result of study is consistent with Kadir et al. (2018) which found that all three similar constructs in its model to be strong indicators explaining the intention to use disposable drinking straw.

The following is the resulting empirical estimate (Equation 1) for the intention to use reusable drinking straw:

$$INT = -1.77 + 0.648ATT + 0.172PBC + 0.228SN \quad (1)$$

6. Conclusion and discussion

The study concluded that attitude of a person towards reusable drinking straw, subjective norm and perceived behavioral control are strong predictors of the intention to use or purchase reusable drinking straws. In order to mould behavior towards a using reusable drinking straws such as those made of steel, bamboo or other materials that allow the straw to be reused after cleaning, attitude of consumers, their control of purchase and use decisions as well as the support of the community they live in play important role.

A positive attitude towards using reusable drinking straws will increase a person's intention to use these straws. In order to encourage the use of reusable drinking straws through instilling the intention to use or purchase these straws, information on the environmental and economic benefits of using them need to be spread to the general public. The public needs to be assured on the benefits of being more concerned and more participative in initiatives to improve and maintain the environment in order to promote positive attitudes and intentions to eventually use and purchase reusable drinking straws. The marketing and promotion of these straws need to be enhanced so that more people will have positive attitude towards it.

For those who are not aware of the benefits of using reusable products, free samples of these straws can be given for the public to try to use and enjoy using it and be able to make comparison with the disposable ones. It is the responsibility of businesses to commit to preservation of nature by being involved in recycling and reusing activities (Ibrahim et al., 2019). Schools and colleges should teach and instill environmental values to students so that they believe in maintaining the environment through reduce-and-reuse efforts. Similarly, the working population should be encouraged to have positive environmental attitudes by promoting the campaign for bringing own food utensils to work, as this means that they will likely make use of reusable drinking straws during their meal time.

It is recommended that sellers and producers of reusable straws promote the benefits of using this product to the public so that people do not find using reusable straws inconvenient and not hygienic. Consumers especially teenagers might have positive attitude and perception towards the products because they love new things such as the metal straw which can attract their attention. Nowadays, metal straws are popular among teenagers. It then will increase and strengthen the consumer's purchasing decision on the products without being doubtful for its safety.

Employers should increase the initiative in increasing awareness of the product among government and private sector workers. There are many workers that have different education background, age, gender and other factor that can affect their understanding regarding plastic straw because most of old generation and employees that are not highly educated faced difficulties to understand about the important of reusable straw. Employers should put more effort by increasing the initiative to make sure all the employees fully understand about the advantage of using reusable straw before the organization implement it.

Apart from attitude, perceived behavioral control is another predictor for the intention to use reusable drinking straw. There are many ways promoting intention to use and purchase of reusable drinking straw can be done. Barriers to using the reusable straws can be reduced intentionally. Examples of the barriers might be lack of accessibility and affordability to these straws. Government can improve affordability by subsidizing the purchase of these straws. Restaurants should allow customers to buy these straws and provide an environment that is conducive for the purchase of these straws. In order to improve accessibility, reusable straws need to be sold at convenience stores and places where they can be easily accessed. Prices of these straws need to be fair and not relatively expensive to its disposable option. More innovative efforts can be done to encourage the use of local resources to produce the reusable straws and to make it more durable and convenient to use.

Community acceptance will strengthen the intention to use reusable straws. When people around us are supportive of new ways of doing things, the intention to accept using the new method comes more naturally

than when the surrounding people object or question the behavior. The government should promote environmental-friendly practices such as using reusable straws as the new norm in the society. More awareness and educational information supporting pro-environmental behavior needs to be spread out to the public in order to make the transition towards environmental-friendly consumption practices more common and acceptable in the society. This will in turn induce intentions for the right behavior.

The study has a few limitations as it was conducted in Selangor. Consumers belonging to other parts of the country may vary in their tendency toward buying reusable straw based on their attitudes, subjective norms and perceived behavioral control. Similarly, the sample respondents represented the viewpoint of highly educated people toward buying reusable straw. It is quite possible that people having lower level of knowledge and education perceive reusable straw consumption in a different manner. It is suggested that for future research, respondents from other states be included in the study. Respondents from a more varied background (such as from the rural or peri-urban areas) can also be included in order to see if results of study are still the same.

Acknowledgements

The study is supported by the Faculty of Business & Management (FBM) of Universiti Teknologi MARA (UiTM) via the Faculty Research Grant (Project Code: 600-IRMI 5/3/DF(FPP) (014/2019). We thank Green Productivity Association of Malaysia (GPAM) who contributed information for use in the analyses.

References

- Aboelmaged, M. (2021) E-waste recycling behaviour: An integration of recycling habits into the theory of planned behaviour. *Journal of Cleaner Production*, 278, 124182.
<https://doi.org/10.1016/j.jclepro.2020.124182>
- Ajzen, I. (1985). From intentions to actions: A theory of planned behaviour. In *Action control* (pp. 11–39). Berlin: Springer.
- Ajzen, I. (1991). The theory of planned behaviour. *Organizational Behaviour and Human Decision processes*, 50(2), 179-211.
- Al-Swidi, A., Huque, S. M. R., Hafeez, M. H., & Shariff, M. N. M. (2014). The role of subjective norms in theory of planned behaviour in the context of organic food consumption. *British Food Journal*, 116(10), 1561–1580.
- Armitage, C. J., & Conner, M. (2001). Efficacy of the theory of planned behaviour: A meta-analytic review. *British Journal of Social Psychology*, 40(4), 471-499.
- Boon, P. (2019). *The ban on single use plastic straws*. Borneo Post Online.
<https://www.theborneopost.com/2019/1/Retrieved: 21 May 2021>.
- Brown, V. (2017). *Spare that straw, please*. The Star. Retrieved May 21, 202 from
<https://www.thestar.com.my/news/nation/2017/08/20/spare-that-straw-please-a-seemingly-harmless-tool-that-helps-you-enjoy-your-cold-drinks-is-sapping-t/>.
- Chan, K. (1998). Mass communication and pro-environmental behaviour: waste recycling in Hong Kong. *Journal of Environmental Management*, 52(4), 317-325.

- Cheung, S. F., Chan, D. K. S., & Wong, Z. S. Y. (1999). Re-examining the theory of planned behaviour in understanding wastepaper recycling. *Environment and Behaviour*, 31(5), 587-612.
- Chu, P. Y., & Chiu, J. F. (2003). Factors influencing household waste recycling behaviour: test of an integrated model. *Journal of Applied Social Psychology*, 33(3), 604-626.
- Conroy, R. (2015). *Sample size: A rough guide*. Retrieved March 8, 2021 from <http://www.beaumontethics.ie/docs/application/samplesizecalculation.pdf>
- Davies, J., Foxall, G. R., & Pallister, J. (2002). Beyond the intention-behaviour mythology: an integrated model of recycling. *Marketing Theory*, 2(1), 29-113.
- Defranc, A., den Broucke Van, S., Leroy, R., Hoppenbrouwers, K., Lesaffre, E., Martens, L., ... & Declerck, D. (2008). Measuring oral health behaviour in Flemish health care workers: an application of the theory of planned behaviour. *Community Dental Health*, 25(2), 107-114.
- Fishbein, M., & Ajzen, I. (1975). *Intention and Behaviour: An introduction to theory and research*. Reading, MA: Addison-Wesley.
- Goddard, S. (2020). Why plastic straws are a problem and what you can do. Green That Life website. Retrieved May 21, 2021 from <https://greenthatlife.com/why-plastic-straws-are-a-problem>
- Geyer, R., Jambeck, J. R & Law, K. L. (2017). Production, use and fate of all plastics ever made. *Science Advances*, 3(7), e1700782. <https://doi.org/e1700782>. 10.1126/sciadv.1700782
- Ham, M., Jeger, M., & Frajman Ivković, A. (2015). The role of subjective norms in forming the intention to purchase green food. *Economic Research-Ekonomska Istraživanja*, 28(1), 738-748. <https://doi.org/10.1080/1331677X.2015.1083875>
- Hamzah, M. I. & Tanwir, N. S. (2021). Do pro-environmental factors lead to purchase intention of hybrid vehicles? The moderating effects of environmental knowledge. *Journal of Cleaner Production*, 279, 123643. <https://doi.org/10.1016/j.jclepro.2020.123643>
- Hasbullah, N., Mahajar, A. J., & Salleh, M. I. (2014). A conceptual framework of extending the theory of planned behaviour: the role of service quality and trust in the consumer cooperatives. *International Journal of Business and Social Science*, 5(12), 142-148.
- Hassan, A., Rahman, N. A., & Abdullah S. I. S. S. (2011). *The level of environmental knowledge, awareness, attitudes and practices among UKM students*. Universiti Kebangsaan Malaysia Research Repository. <http://tree.utm.my/wp-content/uploads/2013/03/the-level-of-environmental-knowledge-awareness-attitudes-and-practices-among-ukm-students.pdf>
- Hassan, N. N. N. M., Kadir, J. M. A., & Abd Aziz, N. N. (2020). Examining a TPB model towards intention to use biodegradable drinking straw using PLS-SEM. *Environment-Behaviour Proceedings Journal*, 5(15), 13-18.
- Hogg, M., & Vaughan, G. (2005). *Social Psychology (4th ed.)*. London: Prentice-Hall.
- Ibrahim, I., Sundram, V. P. K., Omar, E. N., Yusoff, N., & Amer, A. (2019). The determinant factors of green practices adoption for logistics companies in Malaysia. a case study of PKT Logistics Group Sdn. Bhd. *Journal of Emerging Economies and Islamic Research*, 7(1), 14-23. <https://doi.org/10.24191/jeeir.v7i1.6023>

- Jager, J., Putnick, D. L., & Bornstein, M. H. (2017). More than just convenient: The scientific merits of homogeneous convenience samples. *Monographs of the Society for Research in Child Development*, 82(2), 13-30.
- Jambeck, J. R., Geyer, R., Wilcox, C., Siegler, T. R., Perryman, M., Andrady, A., & Law, K. L. (2015). Plastic waste inputs from land into the ocean. *Science*, 347(6223), 768-771.
- Kadir, J. M. A, Hassan, N. N. N. M., & Aziz, N. N. A. (2018). Investigating students' attitude and intention to use biodegradable drinking straw in emerging country. In *Proceedings of ICAM2019 – International Conference on Accounting and Management* (pp.71). Faculty of Accountancy, Universiti Teknologi MARA Selangor. <https://ir.uitm.edu.my/id/eprint/43865/1/43865.pdf>
- Liu, T. K., Wang, M. W., & Chen, P. (2013). Influence of waste management policy on the characteristics of beach litter in Kaohsiung, Taiwan. *Marine Pollution Bulletin*, 72(1), 99-106.
- Levine, D. S., & Strube, M. J. (2012). Environmental attitudes, knowledge, intentions and behaviors among college students. *Journal of Social Psychology*, 152(3), 308-326. <https://doi.org/10.1080/00224545.2011.604363>
- Malay Mail (2018). *Plastic straw ban effective 2020, ministry clarifies*. Retrieved May 21, 2021 from <https://www.malaymail.com/news/malaysia/2018/09/22/plastic-straw-ban-effective-2020-ministry-clarifies/1675334>
- MESTECC (2018) *Malaysia's roadmap towards zero single-use plastics 2018–2030*. Putrajaya, Malaysia: Ministry of Energy, Science, Technology, Environment and Climate Change (MESTECC).
- Mohammed, B. S., Fethi, A., & Djaoued, O. B. (2017). The Influence of attitude, subjective norms and perceived behavior control on entrepreneurial intentions: Case of Algerian students. *American Journal of Economics*, 7(6), 274-282.
- Nguyen, T. T. H., Nguyen, N., Nguyen, T. B. L., Phan., T. T. H., Bui., L. P. & Moon, H. C. (2019). Investigating Consumer Attitude and Intention towards Online Food Purchasing in an Emerging Economy: An Extended TAM Approach. *Food*, 8(11), 576.
- Nunez, K. (2020) *Should you drink with a straw?* Healthline. Retrieved March 8, 2021 from <https://www.healthline.com/health/drinking-through-a-straw>
- Ritchie, H. & Roser, M. (2018). Plastic Pollution. *Published online at OurWorldInData.org*. Retrieved from <https://ourworldindata.org/plastic-pollution>
- Scherer, L., Svenning, J-C., Huang, J., Seymour, C. L., Sandel, B., Mueller, N., Kummu, M., Bekunda, M., Bruelheide, H., Hochman, Z., Siebert, S., Rueda, O. & Bodegom, P. M., (2020). Global priorities of environmental issues to combat food insecurity and biodiversity loss. *Science of The Total Environment*, 730, 139096. <https://doi.org/10.1016/j.scitotenv.2020.139096>
- Silverman, B. G., Hanrahan, N., Huang, L., Rabinowitz, E. F., & Lim, S. (2016). Artificial intelligence and human behavior modeling and simulation for mental health conditions. In D. D. Luxton (Ed.), *Artificial Intelligence in Behavioral and Mental Health Care* (pp. 163-183). Academic Press. <https://doi.org/10.1016/B978-0-12-420248-1.00007-6>

Taylor, S. & Todd, P. (1995). An integrated model of waste management behavior: A test of household recycling and composting intentions. *Environment and Behavior*, 27(5), 603-630.

Tembo Paper. (2020). *Plastic straws and the environment: what is the impact?* Retrieved March 11, 2021 from <https://www.tembopaper.com/news/plastic-straws-and-the-environment-what-is-the-impact>

Wang, H. & Mangmeechai, A. (2021). Understanding the gap between environmental intention and pro-environmental behavior towards the waste sorting and management policy of China. *International Journal of Environmental Research and Public Health*. 18, 757. <https://doi.org/10.3390/ijerph18020757>

Webb, T. L., & Sheeran, P. (2006). Does changing behavioral intentions engender behavior change? A meta-analysis of the experimental evidence. *Psychological bulletin*, 132(2), 249.

Xu, X., Hua, Y., Wang, S. & Xu, G. (2020). Determinants of consumer intention to purchase authentic green furniture. *Resources, Conservation and Recycling*, 156, 104721. <https://doi.org/10.1016/j.resconrec.2020.104721>

Zen, I. S. (2018). Nudge to promote sustainable shopping lifestyle. *Proceedings*, 2, 1394. <https://doi.org/10.3390/proceedings2221394>

Further readings

Rochman, C. M., Browne, M. A., Underwood, A. J., Van Franeker, J. A., Thompson, R. C. & Amaral-Zettler, L. A. (2016). The ecological impacts of marine debris: unraveling the demonstrated evidence from what is perceived. *Ecology*, 97(2), 302-312. <https://doi.org/10.1890/14-2070.1>

Strawless Ocean (2021). *Understanding plastic pollution*. Retrieved May 21, 2021 from <https://www.strawlessocean.org/faq>