

## [LOG 20] FACTORS INFLUENCE CONSUMER'S BEHAVIOUR TOWARD LOGISTICS E-WASTE RECYCLING IN MALAYSIA

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### ABSTRACT

*E-waste generate are greater than e-waste being disposal by consumer in Malaysia which will contaminate the environment and risking public health as well. Past studies revealed that e-waste can be disposal by three ways such as burning, recycling and put at landfill which recycling are the most appropriate concept to reduce the e-waste in an efficiency and effective manner. Previous studies in reverse logistics article mainly focus on recycling concept from supplier or manufacturer context which lack of study connective between logistics company strategy and consumer behaviour. Total 420 undergraduates from University Utara Malaysia (UUM) were choose as respondents due to their knowledgeable about e-waste, high self-discipline and technology generation user via convenience sampling method and data collected will analysis with SPSS version 23. The findings reveal the all the variables such as attitude toward recycling, awareness of environment consequence, perceived social norms, perceived convenience are positives correlated with behaviour toward logistics e-waste recycling in this study.*

**Keywords:** *logistics e-waste recycling, sustainable logistics, environment consequence, social norms, perceived convenience*

### INTRODUCTION

The consciousness towards environmental issues such as pollution, waste and shortage of unrennewable natural resources had widely acknowledged by the people in worldwide due to industrial activities including purchasing materials, packaging and transportation (Nikbakhsh, 2009; Sarkis, 2003). Thus, the subject related to green logistics practice and environmental concern has become popular in academic literature. Schniederjans and Cao (2009) stated the firm's wealth and the standard of society living will increase through practicing sustainable business. Typically, end-of-life product management such as reuse, recycle and remanufactured are the activities of reverse logistics management had been increased which emerging as part of the primary blueprint for practicing sustainable logistics (Wang and Gupta, 2011). Recycling had emerging in interest for both in past and in the present in order to fulfil the increasing basic needs with limited resources. Hence, USEPA (2008) stated recycling remains today as a crucial global issue to reduce the waste and promote environment advantages within community. In this information technology phase, new communication products with high performance capability and user friendly feature are emerging promptly. This growing demand for electrical and electronic products along with the tendency to replace it without recycling e-waste has created new threat for environmental and

humanity (Nixon et al., 2009). Widmer and Oswald (2005) defined e-waste as the variety forms of electrical and electronic products such as computers, cell phone and refrigerator are being unused and discard by consumers. In Malaysia context, the government implement various program in order to promote recycling rate among consumer over the decades yet is still consider quite low when compared to other country. As stated by Datuk Seri Abdullah Ahmad Badawi, former Prime Minister of Malaysia, Malaysian should recycle the waste after consuming should not be limited to the features of colour recycle bins for variety material which society should not ignore e-waste recycling as well as encourage to perform for promote sustainability environment as part of Vision 2020 (Cigdem, G. K., Saba, P. H. and Tran, V. P., 2016). Logistics company that provide reverse logistics service are emerge as one of the alternative for consumer to recycle e-waste or known as logistics e-waste recycling. For instance, TES-AMM and Hitachi Company is a logistics company in Malaysia which provide pick up services for potentially recyclable material and disposal services from consumer and transporting to manufacturer. Therefore, consumers are the main aspect for involvement on logistics e-waste recycling which essential required focusing in order to promoting sustainability environment.

## **PROBLEM STATEMENT**

E-waste produce by the society are million tons each year without realising the risk of it toxic that can damage the environmental and public health (Joseph, 2016). Molinari (2011) stated the potential toxic such as mercury, chromium, arsenic, cadmium and lead is found mostly of the electronic gadget which containing plastic and heavy metals are potentially harm environmental and public health. For instance, the portion of cadmium from one mobile phone battery is enough to contaminate 600,000 liters of water (Nnorom et al., 2009). According to The Star Newspaper, there are around 65 million cell phone in Malaysia which accumulated two for every society. The society are likely get rid of their current mobile phone regularly once they planning to purchase a newest model as well as following the culture of “use-and dump” (Widmer and Oswald, 2005). Therefore, there are continuous increasing e-waste generated by consumers for day to day will contaminate the environment. Furthermore, Ikram Ismail (2014) reveal that e-waste recycling is accountable to the least favourable recycling by the communities compare to other recyclable waste in Malaysia. Previous studies in reverse logistics article mainly focus on recycling concept from supplier or manufacturer context. Nevertheless, there are only few research focus on connecting companies reverse logistics policy and strategy to consumer behaviour. The reverse logistics system clearly cannot work without the involvement of consumers since they are the first link in the overall supply chain (Oom do Valle et al., 2009). Therefore, without consumer involvement on logistics e-waste recycling thus the e-waste will end up disposal by either burning or put at landfills which will pollute the environment. In point of view for the situation, this research will employ Theory of Reasoned Action to examine the factor influences consumer’s behaviour towards logistics e-waste recycling in Malaysia. Thus, the main objective of this research is to examine the relationship between independent variable such as attitude towards recycling, awareness of environment consequences, perceived social norms and perceived convenience and dependent variable such as consumer’s behaviour towards logistics e-waste recycling in Malaysia.

## THEORY OF REASONABLE ACTION

Theory of Reasonable Action (Ajzen and Fishbein, 1980) are widely adopted in attitude and behaviour study (Calvin et al., 2012; Davies et al., 2002). Theory of Reasonable Action provide a structure to examine the factors influencing behavioural option and claimed that an individual either acceptable or unacceptable to perform certain behaviour is the either causative factor or volitional control for that behaviour. Environmental behaviour study lies at the central of the Theory of Reasonable Action models which is the relationship between attitude and behaviour is the reason Theory of Reasonable Action broadly adopted. Barr et al. (2003) regard such relationship as value-action gap by difference between intention and behaviour which crucial for environmental policy makers as their priority to confirm society do what they intend to do. The contention in psychological factors and attitude are recycling behaviour crucial predictors which support by Theory of Reasonable Action and adopting in earlier recycling studies. Based on the Theory of Reasonable Action framework, this research suggested attitude, norms and extra behavioural variables such as awareness and convenience (Calvin et al., 2012; Chu and Chiu, 2003; Kelly et al., 2006; Sidique et al., 2010; Tonglet et al., 2004) are already employ in previous recycling research to reveal recycling option made and the factors that emphasizes behaviours. Therefore, this study will employ Theory of Reasonable Action to examine did the factors such as attitude towards recycling, awareness of environment consequences, perceived social norms and perceived convenience influences consumer's behaviour towards logistics e-waste recycling in Malaysia.

### **Attitude towards recycling**

Electronic waste required an excellent system information and knowledge in order to perform recycling in efficient and effective manner. The extent of knowledge towards recycling will influences a person's attitude (Sidique et al., 2010). The society are not willingness to perform recycling once they are lack of information and knowledge about recycling concept (Cairns, 2005). Consequently, Salhofer and Isaac (2002) reveal that society are educated through public relation will more encouraging in participate recycling programme. In this research, attitude towards recycling is the term which an individual trust that his/her knowledge about recycling would influence the behaviour to perform e-waste recycling in Malaysia (Kelly et al., 2006).

### **Awareness of environment consequence**

The rapidly growth in pollution simultaneous with information technology had created two main issue such as environment pollution and natural resource depletion as well as public healthy will affected. E-waste can disposal by three ways such as burning, put at landfills and recycling. However, e-waste disposal through burning and landfills will produce negative outcome to the environment such as air pollution and land pollution. People whose aware about the environment consequences is positively associated to their behaviour in protecting the environment (Domina and Koch, 2002) which they will favourable to conduct recycling. In this study, awareness towards environment consequence is the term which an individual aware about environment consequences would influence his/her e-waste recycling behaviour (Calvin et al., 2012).

### **Perceived social norms**

Today's, society are easily disclosed to public environment due to globalization and the advancement of information technology which they would prefer imitate what public

perform. Cheung, Chan, and Wong (1999) stated that variety of social reference such as friends and neighbourhood will positively correlated to influence an individual's behaviour and intention to comply regarding environmental concern. Brekke, Kipperberg, and Nyborg (2010) stated an individual will conducting recycling when his/her social reference performing recycling. In this research, perceived social norms is the term to which an individual believes that his/her friends and classmates perception of recycling and the media would influence the logistics e-waste recycling behaviour (Calvin et al., 2012).

### **Perceived convenience**

The innovation of technology field had enhanced convenience and flexibility purpose for saving the industry and society time and cost from squeezing time analysis by Southerton's (2003). Olsen (2011) stated people demand to obtain and consume things in a convenient and easy way due to arising in wealthy and convenient society. As a result, society will conducting recycle if there are time availability and low cost along with desirable facilities located (Saphores et al., 2006; Tonglet et al., 2004). In Malaysia, the facilities provided by government for e-waste recovery are mainly focused on industrial which consumer required to spend extra time to figure out the location of facilities will behave unwilling to perform e-waste recycling. In this research, perceived convenience is the term to which an individual believes that time availability for cleaning, sort, and place to store e-waste would influence his/her e-waste recycling behaviour (Calvin et al. ,2012).

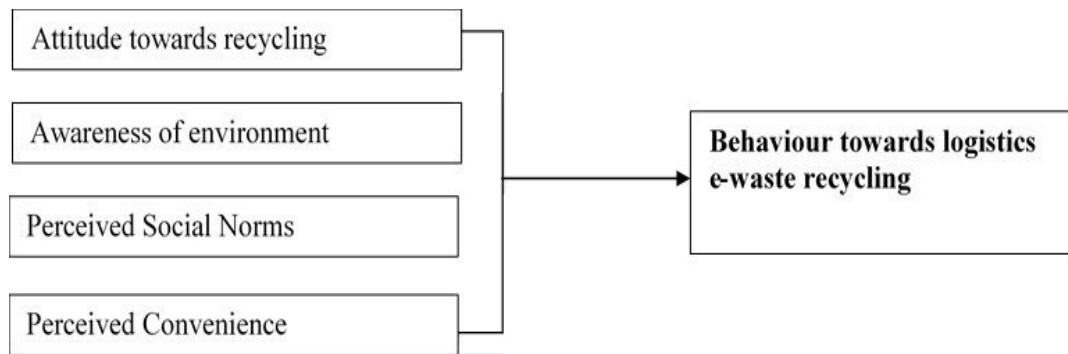
### **Behaviour toward logistics e-waste recycling**

Logistics e-waste recycling is a behaviour that needs reasonable effort on the part of the individual as household electrical and electronic waste must be prepared, sorted and stored and recycle to logistics company (Boldero, 1995). Consumer behaviour towards logistics e-waste recycling influence by knowledge, experience, relationship, education, time availability and cost. Therefore, consumers will perceive convenience by the way reverse logistics company organize the strategic drop-off centre so they had time availability to clean up, sort, and place to store e-waste would influence their logistics e-waste recycling behaviour (Calvin et al., 2012).

## **METHODOLOGY**

In this research paper, quantitative study will be applied in this research by answering four hypotheses through distribute questionnaire which the data will collect and prepared for statistical analysis. In addition, in this research will conduct applied research by employ existing theory which is Theory of Reasonable Action to reveal the relationship between consumer's attitude and behavior in logistics e-waste recycling.

## Research framework



**Figure 1**  
Conceptual framework

## Research hypothesis

In this research, there are four hypotheses are being tested as shown below:

H<sub>a1</sub>: There is a significant relationship between attitude towards recycling and behaviour towards logistics e-waste recycling in Malaysia.

H<sub>a2</sub>: There is a significant relationship between awareness of environment and behaviour towards logistics e-waste recycling in Malaysia.

H<sub>a3</sub>: There is a significant relationship between perceived social norms and behaviour towards logistics e-waste recycling in Malaysia.

H<sub>a4</sub>: There is a significant relationship between perceived convenience and behaviour towards logistics e-waste recycling in Malaysia.

## Data collection

In this research, 15 items measuring the variables are taken from previous research based on construct validity concept (Calvin et al., 2012; Darby and Obara, 2005; Kelly et al., 2006; Nixon et al., 2009). There are total fifteen items contained in the personal administered questionnaires and electronic questionnaire which are closed questions distribute to respondents for make choices on the set of statements given through five-point Likert Scale as 1 denoted strongly disagree and 5 denoted strongly agree with all positive words. This research is carried out in university due to student had unfinished personality, less formulated sense of self and good knowledge about logistics e-waste will increase both reliability and acceptance level of the findings. Ritchie and Lewis (2003) stated convenience sampling technique considered appropriate due to sampling frame of student in University Utara Malaysia are inaccessibility. Previous literature recommends that the general public and wider society can influences by university students' behaviour which possibly regard as a representation of all consumers (Calvin et al., 2012; Kelly et al., 2006). Total number of 420 respondents are participate in answering personal administered questionnaires and electronic questionnaires via "Google Forms" in online. 140 respondents are take part in answering electronic questionnaires while 280 respondents are provided data through personal administered questionnaires.

## Measurement

The 15 items consist in the questionnaire are constructed based on the previous research on the related subject study. Validity testing indicated Cronbach's alpha score for the

entire instrument is 0.891 which is very good score according to Sekaran and Bougie (2013).

**Table 1**  
Cronbach's alpha scores for variables

Variable	N of item	Cronbach's Alpha Value
Attitude towards recycling	3	0.815
Awareness of environment consequences	3	0.831
Perceived social norms	3	0.828
Perceived convenience	3	0.859
Behaviour towards logistics e-waste recycling	3	0.813

There are 3 items for each variable to measured which are attitude towards recycling, awareness of environment consequences, perceived social norms, perceived convenience and behaviour towards logistic e-waste recycling with Cronbach's Alpha value of 0.815, 0.831, 0.828, 0.859 and 0.813 respectively. Therefore, the five variable Cronbach's Alpha value are very good as the value is between 0.8 and 0.9 (Sekaran and Bougie, 2013).

## RESULT AND DISCUSSION

**Table 2**  
Correlation analysis result

		Behaviour towards logistics e-waste recycling
Attitude toward recycling	Person Correlation, r	0.291
	Significant level ( $p \leq 0.01$ )	0.000
Awareness of environment	Person Correlation, r	0.274
	Significant level ( $p \leq 0.01$ )	0.000
Perceived social norms	Person Correlation, r	0.506
	Significant level ( $p \leq 0.01$ )	0.000
Perceived convenience	Person Correlation, r	0.625
	Significant level ( $p \leq 0.01$ )	0.000

**Table 3**  
Descriptive variable statistics

Variable	Means	Standard Deviation
Attitude towards recycling	4.05	0.607
Awareness of environment consequences	4.09	0.667
Perceived social norms	3.08	0.813
Perceived convenience	3.18	0.836
Behaviour towards logistics e-waste recycling	3.27	0.809

### Attitude towards recycling

The first research objective is to examine the relationship between attitude towards recycling and behaviour towards logistics e-waste recycling in Malaysia. The findings reveal there is a weak positive relationship exists between attitude towards recycling and behaviour towards logistics e-waste recycling ( $p \leq 0.01$ ,  $r = 0.29 < 0.5$ ) based on

Table 2. Hence, the finding is consistent with the previous study by Tonglet et al., (2004) suggested consumer are knowledgeable about the recycling method to handle different type of waste will increase his/her behaviour to practice recycling. According to Table 3, the respondents agree that knowledge about type of electronics and electrical waste can be recycle are well known will highly encourage people participate in e-waste recycling. As a result, consumer will practice logistics e-waste recycling as well as the information and skill are availability and accessibility by them.

#### **Awareness of environment consequences**

The second research objective is to examine the relationship between awareness of environment consequence and behaviour towards logistics e-waste recycling in Malaysia. The findings reveal there is a weak positive relationship exists between awareness of environment consequence and behaviour towards logistics e-waste recycling ( $p \leq 0.01$ ,  $r = 0.274 < 0.5$ ) based on Table 2. Hence, the finding is consistent with the previous study by Nnorom et al. (2009) suggested consumer willing to paid more for purchase green electronics as his/her aware about the important conserving the environment. In addition, Nixon et al. (2009) recommended recycling is the best choice practice by the consumer to reduce contamination on the environment. According to Table 3, the respondents agree that recycle e-waste will improve the environment and considered as a major method to reduce landfills and reserve natural resources. As a result, consumer will practice logistics e-waste recycling as well as it is the best method to conserve the environment compare to burning and putting at landfills.

#### **Perceived social norms**

The third research objective is to examine the relationship between perceived social norms and behaviour towards logistics e-waste recycling in Malaysia. The findings reveal there is a strong positive relationship exists between perceived social norms and behaviour towards logistics e-waste recycling ( $p \leq 0.01$ ,  $r = 0.506 > 0.5$ ) based on Table 2. Hence, the finding is consistent with the previous study by Largo-Wight et al. (2012) suggested the more people which refer to consumer's family, friend and neighbour practicing recycle will influence his/her to practice recycling as well. In addition, the popularity of an activity sharing on social network will positively influence society to follow up with the trend (Chu and Chiu, 2003). On the other words, consumer will be motivated to practice recycling frequently if he/she is encouraging by surrounding people and the recycling concept widely known on social media. According to Table 3, the respondents agree that e-waste recycling concept aggressive promote on social media will become slacktivism for the society. As a result, consumer will practice logistics e-waste recycling as well as it is widely accepted and practiced by the social references such as friend, family, neighbour and social media to promote social responsibility.

#### **Perceived convenience**

The fourth research objective is to examine the relationship between perceived convenience and behaviour towards logistics e-waste recycling in Malaysia. The findings reveal there is a strong positive relationship exists between perceived convenience and behaviour towards logistics e-waste recycling ( $p \leq 0.01$ ,  $r = 0.625 > 0.5$ ) based on Table 2. Hence, the finding is consistent with the previous study by Sidique et al. (2010) suggested consumers are more favourable to visit a recycling site as well as they regard recycling a convenient activity. Furthermore, the location of

recycling centre are strategic and convenience will increase consumers to recycle in order to reduce their cost and time consumption (Saphores et al., 2006). According to Table 3, the respondents agreed that the process to perform e-waste recycling will not consumer longer time and cost for sorting, cleaning and storing the e-waste. As a result, consumer will practice logistics e-waste recycling as well as the logistics company capable to provide drop-off transport for e-waste is convenience for his/her to practice recycling in an efficient and effective manner.

### **LIMITATION AND SUGGESTIONS FOR FUTURE STUDY**

There are several limitations have been found in conducting the research as well as suggestion will be provided for future research. Firstly, this research is applied convenience sampling method which the results of the findings unable to generalizable for the whole population. Thus, future research is advised to applied stratified sampling method which consumers lived at different geographical area. The consumers stay at either North Malaysia or South Malaysia will had differ perception on logistics e-waste recycling due to regulations implemented by government. As a result, a better representativeness of population about logistics e-waste recycling context can be obtained via stratified sampling method.

Secondly, this research is not compare the differences mean between gender and age due to the main purpose is examine the correlation relationship between attitude towards recycling, awareness of environment consequence, perceived social norms and perceived convenience with behaviour towards logistics e-waste recycling. Male and female will have different perception on practicing logistics e-waste recycling due to time availability in terms of working and habit. In addition, the differentiate level in age will had different knowledge and experience level to practicing logistics e-waste recycling. Thus, future research is encouraged to develop a moderating variable such as gender and age to increase precision level to support logistics e-waste recycling context.

Lastly, this research had identified the factors such as attitude towards recycling, awareness of environment consequence, perceived social norms and perceived convenience will influence behaviour towards e-waste recycling based on TRA model. However, perceived behaviour control did not construct for logistics e-waste recycling which will create social desirability bias as recycling is commonly promoted and encourage in this research. Therefore, future research could examine this construct by applied Theory of Planned Behaviour model.

### **CONCLUSIONS**

In this research, factors influence consumer's behaviour towards logistics e-waste recycling are determined based on TRA model. Attitude towards recycling, awareness of environment consequence, perceived social norms and perceived conveniences are positive significantly influence consumer's behaviour towards logistics e-waste recycling. The findings of this research is beneficial to the government, logistics company and society for promote sustainability logistics in term of environment, social and economic. Consequently, government should enhance the credibility of logistics



company to perform e-waste recycling with the consumers through various programme organize at schools. Hence, students capable to share their knowledge about logistics e-waste recycling with family, friends and neighbour. As a result, the consumers will acknowledge e-waste can be recycling with logistics company in an efficient and effective manner in order to prevent contamination on the environment and public health. In conclusion, this research hope can provide testability and replicability as a future citation about logistics e-waste recycling context.

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