

**A STUDY ON HOUSEHOLDERS' RECYCLING BEHAVIOR AND THE  
FACTORS THAT DETERMINE THEIR RECYCLING INTENTION**

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## LIST OF ABBREVIATIONS

ATT	Attitude Towards Recycling
AVE	Average Variance Extracted
CFA	Confirmatory Factor Analysis
CR	Composite Reliability
EC	Environment Concern
EK	Environment Knowledge
H	Hypothesis
n	Number of Respondent
PBC	Perceived Behavioral Control
PC	Perceived Convenience
PLS	Partial Least Square
PLS-SEM	Partial Least Square-Structural Equation Modeling
R <sup>2</sup>	R Square
RI	Recycling Intention
SE	Standard Error
SEM	Structural Equation Modeling
SN	Subjective Norm
SPSS	Statistical Package for the Social Sciences
TPB	Theory of Planned Behavior
TRA	Theory of Reasoned Action
$\beta$	Beta
$\alpha$	Cronbach's Alpha

## **ABSTRAK (MALAY)**

Pengurusan sisa yang betul boleh mengurangkan kemerosotan alam sekitar. Kemerosotan alam sekitar seterusnya akan menjejaskan kualiti hidup manusia. Kitaran semula merupakan penyelesaian yang berkesan untuk megurangkan isu-isu alam sekitar. Kitaran semula membantu melindungi persekitaran yang bersih dan memastikan kelangsungan hidup manusia pada jangka masa panjang. Tidak banyak kajian akademi dijalankan ke atas tingkah laku kitaran semula di negara membangun seperti Malaysia. Kajian ini bertujuan untuk mengkaji kelakuan kitaran semula isi rumah tangga dan faktor-faktor yang menentukan niat kitaran semula mereka dengan menggunakan *Teori of Planned Behavior*. Sebanyak 300 borang soal selidik diri telah diedarkan di mana 207 borang soal selidik telah dikumpul kembali. Tetapi hanya 202 borang soal selidik telah digunakan untuk analisis data dengan menggunakan perisian statistik Sains Sosial (SPSS) dan *Partial Least Square (PLS)*. Hasil kajian menunjukkan bahawa sikap dan juga kemudahan mempunyai hubungan positif dan signifikan terhadap niat kitaran semula rumah tangga. Walau bagaimanapun, kebimbangan terhadap pencemaran alam sekitar, pengetahuan penjagaan alam sekitar, norma subjektif dan tanggapan penguasaan tingkah laku tidak mempunyai hubungan positif dan signifikan terhadap niat kitaran semula isi rumah tangga. Hasil kajian ini adalah terhad kepada isi rumah tangga di Pulau Pinang sahaja. Jadi, hasil kajian ini tidak boleh mewakili konteks Malaysia secara keseluruhan. Selain itu, kajian ini hanya menyiasat niat amalan kitaran semula isi rumah tangga, bukan dari aspek tingkah laku isi rumah tangga. Oleh itu, kajian pada masa hadapan terhadap

kitaran semula isi rumah tangga harus diperluaskan kepada responden di seluruh negeri di Malaysia. Selain itu, kajian pada masa hadapan juga perlu melanjutkan model kajian dari niat kitaran semula isi rumah tangga kepada perilaku kitaran semula isi rumah tangga. Penemuan daripada kajian ini boleh digunakan oleh industri kitaran semula, pihak kerajaan dan pertubuhan alam sekitar dalam merancang strategi dan program kitaran semula demi meningkatkan penyertaan komuniti terhadap kitaran semula di Malaysia khususnya.

## **ABSTRACT**

Proper waste management could reduce environment deterioration. Environment deterioration would subsequently affect quality of human life. Recycling is claimed to be a better solution to this environment issues. Recycling helps to keep environment clean and ensure long-term survival of humankind. There is less study on recycling behavior in developing country such as Malaysia. This study aims to study the householder's recycling behavior and the factors that determine their recycling intention using Theory of Planned Behavior. A total of 300 self-administered questionnaires were distributed of which 207 of questionnaires were collected back and only 202 were used for data analysis using statistical Package for the Social Sciences (SPSS) and Partial Least Square (PLS). The findings of the study indicate that attitude as well as perceived convenience have positive and significant relationship towards household recycling intention. Nevertheless, environment concern, environment knowledge, subjective norm and perceived behavioral control do not have positive and significant correlation with household recycling intention. The results of this study are restricted to Penang householders which cannot represent Malaysia context. Also, this study only measures householder recycling intention not actual behavioral. Thus, future similar study should extend the base of respondents throughout whole Malaysia and extend the research model from recycling intention to recycling behavior. The findings from this research can be used by recycling industry, government and environment related organization to strategize their plan and recycling programme to increase community recycling rate.

# **CHAPTER 1**

## **INTRODUCTION**

### **1.0 Introduction**

Recycle is a process of giving used things a new lease of life, by making new things out of the old materials through process of collection, processed, re-built and reused (Pakpour, Zeidi, Emamjomeh, Asefzadeh & Pearso, 2014). It is a key and third component of the “Reduce, Reuse, Recycle”. In recycling process, old or used materials are dismantled into their basic elements such as fiber in paper. These basic elements are then served as raw materials for other new product. Commonly recyclable materials are biodegradable waste, electronic, garments, paper, plastic, batteries, glass, metal and etc (Bezzina & Dimech, 2011). Recycling helps to prolong the life and usefulness of material as well as preserves the environment. It takes less energy and resources to process recycle material than to process virgin materials (Othman & Yuhaniz, 2012). A simple example is it will definitely take less resource to recycle paper than to produce new paper from trees. Less energy consumption also reduce greenhouse gas emissions from factories and air pollution that depletes the ozone layer. Apart from this, recycling helps to reduce the waste materials that are placed into landfills.

Since past decade, people in many parts of the worlds start to practice the recycling for their unwanted material for various benefits of recycling. Through recycling, a significant portion of waste can be reprocess and reused to produce new materials which able to conserve materials and reduce the harmful waste disposed into the environment which caused pollution. Ethically it is human responsibility to

participate in recycling to protect the only one mother earth, making it greener, less toxic and fit for human habitation. This would help to ensure resources are left enough for our future generation consumption. It is not surprising that recycling activities no longer treat as an opinion, but an obligation action to achieve a healthy life and protecting natural environment (Othman & Yuhaniz, 2012). That is the reason why nowadays consumer and business becoming more interesting to involve in recycling (Park & Ha, 2014).

By using recycle products such as recycle paper, it will reduce cutting down trees, which reduce the impact of deforestation on global warming and pollution. The act of purchase recycled plastic will reduce the production of new plastic and reduce the old plastic from disposal system. This help to save environment as plastic is not biodegradable and release toxin when burnt or buried. Overall, people benefit from recycling as the act helps to reduce landfill and save on raw materials. (Park & Ha, 2014).

## **1.1 Back ground**

### **1.1.1 Environmental issues**

Economic development always followed by intensive growth of urbanization and industrialization, devastation of forests for agriculture. All this human activities lead to major environment issues such as resource exhaustion, degradation of land, environmental degradation, loss of resilience in ecosystems, public health and etc (Anand, 2013).

The world's population is increasing at a faster rate and this has caused over consumption which lead to poverty and other environmental problems. As per Admin (2013), many of the environmental issues are caused by the large population that cannot

match against the available resources. Increasing consumption demand will usually direct to environmental degradation which would pressure the quality of human life (ECLAC, 2000). Improper ways of managing solid waste resulted environment deterioration and subsequently affect the quality of human live (Latif, Omar, Bidin, Awang, 2012). Solid waste can be reduced by source reduction and recycling (Hopper, Yaw, Ho, & Vichailak, 1993).

Habitat loss is one of the environmental issues caused by human development and it may cause species face with extinction if the situation do not control well. Human activities like producing green house gases such as methane and carbon dioxide caused climate change which is global warming. Global warming cause polar ice caps melting, displacing people from tropical and coastal island and finally threaten the survival of human race. Other impact from global warming would cause some plants and animals changing their behavior and causing disorder in the food chain. If the situation continues, the warm-weather species will expand and the cold weather species will face potential extinction due to hot weather. Global warming is also caused by ozone depletion. Furthermore, there is several health effects of global warming to the extend it can be life threatening such as heat waves, wild fires, El Nino floods and hurricanes (Union of Concerned Scientists, 2014).

Apart from this, electronic and nuclear waste cause serious pollution and health problems. Electronic wastes (e-waste) include electronic and electrical device that are no longer useful and categories under common type of waste (Wagner, 2011). Every year, there are millions of electronic products such as television sets, mobile phones, computers and laptops are disposed from developed country and dumped into third world

country through illegal import or smuggling (Afroz, Masud, Akhtar & Duasa, 2013). These products are reprocessed in developing country for commercial purpose and subject to release of hazardous materials such as lead, mercury, heavy metal and other toxic substance which caused harm to workers and environment (Wagner, 2011).

Develop nation such as Americans and Japan face environmental problems caused by overconsumption of resources as the result of their economic strength and higher standards of living. The United States attributes to 5% of the world's population but consume 25% of earth resources. Generally, the developed world recorded 23% of world's population but use two-third of the earth resources (Anand, 2013). It is stated that each person in developed nation use three times water and ten times energy compare to a person in developing country.

This situation works in other ways in developing nations. Poverty caused environmental crises in developing country. This can be seen from the Third World countries often short of resources and proper sanitation facilities to provide nation with clean water. Poor farmer slash and burn forest for agriculture purpose. While looking at developing nations, the industry activities harm environment through emission of greenhouse gases. All these environment issues are hard or even impossible to reverse over the long period and it has long-term bad effects on human and societies.

### **1.1.2 Recycling Intention – Global Trend**

Recycling is one of the best things for environment. This not only reduce piles of garbage, but also helps to protecting natural resources, saving water and energy, reduce global warming. Recycling mean a lot more than bringing plastics, can, paper to curb.

According to Natural Resources Defense Council (NRDC), if US were to recycle 75% of the nation's waste, this will create nearly 1.5 million jobs by 2030 apart from reduce pollution, saving water and energy, building economically strong and healthy communities.

People increased dependence on personal technology such as cell phones, laptops, PDAs, computer, printers resulted huge quantities of garbage in landfills and incinerators even majority of this can be reused and recycle. According to U.S. Environmental Protection Agency, about 2.6 millions ton of e-waste ended up in landfills in 2007, only 13.6 percent (408,000 tons) was recycle. It is estimated if Americans recycled more than 100 millions old cell phones, the country would able to save power which enough to support 24,000 household consumption for one year. Lead, mercury and cadmium which contain in personal electronic device are hazardous and release dangerous toxin into land and water when buried into landfills inappropriately. Metal components like copper, silver, gold and palladium in cell phone are reusable. By throwing it away, it caused the demand to mining for new metals. Some recycler even ship discarded electronics to developing countries such as Asia for reprocessing. In 2006 it is reported that 80% of world's high-tech trash ends up in Asia and as high as 90% of this flood in China (On Earth, 2006). The Chinese labour dismantle it by hand which expose to the toxic contents, inappropriate processing and dumping contamination the coils and caused ground water undrinkable.

Recycle trend have changed drastically for recent few years in the way of how entities educate people to care more about recycling, how businesses doing with recycling, which products are being recycled more. Cell phone companies start with free

recycling programme which allow customers to send in their old phone for recycle purpose. Some companies even make use of recycle material to produce goods such as calculator, clothes, shoes and etc. This not only reduces the material cost but also serve as publicity as customers tends to admire companies that participate recycling activities. Car batteries starts to received goods response in recycling as it contain acid and toxins. Resellers, retailer and manufacturer take-back programs and free collection events have become the trends for organization to response to well-publicized problems with environment.

### **1.1.3 Recycling activities in Malaysia**

Majority of Malaysian are conscious of recycling and the importance of waste recycling. However the recycling participation rate is quite low in Malaysia (Ramayah & Rahbar, 2013). As per Solid Waste Management and Public Cleaning Corporation (PPSPPA), there was low response from the public towards their campaign introducing recycling bins to promote recycling. Apart from this, PPSPPA also organising others programs to promote recycling practice such as recycling bank in Kindergarten, Schools, Separation of waste in Residential Areas, Government office and State Bodies, Drive through Recycling activities in Hypermarket and etc. The management of PPSPPA looks at these areas seriously with an aim to increase current recycling rate of 5% to 22% of recycling rate by 2020 (Borneo Post Online, 2013).

Averagely each Malaysian throws away 1.64kg of waste each day. At this rate, the waste generate by Malaysian would increase 65% from 10,000 tons per day in 2010 to 17,000 tons per day by 2020 (Idrus, 2013). Currently recycling rate of Malaysia is very

low which is only 11% of the total solid waste generated as compared to 57% in Singapore and 66% in Germany. Thus, effort to reduce and recycle has become a necessity to protect both environment and life quality.

Research done by Othman & Yuhaniz (2012) to terrace house in Shah Alam which selected randomly by convenience show that 93% of respondents aware that recycling is important to environment and balance 7% think that recycling is significant to economy. Pertaining to recycling practice, 23% never practice recycling, 27% practice frequently, and balance 50% hardly practice recycling. The findings show that main recycling issues at home are no resources for waste separation follow by not interested, busy and no idea on how to practice recycling at home. Respondent with low income group (monthly 0 – RM2999) face issue of no facility, lack of time and no knowledge of recycling. Respondent form medium income level (RM3000 – RM11,999) face issue of no space at home, fussy and not interested. However respondent from high income group (monthly RM12,000 and above) give reason that no space, no facility and fussy.

The finding show that respondents majority from medium size family are equipped with basic recycling knowledge but surprisingly only a quarterly of them recycling frequently with the reason lack of facility, no space and picky whereas medium and large family size claimed that they encounter with problem lack of space. Expectedly, lower income level argue that they are busy have no access time to involve in recycling.

## **1.2 Problem statement**

Environmental pollution problems in Malaysia recorded long history when it started about more than 100 years ago. Water pollution problems were caused by waste water from three traditional industries which were tin mining, natural rubber, and palm oil. The pollution level further increased by industrial waste when Malaysia entered into era industrialization (Ministry of the environment Government of Japan, 2014). Air pollution mainly caused by exhaust gas release by motor vehicle, industries activities and haze which caused by weather and by forest fire in neighboring Indonesia. Apart from pollution, Malaysia could not run away from environment issues and in fact it is a big concern to the society. Environment issues such as deforestation, air and water pollution and waste disposal are inevitable due to rapid development growth in Malaysia.

High economic development rate in Malaysia cause consumption pattern rise (Shafie, Mahlia, Masjuki, & Andriyana, 2011). For example, energy demand of Malaysia increases from 9,690MV in 1999 to 16132MW in 2009, increased by 66.5% (The Malaysia Economic in Figures, 2010). Solid waste generation in Malaysia was estimated to increase from about 9.0million tones in 2000 to about 10.9 million tons in 2010 and finally hit 15.6 million tons in 2020 (Agamuthu & Dennis, 2011). The estimated increasing rate of waste generation will definitely burden our country environmental and water resources. This can be seen by fact such as number of clean rivers decreasing, number of landfills and illegal dumpsites keep on increasing in past recent years (Agamuthu & Dennis, 2011).

The situation is worse by people stay in urban areas go through lifestyle changes which lead to more waste problem in Malaysia. The estimated waste generation rates for

Malaysia are about 4.3% per annum between 2010 to 2020 (Ministry of Housing & Local Government, 2006). As per Shekdar (2009), current rates of resources consumption is anticipated ten thousand times higher than rates of natural resource generation and it is unlikely that this rates will improved in future.

Households are the main source of municipal solid waste in Malaysia and 70% to 80% of the household waste generated is recyclable (Moh & Manaf, 2014). Solid waste is simply dumped by household without and attempt for recycling even there is high potential and change for waste recycling. Recently concept of recycling is widely accept as a sustainable solid waste management method looking at recycling has high potential to reduce disposal costs, waste transport cost and prolong life spans of landfill (Suttibak & Nitivattananon, 2008).

Recycling activity is not popular in Malaysia. This will subsequently caused loss of these resources and fast utilization of landfill space. It is hard enough to request households to reduce their consumption rate and waste generation rate. As per Berita Harian (2012), daily disposal of solid waste in country in year 2012 hits 22,000 tons and there is tendency to increase to 30,000 tons per day by year 2020. However it was reported by New Straits Times (2013) that Malaysia generated 33,000 tons of solid waste daily in 2012 which exceeded the estimation in future. Solid waste generation increase more than 91% over the past 10 years due to uncontrolled consumption resulted from urbanization and industrialization (Moh & Manaf, 2014).

Public awareness of citizen towards recycling in Malaysia is low when compared to neighbor country especially Singapore. This can affirms by facts that Singapore is leading Malaysia in recycling at 40 percent as compared to Malaysia which only aiming

at 22 percent by year 2020 (Ramayah, Lee, & Lim, 2012). In fact, Singapore has set vision to achieve 70 percent recycling rate by year 2030 (Ong, 2012). It is not surprising that a total of RM2,321 million was spent on environmental protection in 2012 (Report on the Survey of Environmental Protection Expenditure Malaysia, 2013).

Recycling in Malaysia is not as advanced as in western country. The challenges face by Malaysia recycling industry are lack of household participation, lack of skilled labour, lack of convenience in facility such as collection service and equipment (Ramayah et al., 2012). Malaysia's government takes serious action to increase the current waste product recycling in the country. One billion new bins for waste collection have already been distributed and the amount will reach five million by 2014. Many apartment buildings and gated community provide recycling casks. There are also more and more recycling bin turning up everywhere such as in shopping complex, airport, bus station, schools and etc.

Nowadays government no longer build solid waste disposal in landfills alone but there is open tender for waste incinerator with capacity of 800 to 1000 tons of solid waste daily such as in Kuala Lumpur. There is also open call for anaerobic fermentation system for food waste, a small pilot project with approximately 300 to 400 tons per day. Biogas is generated as sub output which can be used to generate electricity. Apart from this, the compost can be used in agriculture. Plastic recycling is done to recycle plastic waste into plastic pellets which serve as raw material for related industries. Malaysia overall recycling rate is about 5% which is very low if compared to poor economic country like India which having 15% of recycling rate. This show that recycling in Malaysia is at infant stage (Ramayah & Rahbar, 2013). According to Datuk Seri Abdullah Badawi,

former Prime Minister of Malaysia, recycling does not only mean to using recycling bin with different colour, instead recycling must be incorporate as part of Malaysian lifestyle when buy, consume and dispose waste.

There is a lot of researchers study socio-psychological aspect of household recycling behavior in developing country such as United States, Korean, Europe whereas little attention has been paid to developing country (Tang, Chen, Luo, 2011). Only one was from developing country Malaysia which tested contractor's waste administration (Begum, Siwar, Pereira & Jaafar, 2009). With concern to the quality of life of future generation, whether able to live in clean environment, able to consume enough resource, there is urgent need to preserve environment. One of the common and best ways to preserve environment is through recycling. Looking at low recycling rate in Malaysia, it is important to study the factors determine householders recycling intention in Malaysia in order to formulate effective ways to encourage recycling behavior. The reason was householder was the main consumers of the country and their recycling behavior would direct relate to country recycling rate. This will help to increase participation rate of recycling in Malaysia.

Hence, this study aims to close the above gap by examining from a Theory of Planned Behavior perspective the factors determine householder recycling behavior. It will provide valuable information to government and non-government stakeholders to take essential steps to increase the recycling awareness in Malaysia community. With high recycling awareness and recycling behavior, it will reduce and slow down the environment issues as discussed earlier.

### **1.3 Research Objective**

This paper aims to study and understand the recycling behavior of householders in Malaysia and the factors that determine their recycling intention. The research objective (RO) is as below:

RO 1: To examine whether attitude, environment concern, environment knowledge, subjective norm, perceived behavioral control and perceived convenience that determine householders to participate in recycling activities

### **1.4 Research Question**

To accomplish the above objective, this paper targets to answer the following research question:

RQ1: Does attitude, environment concern, environment knowledge, subjective norm, perceived behavioral control and perceived convenience determine householders' recycling intention?

### **1.5 Definition of Key Term**

Definition of key terms is incorporated in this section to have common understanding of the concepts and terms to avoid any confusion about this research.

#### **1.5.1 Attitude Towards Recycling (ATT)**

Attitude towards recycling refers to extend where an individual has a favourable or unfavourable appraisal of household recycling (Tang et al., 2011).

### **1.5.2 Environmental Concern (EC)**

Environment concern is defined as a common attitude toward environmental issue and the level one is aware of the problems pertaining the environment and follow by action to solve them (Elgaaied, 2012).

### **1.5.3 Environmental Knowledge (EK)**

Environmental knowledge consists of two elements that are specific knowledge of a recycling plan and knowledge of environment benefits of recycling (Tang et al., 2011). It refers to degree of householder's perception on knowledge which non recycling may caused harms to environment (Tang et al., 2011).

### **1.5.4 Subjective Norm (SN)**

Subjective norm in this study refers to a householder's perception of social pressure to recycle or not to recycle household waste (Wan, Cheung & Chen, 2012).

### **1.5.5 Perceived Behavioral Control (PBC)**

Perceived behavioral control is a person's perception of their ability to perform the recycling behavior which reflects an individual's past experience and anticipated barriers (Wan et al., 2012).

### **1.5.6 Perceived Convenience (PC)**

Convenience is regard as the time, space and perceived ease of one in organizing waste (Wan et at., 2012).

### **1.5.7 Recycling Intention (RI)**

Intention symbolizes a person's self-commitment to carry out the behavior (Wan Et al., 2014). Theory of Planed Behavior suggests that behavioral intention is a function of three belief determinants: attitude of the behavioral belief, subjective norms of the normative belief, and perceived behavioral control of the control belief.

## **1.6 Significance of the Study**

The context for this research aims to establish the factors that determine householders' recycling intention in Malaysia. Attitude, environment concern, environment knowledge, perceived behavioral control, perceived convenience and subjective norm are examines in this research. Key contributions of this study are listed down in four categories as below:

### **1.6.1 For the recycling industry**

Solid waste management in developing countries should move towards "waste as resource or income generator approach (Singhirunnusorn, Donlakorn, Kaewhanin, 2012). This study on factors that determine householders' intention to participate in recycling activities is important to scarp collector and recyclers. With the understanding on the intention to participate in recycling among householders, it helps them in investment decision such as to set up appropriate recycling plant in right location. The investors in running recycling business could also make use of the outcome of research to work with both authorities and non government stakeholder to increase the recycling rate within Malaysia community. Information such as recycling rate, material that householders

recycle, recycling behavior of householder and intention to recycle will enable investors in recycling industries to formulate effective business plan and right investment decision. This will help to boost the contribution of recycling towards Malaysia economic and at the same time save the environment.

### **1.6.2 For the Policy maker**

The Malaysia government can take actions to increase awareness of householders and encourage them to recycle waste through organizing campaigns, workshop and seminar (Afroz et al., 2013). Looking at government has high concern on low recycling rate in Malaysia and the possibility of failure to achieve targeted recycling rate by 2020, this study aim to provide important information to both national and local authority the recycling behavior of householders in Malaysia. This will subsequently provide better insight to authorities to organize and implement effective strategies to motivate aggressive and continuous public participation in solid waste recycling with the aim to minimize environment degradation. Higher participation among householders is critical to reduce environment problems to ensure better environment quality and better life quality.

### **1.6.3 For the environment related organizations**

This research will help to increase the consciousness among environment related organizations pertaining to recycling problems, challenges, restriction faced by Malaysia society. Thereafter environment related organization are able to formulate effective campaign to create awareness pertaining to environment issues and educate society the

importance to participate in waste management activities. The campaign should be continuous to ensure the recycling concept reach every level of society from child, adult to the elders.

#### **1.6.4 For the householders**

Past study shows that consumers will aggressively participate in recycling practice if more facilities are available (Chen & Tung, 2010). With the understanding of householder behavioral towards recycling such as resources, logistic, facilities, knowledge, it will later serve as motivation to the existing householders to continue participate in recycling and at the same time create awareness to others householders to take first step to participate in recycling. This will serve as key driver to increase the recycling rate in country in near future.

### **1.7 Organization of Remaining Chapters**

This study is constructed in five chapters. Chapter 1 provides introduction and overview of this study. The recycling problems facing in Malaysia and the importance of this research to industry, government, organization and householders to rationalize the significant of this research are discussed. Chapter 2 exhibits the literature review on factors that determine householders' intention to participate in recycling activities. In addition, the researches that conducted in Malaysia relevant to this study also discussed in this chapter. The theoretical framework and hypothesis is developed here. Methodology used in this study is discussed in this chapter 3. It consists of method used by researcher to conduct the research in order to accomplish the objectives set in Chapter

1. The methodology comprise of research design, research strategy, data collection, research instruments and the method of data analysis. Chapter 4 presents results of finding derived using both SPSS and Smart PLS software. The results that analyzed with the statistical tools are tabulated here. Chapter 5 states the overalls outcomes and implications of this research. It will also contain the limitation of this study, suggestion for future research as well as conclusion.

## **CHAPTER 2**

### **LITERATURE REVIEW**

#### **2.0 Introduction**

This chapter outlines the overview of past literatures pertaining to areas of behavioral recycling and intention to recycle. There are six independent variables namely, attitude, environment concern, environment knowledge, subjective norm, perceived behavioral control and perceived convenience, and one dependent variable namely recycling intention. The literature reviews on the theoretical framework and variable developed and variable constructed in the framework will be discussed in this chapter. Finally, a total of six hypotheses are developed and all the hypothesis result will be examined in Chapter 4.

#### **2.1 Overview of Household Recycling**

Waste is generated by households, business, commercial establishments and institutions and process of producing waste is unavoidable by mankind (Jibril, Sipan, Sapri, Shika, Isa, & Abdullah, 2012). Consumer and business starts to interest on recycling as recycling is an effective way to reduce landfill and consumption of resources (Park & Ha 2014). Trend of recycling has been growing since past due to people needs increase with limited resources and looking at recycling activities bring advantage to environment through material reused, and improve health to society (Ramayah & Rahbar, 2013).

Goods consumption happen at household level, thus household decision on recycling or reuse material is important to society environmental decision making. To recycle, householders after generate the waste, must sort the waste, store it and then later transfer it to curbside for recycle purpose (Wagner, 2013). Even though public go through hard work to encourage recycling, but the success heavily rely on household decision whether or not to recycle (Yi, Hartloff & Meyer, 1999). Public participation in recycling can be boost through enlightening householder on importance of recycling and provide information on how and where to recycle (Guagnano, Stern & Dietz, T, 1995). Recycling is noted to be preferable than to landfill or incineration (Smallone, 2005). If recycling is treated as a waste disposal option, householder will have to involve much effort to separate and sorting their waste and there is necessity to encourage householders to keep different type of waste separately at home as well as to dispose it separately (Smallone, 2005).

As per Wang, Zhang & Yin (2011), lower rate of recycling in developing country compared to developed country is due to lower level of income level and environmental awareness of community in developing country. Malaysians do not convert their knowledge of environment into behavior such as participates in recycling even they are aware there is need to take care of environment (Mahmud & Osman, 2010). Proper release of waste play a significant role in protecting environment and inadequate involvement from community is the root cause of failure in recycling campaign in Malaysia (Chee & Narayanan, 2006).

## **2.2 Recycling Intention**

Factors that trigger one to recycle are environment responsibility, convenience and economic incentives (Wagner, 2011). Past survey result from Wagner (2011) showed that low recycling rate due to lack of knowledge about recycling requirements and collection system and also inconvenience of collection systems. Imposed recycling fees can be discourage to recycling activities and at the same time encourage illegal disposal (Skumatz, 2008). Recycling works negative to factors that increase the costs such as low income and short of storage space; on the other hand, recycling increase if one's is environmentally conscious (Chee & Narayanan, 2006).

Convenience of recycling program is one of most significant determinants whether one will participate in recycling (Peretz, Tonn, Folz, 2005). The time and attempt to involve in recycling is a built-in cost to the individual (Baksi & Long, 2009). Individual refuses to participate in recycling if the recycling cost become too high for them even they are aware of community and environment advantage from recycling (Boldero, 1995). However, some individual will still participate in recycling even though there is inconvenience due to their belief recycling is the right thing to do (Hornik, Cherian, Madansky & Narayana 1995). While other research claim that positive attitudes to engage in recycling are not as crucial as convenience as a person with recycling minded unlikely to recycle if facility is inconvenience (De Young, 1989). There is possibility to increase consumer participation in recycling through increasing convenience (Wagner, 2013).

When communicating recycling to public, message should emphasize on benefit derived rather than consequence of individual behavior towards environment (Bratt,

1999). Environmental organization, schools and universities should continue to alert people about the impact of dumping waste into environment (Saphores, Ogunseitan, & Shapiro, 2012). Waste management practice emphasize to trim down waste at source, if possible to prevent waste; to discover reuse alternative; to the extend if waste cannot be reused, recycle is another option (Jibril et al., 2012).

Research by Caruana (2007) illustrated that consumer often disregard of ethical point even though process of utilization create negative impact to the environment, for instance bulk reduction in biodiversity, global warming, depletion of natural resources. Action of recycling not only involve householder to generate, separate waste, post-purchase activity to dispose, returning to supplier, re-used, re-sell and recycle but also including business who collect, sort and process waste (Culiberg & Bajde, 2013). A person understanding on how to recycle and type of material suitable for recycle is a significant factor affecting recycling participation (Chu & Chiu, 2003).

It is important to understand recycling behavior to manage, facilitate and influence those behavior toward society good as such behavior is voluntary, diverse and subject to change (Bezzina & Dimech, 2011). Research by Bezzina & Dimech (2011) also indicate recycling become right thing to do when it is perceived by large community, and when one own recycling knowledge and conscious of impact for not recycling, and believe one's contribution is effective and has moral obligation to recycle. The challenge faces is how to convert awareness of environment problem into an intention to recycle and then into recycler behavior and also how to persuade those not recycle into those who recycle (Smallone, 2005).

### **2.3 Attitude (ATT)**

Attitude toward behavior is direct determinant of behavioral intention in TPB and intimately related to intended behavior (Tang et al., 2011). The same research show attitude toward recycling is extensively affecting recycling behavior. Predicted positive or negative result of performing an aimed behavior determined an attitude toward behavior and householder recycling attitude is figured from their perception of recycling impact.

Attitude towards recycling predict behavioral intention for adults (Madmud & Osman, 2010). One personal attitude towards preserving the environment will determine their level of commitment in recycling (Chee & Narayanan, 2006). Pro-environment attitude are figured by individuals' belief structure and value connected to human-environment relations, outcome, responsibilities and duties of correction action which are influence by norms (Joung & Haesun, 2013). There is cognitive component of attitude which refer to reasonable insight into the actual extinction of environment issues and portray an action in contract to specific behavior and therefore recycling behavior is believe to directly predict by specific attitudes (Best & Mayerl, 2013).

The belief element portrays one's knowledge and perception about a certain behavior and there has been many studies proved the relationship between attitudes and behavioral attention (Wan et al., 2012). Research done by Lee & Phaik (2011) to examine Korean household recycling and waste management behavior found that attitude was the strongest factor to predict recycling behavior. Research findings suggest that recycling attitudes are the main determinant of recycling behavior and these attitudes are influence

by having appropriate opportunities, facilities and knowledge to recycle (Tonglet, Philips, & Read, 2003).

#### **2.4 Environment Concern (EC)**

Since last few decades, the study of environmental concern has prospered and there has been huge number of research on the determinants of environmental behavior towards behavior (Best & Mayerl, 2013). People who have environment concern tend to look for solutions to increasing waste problem in their district. One that concern about the environment is more willing to separate their waste compared to those without environment concern (Ekere, Mugisha & Drake, 2009). General alertness of environmental issues has direct influence on willingness in recycling (Nnorom, 2009). However study by Wang et al. (2011) show that environmental awareness does not equal to willingness to involve in environment protected activities such as recycling.

As per Bezzina & Dimech (2012), environment concern people do not look for economic incentive as they are satisfy by doing something valuable and helpful to environment as this group of people are more like to act in environmental appropriate ways. However, (Schultz, Oskamp & Mainieri, 1995) have different view that environment concern is not an important predictor of recycling behavior as recycle concept is widespread today and both recyclers and non recyclers have pre-environmental concern. Their research indicates that environment concern only related to recycling when recycling required big effort. However, according to Nixon & Saphores (2009), individual obstruction such as short of interest, laziness will sometimes offset environment concern.

## **2.5 Environment Knowledge (EK)**

Environment knowledge of households should be assessed in order to understand their behavior and to motivate recycling activities (Singhirunnusorn et al., 2012). Environment knowledge and waste management knowledge has been identified as one of the significant factor that affect household recycling (Nixon & Saphores, 2009). In addition, several researches indicate that educating consumer on the importance of recycling, how to recycle and where to recycle able to increase public involvement in recycling practice (Ramayah et al., 2012). Beside Begum et al. (2009) also affirm that contractor recycling attitude and behavior tends to varies based on their recycling knowledge.

With environment knowledge, one will aware, concern and appreciate outcome of others action and this would lead to environmental responsible behavior (Ramayah & Rahbar, 2013). This study was conduct to examine the recycling behavior of university students and the results indicate that environment related knowledge positively related to attitude towards recycling. Students have more positive attitude towards recycling when they are aware of benefit of recycling. The result obtain was constant with paper done by Sidique, Lupi & Joshi (2010) pertaining recycling behavior in context of drop-off recycling which conclude that attitudes and knowledge towards recycling are important psychology factors of recycling behavior. In the research conducted by Hassan, Noordin & Sulaiman (2010) towards secondary school in Malaysia discover that despite of high level of environment awareness, they feel hard to perform action which benefit to the environment.