UNIVERSITI PUTRA MALAYSIA

DETERMINANTS OF RECYCLING INTENTION AMONG UNIVERSITY STUDENTS IN MALAYSIA

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By

LOKE WYE MEIGN

Thesis Submitted to the School of Graduate Studies, Universiti Putra Malaysia, in Fulfillment of the Requirements for the Degree of Master of Science

NOVEMBER 2014

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DEDICATION

I dedicate this thesis to:

My father for his constant love and guidance always inspired me,

My mother for her patience and support encouraged me,

My sister for her care and understanding cheered me,

My brother for his challenges and success motivated me,

Mr. Lim Chee Hong for his faith and believe strengthened me,

Without any of them, the completion of this work would not have been possible.

Abstract of thesis presented to the Senate of Universiti Putra Malaysia in fulfillment of the requirement for the degree of Master of Science

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By

LOKE WYE MEIGN

NOVEMBER 2014

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Malaysia biggest environmental problem is the waste management with increasing waste generation rate every year in response to Malaysia's rapid development and low recycling rate. However, recent concerns focus on universities as it mirrors the national household waste statistics especially those provide residential accommodations operating similarly to small cities. Therefore, the understanding of university students' recycling intention was the key to improve the recycling rate and the environment of Malaysia to be considered as environmentally responsible institutions. The present study aims to identify the unique predictors from the expanded Theory of Planned Behavior (TPB) variables (recycling attitude, subjective norm, perceived behavioral control and past recycling behavior) on recycling intentions among university students.

The present study employed a quantitative research approach and correlational research design. A total of 498 Malaysian university students who live in the residential colleges provided in University of Putra Malaysia (UPM) with average age of 22 years old recruited as respondents through cluster sampling technique. The instrument used in the present study was from established measures with acceptable reliabilities for assessing the expanded TPB variables. Moreover, the data of the present study was analyzed with descriptive, bivariate and multivariate analyses.

The result of descriptive analysis indicated university students have a moderate level of recycling attitude, subjective norms, perceived behavioral control, past recycling behavior and recycling intention. Then, results of bivariate findings in which the t-test analysis revealed there was a significant gender difference in recycling intention. In addition, Pearson's correlation analysis showed all the expanded TPB variables were significantly positively related to recycling intention. Next, result of multiple regression analysis indicated all four predictors explained 22.9% of the variance in explaining recycling intention. Past recycling behavior was the strongest predictor in explaining recycling intention among university students followed by subjective norm and perceived behavioral control. However, recycling attitude did not significantly predicted recycling intention. The findings of the present study emphasized the importance of expanded TPB variables on recycling intention among

Malaysian university students. Hence, intervention programs on promoting recycling among university students should emphasized on expanded TPB variables.

Abstrak tesis yang dikemukakan kepada Senat Universiti Putra Malaysia Sebagai memenuhi keperluan untuk ijazah Ijazah Sarjana Sains

PENENTU KE ATAS NIAT KITAR SEMULA DALAM KALANGAN PELAJAR UNIVERSITI MALAYSIA

By

LOKE WYE MEIGN

NOVEMBER 2014

Pengerusi: Mohamad Ibrani Shahrimin, PhD
Fakulti: Ekologi Manusia

Masalah alam sekitar yang terbesar di Malaysia adalah pengurusan sisa disebabkan peningkatan kadar penjanaan sisa setiap tahun kesan daripada proses pembangunan pesat Malaysia dan kadar kitar semula yang rendah. Namun, kebimbangan terkini memberi tumpuan kepada universiti kerana ia mencerminkan statistik sisa perumahan negara terutamanya universiti-universiti yang menyediakan penginapan kediaman yang beroperasi seperti bandar-bandar kecil. Oleh itu, pemahaman pelajar universiti terhadap niat kitar semula adalah kunci untuk meningkatkan kadar kitar semula dan persekitaran Malaysia supaya dianggap sebagai institusi yang bertanggungjawab kepada alam sekitar. Kajian ini bertujuan untuk mengenal pasti prediktor unik daripada pembolehubah-pembolehubah Theory of Planned Behavior (TPB) yang dikembangkan (sikap kitar semula, norma subjektif, tanggapan kawalan tingkah laku dan tingkah laku kitar semula yang lepas) terhadap niat kitar semula dalam kalangan pelajar universiti.

Kajian ini menggunakan pendekatan penyelidikan kuantitatif dan reka bentuk kajian korelasi. Seramai 498 pelajar universiti Malaysia yang tinggal di kolej-kolej kediaman Universiti Putra Malaysia (UPM) dengan purata usia 22 tahun telah diambil sebagai responden melalui teknik persampelan rawak kelompok. Instrumen yang digunakan dalam kajian ini adalah instrumen yang sedia ada dengan reliabiliti yang boleh diterima untuk menilai pembolehubah TPB yang dikembangkan. Selain itu, data kajian ini telah dianalisis dengan mengunakan analisis deskriptif, bivariat dan multivariat.

Hasil analisis deskriptif menunjukkan pelajar universiti mempunyai tahap sikap kitar semula, norma subjektif, tanggapan kawalan tingkah laku, tingkah laku kitar semula yang lepas dan niat kitar semula yang sederhana. Kemudian, hasil penemuan bivariat di mana analisis ujian-t menunjukkan perbezaan jantina yang signifikan dalam niat kitar semula. Di samping itu, analisis korelasi *Pearson* menunjukkan kesemua pembolehubah TPB yang dikembangkan mempunyai hubungan positif yang signifikan dengan niat kitar semula. Seterusnya, hasil dapatan analisis regresi berganda menunjukkan keempat-empat prediktor menerangkan 22.9% daripada varians dalam menerangkan niat kitar semula. Tingkah laku kitar semula yang lepas

adalah peramal yang paling kuat dalam menjelaskan niat kitar semula di kalangan pelajar universiti diikuti dengan norma subjektif dan tanggapan kawalan tingkah laku. Walaubagaimanapun, sikap kitar semula tidak meramalkan secara signifikan terhadap niat kitar semula. Hasil dapatan kajian ini menekankan kepentingan pembolehubah-pembolehubah TPB yang dikembangkan terhadap niat kitar semula dalam kalangan pelajar universiti di Malaysia. Justeru, program intervensi untuk menggalakkan kitar semula di kalangan pelajar universiti perlu menitiberatkan pembolehubah-pembolehubah TPB yang dikembangkan.

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LOKE WYE MEIGN

NOVEMBER 2014

This thesis was submitted to the Senate of Universiti Putra Malaysia and has been accepted as fulfilment of the requirement for the degree of Master of Science. The members of the Supervisory Committee were as follows:

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Declaration by graduate student

I hereby confirm that:

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Declaration by Members of Supervisory Committee

This is to confirm that:

- the research conducted and the writing of this thesis was under our supervision;
- supervision responsibilities as stated in the Universiti Putra Malaysia (Graduate Studies) Rules 2003 (Revision 2012-2013) are adhered to.

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LIST OF ABBREVIATIONS

B	Unstandardized Regression Coefficient
ß	Standardized Regression Coefficient
CFI	Comparative Fit Index
CR	Construct Reliability
DNSWM	Department of National Solid Waste Management
EDA	Exploratory Data Analysis
EE	Environmental Education
GFI	Goodness of Fit Index
M	Mean
Max	Maximum
Min	Minimum
NACUFS	National Association of College & University Food Service
NFI	Normed Fit Index
PBC	Perceived Behavioral Control
PRB	Past Recycling Behavior
RA	Recycling Attitude
RI	Recycling Intention
SD	Standard Deviation
S.E.	Standard Error
S.E.*B*	Unstandardized Standard Error Regression Coefficient
SN	Subjective Norm

SPSS	Statistical Package for the Social Sciences
SWM	Solid Waste Management
TLI	Tucker Lewis Index
TPB	Theory of Planned Behavior
TRA	Theory of Reasoned Action
UPM	University of Putra Malaysia
USEPA	United States Environmental Protection Agency

CHAPTER 1

INTRODUCTION

This chapter presents the background of the study on recycling intention followed by statement of problem, objectives and hypotheses of the present study. Next, this chapter continued with the significance of the study, definition of terms, theoretical background and conceptual framework of the present study. Lastly, this chapter ends with a chapter summary.

1.1 Background of the study

Evidence dated since the industrial revolution in the 18th century, human was given with the power of technology and scientific growth to control the environment (Zhou, 2010). Humans were taken for granted with the assumption of having unlimited resources to supply for the demands where more goods and products to be produce for human consumption with 90% of major contribution to the climate change was due to human activity (Jurng, 2009). Consequently, a dramatic increase in the production of waste from concentrated population and a higher standard of living with negative effect contaminating the natural environment (Th°gersen & Grunert-Beckmann, 1997). It is acknowledged worldwide that waste is hazardous for the environment and ways to manage waste is indeed in need of serious concern (Jurng, 2009). The management of waste materials is an acute problem currently faced by our societies as economic development leads to generating even larger quantities of waste with current city landfills reaching its full capacity (Veeraiah, 2006).

Similarly, due to the rapid industrialization and urbanization that resulted increased of waste had rose to more than 91% over the past decade in Malaysia (Samsudin & Don, 2013). Malaysia successfully transit into a developed country have grown demand for quality of life which also increases the rates for waste generation every year especially in the capital city Kuala Lumpur, due to over consumption with increase population and higher standard of living contributing to the adverse effects on the environmental pollution (Saeed, Hassan, & Mujeebu, 2007). Subsequently, waste had become an issue and the main environmental problem in Malaysia is the ineffective of waste management. Majority of waste are commonly disposed with method of incineration and land filled with most open dumping site in Malaysia creating negative impacts on the environment (Samsudin & Don, 2013). Certainly, these methods of waste management are not the best ways to handle waste as there are threat in consumptions of air pollutions and water contaminations that affect both the environment and our health (Guy & Rogers, 1999). Consequently, it is a must to develop and adopt new alternatives to extend the life of these landfills and our future generations even if it means to make changes in ways to dispose waste (Tan & Lau, 2009). The importance for maintaining a balance between utilizing and replenishing natural resources is visualized through sustainable development as it ensures a sustainable environment (Guy & Rogers, 1999), where the current adverse effects we are suffering can be avoided for living in a developed world with promising future (Jalil, 2010).

Recycling and sustainability are always interconnected to each other as recycling plays an important role in achieving the concept of sustainable development. Therefore, recycling is the best alternative to not only handle solid waste reduction, reuse, preventing the origination of waste by using fewer primary materials (Recycling Rate In Malaysia Still Low, 2009), it also help suspend climate change in order to abate the heat trapping of greenhouse gases that are generated from daily trash according to USEPA (Jurng, 2009). Furthermore, recycling is a well known alternative with means of protecting the environment due to it is one of the most prudent solutions on both economically and ecologically for managing waste (Omran, Mahmood, Abdul Aziz, & Robin, 2009).

Moreover, recycling encourage developing environmentally friendly technologies by producing more recycled and recyclable products will decreased the amount of waste that is sent to landfills or incinerators as well as reducing the need for virgin natural resources and energy being produced (Jurng, 2009). Recycling for materials such as glass, metals, paper, and plastics are recycled to produce new products where it is estimated that recycling can reduce the amount of virgin material in a product within 20% to 90% (Ho, 2002). Further support from BERNAMA, added by the Housing and Local Government Minister, "When recycling is practiced every day, the life span of solid waste disposal sites would be longer," said Datuk Seri Kong Cho Ha (Recycling Rate In Malaysia Still Low, 2009). Besides, there are also many other reasons why recycling is better than littering, such as it saves money (Jurng, 2009). Just a simple act, by recycling as much as 22% of the five million tons of waste produced each year, Malaysians could save approximately RM88 million a year (Veeraiah, 2006).

Sustainable development is an issue of concern for all levels in the society and institutions including higher education institution (Dahle & Neumayer, 2001). The concept of sustainable higher education institution serves as a platform and most appropriate place to act upon the challenges for sustainability (Dola, Saadatian, & Askari, 2009). Further support from Stockholm Declaration of 1972, which has acknowledged the interdependency between humans and the environment, was the first to make reference to sustainability in higher education (Mat et al., 2009). A sustainable university is sufficient on its ability as a viable institution to change and induce change in behaviors that will create a more sustainable future (Dola et al., 2009). Therefore, the contributions of higher education to knowledge and the well being of the society is of great importance in sustainable development. Hence, progress towards sustainability in a university without delay is absolutely necessary (Cheah, 2009) in order to create an equitable and ecologically sound future (Mat et al., 2009).

According to the statistics showing that recycling rate in Malaysia is still low and that comes to a point where questions arise from their recycling intention or behavior (Chen & Tung, 2010). A recycling program is only successful if people support and actively participate in it (Ho, 2002). Relatively, public participation is an essential behavior as a support for the success of effective recycling programs (Sidique, 2008). Therefore, there is a need to change the recycling intention or behavior of Malaysian

in order to increasing the recycling rate (Thomas, Yoxon, Slater, & Leaman, 2004). Thus, it is important to understand factors that stimulate people to recycle (Ittiravivongs, 2012).

However, there were limited literatures in understanding university students' recycling intention where most literatures were on household recycling as the key to improve the environment in a sustainable way for institutions especially in the higher education institution as an environmentally responsible organization (Lifting The Lid: Students Attitude and Behaviors Towards Recycling and Waste, 2013). The need of understanding how university students feel about recycling when in terms of disposing waste is essential in a university setting with its influence and resources are well suited as leadership for promoting sustainable development (Dahle & Neumayer, 2001). In relation, the vision toward the year of 2020 in the Malaysian National higher Education Strategic Planning and sustainability in higher education institution both are in same direction for Malaysia as an international hub for excellent international higher education with transformation of education revolution for sustainable higher education (Sirat, 2009).

An environmental significant behavior that causes environmental change directly or indirectly impact on climate change are meaningful if undertaken with the expressed intent of changing the environment, which include individual preferences and actions toward climate change policies and regulations, psychological motivations for climate sensitive behaviors (Zahran, Brody, Grover, & Vedlitz, 2006). Ajzen suggested it is essential to first identify the determinants of intention in order to understand behavior (Ajzen, 1985). This is because behavior was influenced by intention that embraced motivational factors and indicates the level of willingness to perform a behavior. Therefore, one has stronger intention towards a behavior, the more likely behavior to be performed (Ajzen, 1991).

The specific behavior factors including attitudes, situational and psychological variables are in the framework of the Theory of Planned Behavior (TPB), a theory designed to predict and explain human behavior in specific contexts (Ajzen, 1991) is suitable to study recycling determinants (Valle, Rebelo, Reis, & Menezes, 2005). Recent research have been applying theoretical framework of TPB as models from social psychology for understanding recycling behavior (Tonglet, Phillips, & Read, 2004; Davis & Morgan, 2008; Knussen & Yule, 2008; Chen & Tung, 2010). It systematically explores the factors which influence behavioral performance which implies that individuals make decision or behave based on a careful consideration of available information (Ioannou, Zampetakis, Beligianni, Nakou, & Lasaridi, 2011).

According to social psychology, what influence people's recycling behavior show great interest in their attitude. Attitudes are likely the major determinants and predictors of behavior meaning that people are tending to behave consistently with their attitudes (Velagic, 2009). Similarly, recycling attitude refers to individual preferences towards recycling behavior which is a psychological tendency that is expressed by evaluating a particular behavior with some degree of preference (Francis, et al., 2004). There were many previous researches highlighted the direct

relationship between attitude and intention, where findings indicated attitude was the most significant predictor of recycling intention (Cheung, Chan, & Wong, 1999; Rise, Thompson, & Verplanken, 2003; Tonglet et al., 2004a; Ioannou, Zampetakis, & Lasaridi, 2011). Therefore, recycling attitude need to be considered in studies of recycling intention.

Moreover, Ajzen regarded subjective norm as the product of normative belief and motivation to comply. Normative belief reflects the pressure perceived by individuals to perform or not to perform a behavior in relation to those persons or organizations important to them. Motivation to comply refers to the willingness of individuals to comply with important others' expectations when deciding whether to perform a certain behavior or not. Subjective norms are normally the influence of those persons or organizations important to individuals when performing a certain behavior (Ajzen, 1991). There were extensive literatures that found subjective norm positively and significantly predicted recycling intention (Cheung et al., 1999; Ho, 2002; Valle et al., 2005; Chaisamrej, 2006; Chen & Tung, 2010; Mahmud & Osman, 2010; Zhou, 2010; Ittiravivongs, 2012; Tih & Zainol, 2012). Therefore, subjective norms need to be considered in studies of recycling intention.

Furthermore, Bandura's Social Cognitive Theory was about how one has the ability to exert control over situations and performing a behavior (Bandura, 2001). Similarly, perceived behavioral control is a composition of control belief or the beliefs about the factors facilitating or impeding the behavior and the control power individuals have over these factors (Ajzen, 1991). It is also perceptions about how easy or difficult it is to perform the behavior (Francis et al., 2004). There were strong evidence of literatures stated that perceived behavioral control was the strongest significant predictor of recycling intention and other literatures yielded perceived behavioral control positively and significantly predicted recycling intention (Armitage & Conner, 2001; Chaisamrej, 2006; Mahmud & Osman, 2010; Tih & Zainol, 2012). Therefore, perceived behavioral control needs to be considered in studies of recycling intention.

All three factors are to predict whether or not a person intends to perform a behavior. For example, if an individual is in favor towards a behavior such as recycling, one would evaluate recycling as positive and if the factor of other's expectation or social pressure wanted the individual to recycle with considering the control one would have over recycling, the results is in greater intention to recycle. The stronger intention to engage in a behavior, the more likely one would perform. However, intention only predicts behavior if the individual have the ability to control behavior with voluntary behavior (Ajzen, 1991). TPB help explain why some recycle and others do not.

In addition, many other factors may serve as potential stimulator to behavioral change that influenced recycling intention or recycling behavior (Velagic, 2009). This is because different researches confirms different determinants of TPB and recommended to include additional factors. For instance, altruism (Chaisamrej, 2006), self identity (Rise, Sheeran, & Hukkelberg, 2010), moral norms (Chen & Tung, 2010), economic incentive and responsibility (Ittiravivongs, 2012). However, past recycling

behavior received consistent attention from the past literatures and it was particularly supportive from Ajzen suggesting that past behavior served as a reflection of all factors that should be included to determine recycling intention or behavior (Ajzen, 1991; Tonglet et al., 2004; Chen & Tung, 2010). In addition, the fact that Ajzen allow TPB with the inclusion of additional factors besides the main variables past recycling behavior should be considered in studies of recycling intention (Ajzen, 1991).

1.2 Statement of Problem

Today Malaysia biggest environmental problem is the solid waste management (SWM) (Saeed et al., 2007). Malaysia has increasing waste generation rate every year in response to rapid increase population mobility, accelerated urbanization, industrialization development process and economic growth (Ali, 2008). The fact of receiving records of increasing waste generation rate every year should be eliminated, added by Datuk Seri Lajim Ukin said "This must be halted," (Ruekeith, 2010). This is an acute problem currently and also in the near future as there are not enough landfills to deal with the waste and the cost of managing waste is increasing (Veeraiah, 2006).

Malaysian Government recognized the importance of industrial waste recovery and identified it as an important environmental and economic activity. The establishment of the Department of National Solid Waste Management (DNSWM) was to ensure effective sustainability on waste management with focus waste reduction through 3R and emphasize on environmental protection and public health (Mohamed, 2009). Further support where Datuk Seri Lajim Ukin stated that recycling should be treated as a national agenda (Ruekeith, 2010). Although recycling has been identified as national agenda, yet most citizens still do not recycle (Burn, 2006).

Over hundred million tons annually of waste could be recycled, instead are land-filled (Omran et al., 2009). Relatively, it appears that recycling programs and campaigns were ineffective and have failed to change Malaysian in recycling waste (Ali, 2008). Majority of did not understand and respect to use the proper way to dispose their waste (Omran et al., 2009). For example, people are throwing waste regardless the means of the different types of recycle bins provided. Further support that over 80 percent of 2400 recycling bins placed nationwide have been misused (Mutang, 2008).

In fact, the importance of recycling is well introduced to all citizens of Malaysia. A national recycling campaign launched since 1993 by Malaysia Government through minister of Housing and Local Government. Moreover, a re-launch for three consecutive years held in between 2001 to 2003 (Recycling Organic Waste-The Malaysian Experience, 2007). The objective was to reduce waste generation by applying 3R concepts which includes reduce, reuse & recycle. However, the result is comparatively still the same with only five per cent of the total waste is being recycled (Omran et al., 2009).

Despite significant efforts on recycling from recycling programs, the recycling rate is still low and not become a universal way of life in the behavior of Malaysian (Omran et al., 2009). As added, "with a mere 17 per cent recycled, this figure is too low," said by Datuk Peter Nansian Ngusie stated that (Ruekeith, 2010). Malaysia is falling

behind as compared with neighbor countries such as Singapore (Recycling Rate In Malaysia Still Low, 2009) of 56 per cent and Thailand a 50 per cent recycling rate in 2008 (Joshi, 2009). It is no longer the case of low awareness on recycling (Mutang, 2008) but rather it is how Malaysians are taking recycling seriously with action.

On the other hand, universities are also becoming a central of attention internationally. University sustainability has become an issue of global concern where its role has been disregarded of its social and environmental responsibility as a center of teaching and learning by promoting sustainability to serve the nation. It can play a vital role in determining the success of sustainability issue (Mat et al., 2009) as it can contribute both good and bad effects to the environment. In general, public universities mirror the national household recycling statistics (Creighton, 1998). Universities especially those which provide residential accommodations are operating similarly to a small city due to its large area of space occupied with growing populations, traffics and activities which contribute pollution to the environment (Mat et al., 2009).

Thus, universities generally recycles about a third of waste instead of sending it to land filled or incinerated (Creighton, 1998). Therefore, whether the contributions of higher education are on pollution or promoting sustainability is still unknown and depends on the universities. In addition, youth deserves special attention for their environmental views have high social relevance which is more open to socialization influences on behaviors (Niaura, 2013). Hence, it is essential that Malaysian universities devote efforts to initiate recycling behavior by practicing reducing waste with separating waste through the provision of recycle bins as a culture to their students within society and further expand to Malaysian citizens (Nameghi & Shadi, 2013).

However, there is a gap between empirical researches where many are on household recycling in the western countries than compared to university recycling in Malaysia. Therefore, there are still lack of understanding how factors such as attitudes, situational and psychological variables influence on Malaysian university students' recycling intention which might lead to further behavioral change improving the recycling performance and supporting the success of the recycling practice (Velagic, 2009). Recycling participants including the university students' can be greatly affected by their social environment or the amount of organization and as different social structure and recycling programs vary from one another translate differences in program efficiency and participation rate (Kao, 2007). Different social setting as in both household in the western countries and university setting in Malaysia are both competitively different and similar in the sense as a university setting which operates similarly to a small city and yet with its influence and resources are well suited as leadership for promoting sustainable development (Dahle & Neumayer, 2001). Thus, little was known about Malaysian university students particularly those who stayed in the campus as an individual.

Therefore, all the issues above have lead researcher to gain more understanding in this topic to explore the recycling intention with application of The Theory of Planned Behavior. The focus of this study is to examine the determinants of recycling

intention on students who live in the residential collages provided by University of Putra Malaysia (UPM) which is similar to previous research of applying TPB to understand the determinants of household waste recycling intention in a community setting. This study is guided by TPB with variables of recycling attitudes, subjective norms and perceived behavioral control with an addition of past recycling behavior towards recycling intention which is the immediate predictor of recycling behavior.

1.3 Research Objectives

This section presents the general objective and specific objectives in the present study.

1.3.1 General Objectives

This study aims to determine the relationship between the variables of expended TPB and recycling intention among university students.

1.3.2 Specific Objectives

Specific objectives in the present study were stated as below:

1. To describe demographic characteristic among university students.
2. To identify gender differences in recycling intention among university students.
3. To determine the relationship between recycling attitude, subjective norms, perceived behavioral control, past recycling behavior and recycling intention among university students.
4. To determine the unique predictors among recycling attitude, subjective norms, perceived behavioral control, past recycling behavior and recycling intention among university students.

1.4 Research Hypotheses

Research hypotheses were formulated based on specific objectives of 2, 3 and 4.

Objective 2: ***To identify gender differences in recycling intention among university students.***

H_o1: There is no significant gender difference in recycling intention among university students.

Objective 3: ***To determine the relationship between recycling attitude, subjective norms, perceived behavioral control, past recycling behavior and recycling intention among university students.***

H_o2: There is no significant relationship between recycling attitude and recycling intention among university students.

H_o3: There is no significant relationship between subjective norm and recycling intention among university students.

H_o4: There is no significant relationship between perceived behavioral control and recycling intention among university students.

H_o5: There is no significant relationship between past recycling behavior and recycling intention among university students.

Objective 4: ***To determine the unique predictors among recycling attitude, subjective norms, perceived behavioral control, past recycling behavior and recycling intention among university students.***

H_o6: Regression coefficients for all the selected variables are equal to zero when regressed against recycling intention among university students.

1.5 Significance of Study

The present study aims to identifying the unique predictors for recycling intention among university students which is the key to improve the environment in a sustainable way for institutions especially the higher education institution serve as an environmentally responsible organization. Subsequently, the findings of the present study may serve as a guide for an effective recycling program within university setting and influence other universities in Malaysia to be a sustainable university, leading as an example where social responsibility were educated and cultured among university students for Malaysia as an international hub for excellent international higher education with transformation of education revolution for sustainable higher education (Sirat, 2009).

There are limited studies in Malaysia for examining the relationship of extended TPB variables (recycling attitude, subjective norms, perceived behavioral control and past recycling behavior) and recycling intention among university students. Thus, the present study may fill in the knowledge gap provide more understanding of recycling intention from attitudinal, situational and psychological perspective with applying theoretical framework of TPB designed to predict and explain human behavior that is well suitable to study recycling determinants. Subsequently, the findings of the present study could offer more information in the field of Social Psychology based on scientific evidence and serve as database on recycling intention among university students.

Based on the fact that the recycling rate of Malaysia is still low and has not become a lifestyle in the behavior of its nation (Omran et al., 2009), the importance of increasing the recycling rate was dependent on recycling programs that requires people first to have the recycling intention and then participate in recycling activities followed by continuously participating in recycling activities (Morgan & Hughes, 2006). Therefore, the present study also aims to identify the unique predictors for recycling intention among university students that could further reach out and influence the society to participate more in recycling activities in order to increase the recycling rate in Malaysia for the government has set a target of 22 per cent solid waste recycling rate by the year of 2020 (Ruekeith, 2010).

1.6 Definition of Terms

This section presents the conceptual and operational definition of variables or specific terms used in the present study.

1.6.1 Recycling

Conceptual definition:

Recycling is a behavior which can require considerable effort on the part of the individual that waste must be sorted, prepared and stored practice often (Boldero, 1995).

Operational definition:

Recycling is a behavior is defined as the act of separating waste according to material quality such as paper, plastic, glass, aluminum and others (Velagic, 2009).

1.6.2 Recycling Intention

Conceptual definition:

Ajzen defined intention as a person's subjective probability of performing a behavior. It reflects the willingness of an individual to engage in a certain behavior (Ajzen, 1991).

Operational definition:

Recycling intention refers to intention to recycle for each type of waste (paper, plastic, aluminum and glass) within next month. This was based on the recycling literature and previous applications (Knussen & Yule, 2008). This also means that higher scores indicate greater intention.

1.6.3 Recycling Attitude

Conceptual definition:

Attitude refers to a relatively persistent and consistent behavioral inclination of individuals based on their recognition of behavior (Ajzen, 1991).

Operational definition:

Recycling attitude refers to individual preferences towards recycling behavior from questionnaire based on the recycling literature and previous applications of TPB (Tonglet et. al., 2004). This also means that higher scores indicate greater recycling attitude.

1.6.4 Subjective Norms

Conceptual definition:

Subjective norms are normally the influence of those persons or organizations important to individuals when performing a behavior (Ajzen, 1991).

Operational definition:

Subjective norm refers to social pressure to recycle waste was from questionnaire based on the recycling literature and previous applications of TPB (Tonglet et al., 2004a; Knussen & Yule, 2008). This also means that higher scores indicate greater subjective norms.

1.6.5 Perceived Behavioral Control

Conceptual definition:

Perceived behavioral control is defined as a composition of control belief or the beliefs about the factors facilitating or impeding the behavior and the control power individuals have over these factors (Ajzen, 1991).

Operational definition:

Perceived behavioral control refers the level of control over the behavior of interest and how easy or difficult performance of the behavior is likely to be based on the recycling literature and previous applications of TPB (Tonglet et. al., 2004a). This also means that higher scores indicate greater perceived behavioral control.

1.6.6 Past Recycling Behavior

Conceptual definition:

Past behavior is defined as an action or reaction of a person in response to the stimuli in the past (Sommer, 2011).

Operational definition:

Past recycling behavior refers to the proportions of each of the four types of waste (paper, plastic, aluminum and glass) recycled within the last 3 months (Knussen & Yule, 2008). This also means that higher scores indicate greater past recycling behavior.

1.7 Theoretical Framework

Environmental attitudes and situational and psychological variables have been identified as important predictors of recycling behavior. However, to explore the influence of these factors further, a theoretical framework for systematically identifying the determinants of recycling behavior is required (Tonglet et. al., 2004a). The Theory of Planned Behavior (TPB) as noted by Ajzen (1991) provides such a theoretical framework for systematically investigating the factors which influence behavioral choices and has been applied to a wide range of behaviors in order to better understand which individuals behave. It is one of the best supported social psychological theories with respect to predict human behavior (Sommer, 2011). TPB was developed from the earlier Theory of Reasoned Action (TRA) that assumes that people behave rationally, in that they consider the implications of their actions. Both theories apply to situations involving a choice of behavior, where reasons can be given for the choice made. Central premise is that behavioral decisions or intention are the result of a reasoned process in which the behavior intention is influenced by attitudes, subjective norms and perceived behavior control. TPB assumes that intention is the immediate predictor of behavior (Ajzen, 1991).

According to the TPB theory, the antecedents of attitude, subjective norms and perceived behavior control are guided by three types of beliefs which include behavioral beliefs, normative beliefs and control beliefs reflecting the cognitive structure. Firstly, attitude towards a behavior is determine by behavioral beliefs where beliefs about the consequences of the behavior salient at that point of time to generate

the attitude of an individual towards a behavior. Secondly, subjective norms are considered to be a function of salient normative beliefs where beliefs about the expectation of significant others with whom the individual motivated to comply. Thirdly, perceived behavioral control is determined by control beliefs where beliefs about the perceived powers factors which facilitate or inhibit performance that may influence performances of the behavior. Consequently, the combination of three types of beliefs contributes cognitively to the decision making of an individual intention to perform a particular behavior (Ajzen, 1991). For example, one may possess preferable recycling attitude with the social influence or support by significant others such as peers plus the perceived control one have towards recycling, all together may contribute one to have greater recycling intention in the future.

First and foremost, attitude forms behavioral beliefs with attributions reasonably associating and developing from beliefs toward a behavior by evaluating positively or negatively following the preferences of an individual about performing the behavior. Consequently, attitude can be formed based on behavioral beliefs that an individual attributes preferences towards the behavior (Ajzen, 1991). The implications from past literatures stated if one is more positive attitude toward recycling, one will be more likely to have recycling intention (Chen & Tung, 2010). Further explained by Davis and Morgan (2008) where recycling attitude was a significant predictor of recycling intention which indicated the more a person thinks they have positive attitudes towards recycling, the more they intend to recycle in the future. In addition, this could be supported with continued promotion of positive reasons for recycling. For example, positive recycling attitudes such as recycling is responsible, rewarding, sensible and good which are strongly correlated with recycling behavior (Tonglet et al., 2004a).

On the other hand, subjective norms forms normative beliefs with references from important significant others' approval or disapproval for performing a behavior. Consequently, subjective norms can be formed based on normative beliefs where individuals beliefs about the expectation of significant others towards a behavior were the motivation to comply for performing the behavior (Ajzen, 1991). Past implications from literatures stated that if one have more positive subjective norms then one will be more likely to have recycling intention (Chen & Tung, 2010). In other words, the more individuals was motivated to comply with people around them who does recycling, the more likely individuals' intention to participate in recycling (Tih & Zainol, 2012). Further support from Ittiravivongs (2012), it is important to make recycling a practice performed by majority to reinforce individuals to comply in having recycling intention. For example, in a university setting, important significant others such as all university students and university administrators could lead to encourage more recycling intention (Zhou, 2010).

Moreover, perceived behavioral control forms control beliefs that may either increase or reduce the perceived level of difficulty for performing a behavior. Consequently, perceived behavioral control can be formed based on control beliefs where individuals believed that they possess more opportunity than obstacles when performing the behavior (Ajzen, 1991). Previous implications from past literatures stated that the more a person thinks they have control over recycling, the more they

intend to recycle in the future. In addition, this could be supported with clear and simple recycling instructions (Davis & Morgan, 2008). Further support from Tonglet et al. (2004a) where the use of mix traditional perceived behavioral control which included difficulty and opportunity with facilities factors such as inconvenient, knowledge of how, what and where to recycle, and provision of recycling resources. For example, the increased in easy accessibility of recycling facilities helped remove the external barrier to recycle and increased recycling intention (Ho, 2002) along with the knowledge of knowing what to do in recycling will be even easier for individual to participate in recycling and develop more recycling intention (Tih & Zainol, 2012).

According to Ajzen (1991), TPB allow the inclusion of any additional predictors that are able to prove its significance of variance to intention or behavior. Subsequently, past recycling behavior received consistent attention that it should be include the additional measures of TPB as an expanded model of TPB framework especially in recycling context from the past literatures (Tonglet et al., 2004a; Chen & Tung, 2010). The interest of researcher for past recycling behavior was from Knussen and Yule (2008) where this study found significance for past recycling on recycling intention with single contributions of 17% of variance. This study found that those whose reason for their failure to recycle in the past was lack of habit were less likely to have recycled in the past. Thus, this study suggested that past recycling behavior was not the proper measurement of habit.

Hence, the present study utilized the TPB to develop the conceptual framework in understanding recycling intention among university students. Specifically, the preset study examines the TPB components which include attitude, subjective norms and perceived behavioral control with additional variable of past recycling behavior on recycling intention among Malaysian university students.

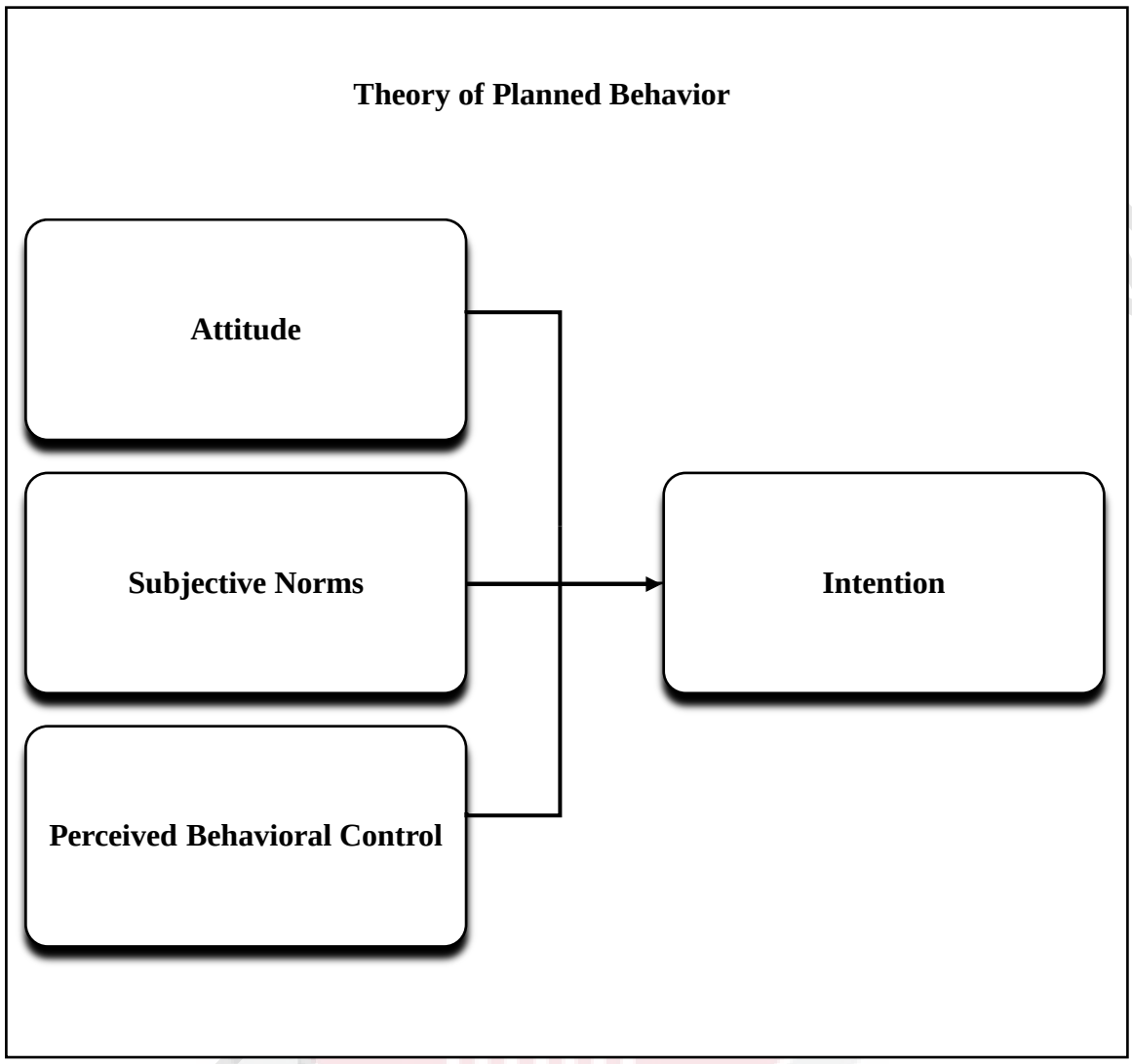

Figure 1.1 Theoretical Framework of the Study on "Determinants of Recycling Intention with the Application of the Theory of Planned Behavior".

1.8 Conceptual Framework

The conceptual framework of the present study was developed and constructed based on the theoretical framework of TPB in the present study to achieve the research objectives stated in the previous section. The TPB emphasized intention as central premise for behavioral decisions and provides better predictions in identifying determinants of intention (Ajzen, 1991). Therefore, the present study included all TPB variables in the recycling context along with additional variable of past recycling behavior to predict recycling intention. The present study consist of one main dependent variable which is recycling intention and four independent variable which include recycling attitude, subjective norms, perceived behavioral control and past recycling behavior (Figure 1.2).

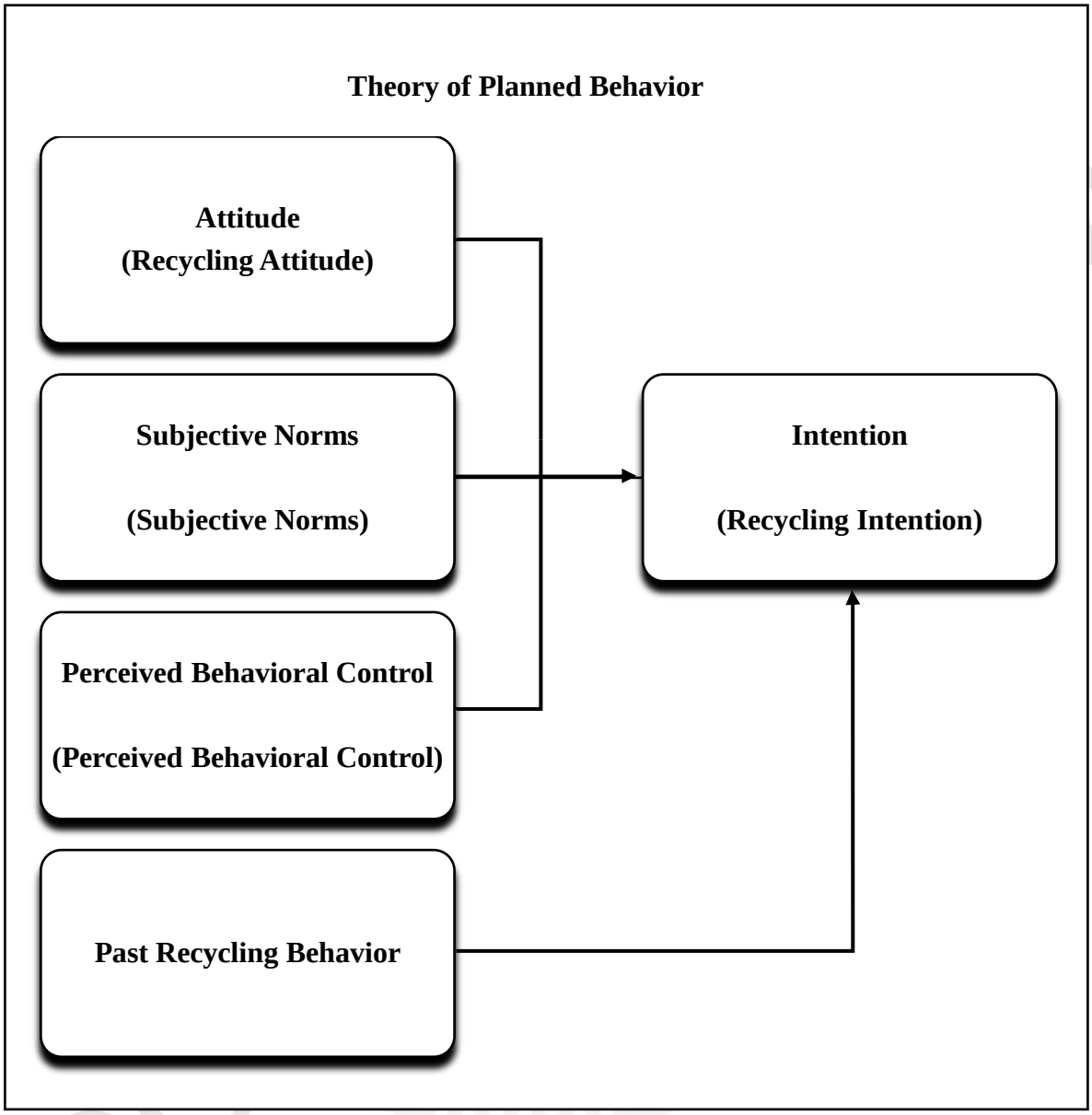

Figure 1.2 Conceptual Framework for the Study on "Determinants of Recycling Intention with the Application of the Theory of Planned Behavior".

According to Ajzen (1991), the compositions of the three elements of TPB influence the decision making of an individual intention. Based on past literatures, many have found significant influence of recycling attitude on intention as recycling attitude attributes reasonable association with preferences towards recycling (Boldero, 1995; Ho, 2002; Chaisamrej, 2006; Davis & Morgan, 2008; Tih & Zainol, 2012; Nameghi & Shadi, 2013).

Moreover, significant influence have also been found upon subjective norms on recycling intention especially when recycling is a public required behavior subjective

norm is significantly important (Cheung et al., 1999; Ho, 2002; Valle et al., 2005; Chaisamrej, 2006; Chen & Tung, 2010; Mahmud & Osman, 2010; Zhou, 2010; Ittiravivongs, 2012a; Tih & Zainol, 2012).

Furthermore, strong evidence found significant influence of perceived behavioral control on recycling intention especially when recycling requires effort to sort out recycling waste materials with appropriate opportunities, facilities and knowledge (Dahab Gentry, & Su, 1995; Rise et al.2003; Davis & Morgan, 2008; Ioannou et al., 2011b; Ittiravivongs, 2012a; Niaura, 2013). Next, the addition of past recycling behavior also found significant influence on recycling intention by providing experiences or information about recycling and its individual contributions (Dahab et al., 1995; Norman & Smith, 1995; Conner & Armitage, 1998; Bamberg et al., 2003; Ioannou et al., 2011b).

1.9 Chapter Summary

In summary, this chapter presented a brief introduction on background of the present study with the need to understand recycling intention among university students which is the key to improve the recycling rate for the sake of environment in a sustainable way where higher education institution can lead as an environmentally responsible organization.

The problems of recycling was highlighted in Malaysian context with significance of the present study to emphasize the need for effective recycling program with the contributions to the field of Social Psychology and also the bear the responsibility as Malaysian to reach the target of 22% in recycling rate by the year of 2020.

Subsequently, terminology of definitions and both theoretical and conceptual frameworks of the present study were discussed with the association of variables and recycling intention. Hence, the reviews of past literatures in relation to the key variables are discussed in the next chapter.

REFERENCES

Ajzen, I. (1987). Attitudes, traits, and actions: Dispositional prediction of behavior in personality and social psychology. *Advances in Experimental Social Psychology , 20,* 1-63.

Ajzen, I. (1985). From intentions to actions: A theory of planned behavior. In I. Ajzen, J. Kuhl, & J. Beckmann (Eds.), *Action Control* (pp. 11-39). Springer Berlin Heidelberg.

Ajzen, I. (2002). Residual effects of past on later behavior: Habituation and reasoned action perspectives. *Personality and Social Psychology Review , 6* (2), 107-122.

Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes , 50* (2), 179-211.

Ajzen, I., & Fishbein, M. (2005). The influence of attitude on behavior. In D. Albarrac ń, B. T. Johnson, & M. P. Zanna, *The Handbook of Attitudes* (pp. 173-221). USA: Lawrence Erlbaum Associates Publishers.

Ali, A. O. (2008). *Attitude of Malaysian on recycling of municipal solid waste: Case studies in the major towns of the east coast and north Malaysia*. (Doctoral Dissertations, Universiti Sains Malaysia, Panang, Malaysia). Retrieved from http://eprints.usm.my/9006/1/ATTITUDE_OF_MALAYSIAN_ON_RECYCLING_OF_MUNICIPAL_SOLID_WASTE.pdf

Allen, P., & Bennett, K. (2008). *SPSS for the health and behavioural sciences.* Australia: Thomson.

Andersson, M., & von Borgstede, C. (2010). Differentiation of determinants of low-cost and high-cost recycling. *Journal of Environmental Psychology , 30* (4), 402–408.

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.

Babbie, E. (2007). Multistage cluster sampling. In E. Babbie, *The practice of social research* (11 ed., pp. 208-210). USA: Thomson Wardsworth.

Badsar, M., Samah, B. A., Hassan, M. A., Osman, N. B., & Shaffri, H. A. (2011). Predictor factors of telecentres outcome from the users perspectives in rural communities. *American Journal of Applied Sciences , 8* (6), 617-627.

Bagozzi, R. P. (1981). Attitudes, intentions, and behavior: A test of some key hypotheses. *Journal of Personality and Social Psychology , 41* (4), 607-627.

Bamberg, S., Ajzen, I., & Schmidt, P. (2003). Choice of travel mode in the theory of planned behavior: The roles of past behavior, habit, and reasoned action. *Basic and Applied Social Psychology , 25* (3), 175-187.

Bandura, A. (2001). Social cognitive theory: An agentic perspective. *Annual Review of Psychology , 52,* 1-26.

Bartlett, J., Kotrlik, J., & Higgins, C. (2001). Organizational research: Determining appropriate sample size in survey research. *Information Technology, Learning, and Performance Journal , 19* (1), 43-50.

Bern, D. J. (1972). Self-perception theory. (L. Berkowitz, Ed.) *Advances in experimental social psychology , 6,* 1-62.

Biswas, A., Licata, J., McKee, D., Pullig, C., & Daughtridge, C. (2000). The recycling cycle: An empirical examination of consumer waste recycling and recycling shopping behaviors. *Journal of Public Policy & Marketing , 19* (1), 93-105.

Boldero, J. (1995). The prediction of household recycling of newspapers: The role of

attitudes, intentions, and situational factors. *Journal of Applied Social Psychology , 25* (5), 440-462.

Burn, S. M. (2006). Social psychology and the stimulation of recycling behaviors: The block leader approach. *Journal of Applied Social Psychology , 21* (8), 611–629.

Chaisamrej, R. (2006). *The integration of the theory of planned behavior, altruism, and self-construal: Implications for designing recycling campaigns in individualistic and collectivistic societies.* (Doctoral Dissertations, University of Kentucky, Lexington, Kentucky). Retrieved from http://uknowledge.uky.edu/gradschool_diss/318

Cheah, C. M. (2009). *A study on consumers' green purchasing intention*. (Master Thesis, University Utara Malaysia, Penang, Malaysia). Retrieved from University Utara Malaysia: http://etd.uum.edu.my/1778/1/Cheah_Ching_Mun.pdf

Chen, M. F., & Tung, P. J. (2010). The moderating effect of perceived lack of facilities on consumers' recycling intentions. *Environment and Behavior , 42* (6), 824–844.

Cheung, S. F., Chan, D. K. S., & Wong, Z. S. Y. (1999). Reexamining the theory of planned behavior in understanding wastepaper recycling. *Environment and Behavior , 31* (5), 587-612.

Chu, P., & Chiu, J. (2003). Factors influencing household waste recycling behavior: Test of an integrated model. *Journal of Applied Social Psychology , 33* (3), 604-626.

Clay, S. (2005). Increasing university recycling: Factors influencing recycling behaviour among students at Leeds University. *Earth & Environment , 1*, 186-228.

Conner, M., & Armitage, C. J. (1998). Extending the theory of planned behavior: A review and avenues for further research. *Journal of Applied Social Psychology , 28* (15), 1429-1464.

Coolidge, F. L. (2013). *Statistics: A gentle introduction* (3rd ed.). USA: SAGE Publication. Inc.

Creighton, S. (1998). *Greening the ivory tower: Improving the environmental track record of universities, colleges, and other institutions.* U.S.A: Massachusetts Instituition of Technology, The MIT Press.

Cusker, C. M. (2013). *The no imact jack sustainable living certificate: A Program evaluation*. (Master's thesis, Northern Arizona University, Flagstaff, Arizona, United States). Retrieved from http://www.aashe.org/files/resources/student-research/2009/thesis_cusker_042013.pdf

Dahab, D. J., Gentry, J. W., & Su, W. (1995). New ways to reach non-recycles: An extention of the model of reasoned action to recycling behaviors. *Advances in Consumer Research , 22*, 251-256.

Dahle, M., & Neumayer, E. (2001). Overcoming barriers to campus greening: A survey among higher educational institutions in London, UK. *International Journal of Sustainability in Higher Education , 2* (2), 139-160.

Danner, U., Aarts, H., & De Vries, N. (2008). Habit vs. intention in the prediction of future behaviour: The role of frequency, context stability and mental accessibility of past behaviour. *British Journal of Social Psychology , 47*, 245–265.

Davis, G., & Morgan, A. (2008). Using the theory of planned behaviour to determine recycling and waste minimisation behaviours: A case study of Bristol City, UK. *The Australian Community Psychologist , 20* (1), 105-117.

Dola, K., Saadatian, O., & Askari, H. (2009). Public awareness and understanding on

sustainable development in creating sustainable campus. *Alam Cipta Journal* , 43-50.

Festinger, L. (1964). *Conflict, Decision, and Dissonance.* USA: Stanford University Press.

Fielding, K. S., Louis, W. R., Warren, C., & Thompson, A. (2009). Environmental sustainability in residential housing: understanding attitudes and behaviour towards waste, water, and energy consumption and conservation among Australian households. *AHURI Positioning Paper , 121*, 1-50.

Fishbein, M., & Ajzen, I. (1975). *Belief, attitude, intention and behavior: An Introduction to theory and research.* USA: Addison-Wesley Pub.Co.

Francis, J., Eccles, M., Johnston, M., Walker, A., Grimshaw, J., Foy, R., et al. (2004). *Constructing questionnaires based on the theory of planned behaviour: A manual for health services researchers.* University of Newcastle upon Tyne, Centre for Health Services Research, Newcastle upon Tyne, UK.

Glor, A. (2009). *Sustainability in practice: A study of the sustainable behaviors of students at the University of Tennessee at Chattanooga*. (Departmental Honors Thesis, University of Tennessee at Chattanooga, Chattanooga, Tennessee, United States). Retrieved from http://www.utc.edu/departmental-honors/pdfs/glora.pdf

Guy, S. M., & Rogers, D. L. (1999). Community surveys: Measuring citizens' attitudes toward sustainability. *Journal of Extension , 37* (3).

Ho, Y. Y. (2002). *Recycling as a sustainable waste management strategy for Singapore: An investigation to find ways to promote Singaporean's household waste recycling behaviour.* (Master's thesis, Lund University, Lund, Sweden). Retrieved from Lumes: http://www.lumes.lu.se/database/alumni/01.02/theses/ho_yanyin.pdf

Hooper, D., Coughlan, J., & Mullen, M. R. (2008). Structural equation modelling: Guidelines for determining model fit. *Journal of Business Research Methods , 6* (1), 53-60.

Ioannou, T., Zampetakis, L., Beligianni, A., Nakou, O., & Lasaridi, K. (2011a). An analysis of household waste recycling behavior. *Proceeding of 12th international Conference on Environmental Science and Technology*, (pp. A-759-A-766). Rhodes, Greece.

Ioannou, T., Zampetakis, L. A., & Lasaridi, K. (2011b). Using the theory of planned behavior for understanding the drivers of household recycling behavior. *Proceedings of the 3rd International CEMEPE & SECOTOX Conference*, (pp. 429-434). Skiathos, Greece.

Ittiravivongs, A. (2012a). Household waste recycling behavior in Thailand: The role of responsibility. *2012 International Conference on Future Environment and Energy, International Proceedings of Chemical, Biological and Environmental Engineering (IPCBEE). 28*, pp. 21-26. Singapore: IACSIT Press.

Ittiravivongs, A. (2012b). Recycling as habitual behavior: The impact of habit on household waste recycling behavior in thailand. *Asian Social Science , 8* (6), 74-81.

Jalil, M. A. (2010). Sustainable development in Malaysia: A case study on household waste management. *Journal of Sustainable Development , 3* (3), 91-102.

Joshi, M. (2009, February 23). *Malaysia bemoans low recycling rate*. Retrieved October

8, 2011, from Topnews: http://www.topnews.in/malaysia-bemoans-low-recycling-rate-2129412

Jurng, Y. (2009). *Recycling Behavior in the home environment:A comparative approach between Daegu, South Korea and Lubbock, Texas, United States.* (Master's thesis, Texas Tech University, Lubbock, Texas, United States). Retrieved from http://etd.lib.ttu.edu/theses/available/etd-04032009-151141/unrestricted/Jurng_Youjin_Thesis.pdf

Kao, S. (2007). Determinants of recycling behavior: A UC Berkeley case study. 1-21.

Kelly, T., Mason, I., Leiss, M., & Ganesh, S. (2006). Univeristy community responses to on-campus resource recycling. *Resources, Conservation and Recycling , 47* (1), 42-55.

Kestenbaum, B. (2009). Cross-sectional studies. In B. Kestenbaum, *Epidemiology and Biostatistics: An Introduction to Clinical Research* (pp. 29-31). New York: Springer.

Kidwell, B., & Jewell, R. D. (2007). The moderating effects of past experience on behavioral intentions. *Advances in Consumer Research , 34*, 555.

Knussen, C., & Yule, F. (2008). "I'm not in the habit of recycling" : The role of habitual behavior in the disposal of household waste. *Environment and Behavior , 40* (5), 683-702.

Knussen, C., Yule, F., MacKenzie, J., & Wells, M. (2004). An analysis of intentions to recycle household waste: The roles of past behaviour, perceived habit, and perceived lack of facilities. *Journal of Environmental Psychology , 24*, 237–246.

Largo, W. E., Bian, H., & Lange, L. (2012). An empirical test of an expanded version of the theory of planned behavior in predictingrecycling behavior on campus. *American Journal of Health Education , 43* (2), 66-73.

Lewis-Beck, M. S., Bryman, A., & Liao, T. F. (2004). *The SAGE encyclopedia of social science research methods.* U.S.A: SAGE Publications, Inc.

(2013). *Lifting the lid: Students attitude and behaviors towards recycling and waste.* United Kingdom: NUS, SITA UK.

Limayem, M., Hirt, S. G., & Cheung, C. (2003). Habit in the context of is continuance: theory extension and scale development. *Proceedings of the Eleventh European Conference on Information Systems (ECIS 2003).* Naples, Italy.

Mahmud, S. N., & Osman, K. (2010). The determinants of recycling intention behavior among the Malaysian school students: An application of theory of planned behaviour. *Procedia Social and Behavioral Sciences , 9*, 119-124.

Mannetti, L., Pierro, A., & Livi, S. (2004). Recycling: Planned and self-expressive behaviour. *Journal of Environmental Psychology , 24* (2), 227–236.

Mat, S., Sopian, K., Mokhtar, M., Ali, B., Hashim, H. S., Rashid, A. K., et al. (2009). Managing sustainable campus in Malaysia: Organisational approach and measures. *European Journal of Social Sciences , 8* (2), 201-213.

McCullough, B. P., & Cunningham, G. B. (2009). Recycling after consumption: A theory of planned behavior approach. *Journal of Applied Social Psychology* , 1-20.

Mohamed, A. F. (2009). Recycling systems in Malaysia: Case studies on industrial waste. In M. Kojima, & E. Damanhuri (Ed.), *3R Policies for Southeast and East Asia.* (pp. 53-72). Jakarta: ERIA.

Morgan, F., & Hughes, M. (2006). Understanding recycling behavior in Kentucky: Who

recycles and why. *JOM* , 32-35.
Mueller, R. O., & Hancock, G. R. (2001). Factor analysis and latent structure: confirmatory factor analysis. *International Encyclopedia of Social and Behavioral Sciences* , 5239-5244.
Mutang, J. A. (2008). *Predictors Of Recycling Behavior Among Residents Of The Klang Valley, Malaysia*. (Master's thesis, Universiti Putra Malaysia, Selangor, Malaysia). Retrieved from http://psasir.upm.edu.my/4985/1/FEM_2008_6A.pdf
Myers, D. G. (2013). Chapter 4: Behavior and attitudes. In D. G. Myers, *Social Psychology* (11th ed., pp. 100-140). New York: McGraw-Hill.
Nameghi, E. N., & Shadi, M. A. (2013). Affective and cognitive: Consumers attitude toward practicing green (Reducing, Recycling & Reusing). *International Journal of Marketing Studies , 5* (1), 157-164.
Niaura, A. (2013). Using the theory of planned behavior to investigate the determinants of environmental behavior among youth. *Environmental Research, Engineering and Management , 1* (63), 74-81.
Nigbur, D., Lyons, E., & Uzzell, D. (2010). Attitudes, norms, identity and environmental behaviour: Using an expanded theory of planned behaviour to predict participation in a kerbside recycling programme. *British Journal of Social Psychology , 49* (1), 259–284.
Norman, P., & Smith, L. (1995). The theory of planned behaviour and exercise: An investigation into the role of prior behaviour, behavioural intentions and attitude variability. *European Journal of Social Psychology , 25* (4), 403-415.
(2008). OECD. In *OECD glossary of statistical terms* (5th ed., p. 78). OECD Publishing.
Olivares, M., & Forero, G. (2010). Goodness-of-fit testing. *International Encyclopedia of Education , 7*, 190-196.
Omran, Mahmood, A., Abdul Aziz, H., & Robin, G. (2009). Investigating households attitude toward recycling of solid waste in Malaysia: A Case Study. *International Journal of Environmental Research , 3* (2), 275-288.
Ouellette, J. A., & Wood, W. (1998). Habit and Intention in everyday life: The multiple processes by which past behavior predicts future behavior. *Psychological Bulletin , 124* (1), 54-74.
Ramayah, T., Lee, J., & Lim, S. (2012). Sustaining the environment through recycling: An empirical study. *Journal of Environment Management , 102*, 141-147.
Recycling organic waste-the Malaysian experience. (2007). Retrieved November 6, 2011, from Legenda Madu Sdn Bhd: http://www.lmorganicfertilizer.com/resources/recycling-waste-management-history-malaysia-update.html
Recycling rate in Malaysia still low. (2009, August 29). Retrieved Novermber 9, 2011, from Bernama: http://bernama.com/p/news-articles/bernama-malaysian-national-news-agency/mi_8082/is_20090829/recycling-rate-malaysia-kong-chong/ai_n51632055/
Rise, J., Sheeran, P., & Hukkelberg, S. (2010). The role of self-identity in the theory of planned behavior: A meta-analysis. *Journal of Applied Social Psychology , 40* (5), 1085–1105.
Rise, J., Thompson, M., & Verplanken, B. (2003). Measuring implementation intentions

in the context of the theory of planned behavior. *Scandinavian Journal of Psychology , 44* (2), 87-95.

Ruekeith, G. O. (2010). *Govt targets 22 pct recycling rate by 2020*. Retrieved November 18, 2011, from The borneo Post.com: http://www.theborneopost.com/2010/01/17/govt-targets-22-pct-recycling-rate-by-2020/

Saeed, M. O., Hassan, M. N., & Mujeebu, M. A. (2007). Development of municipal solid waste generation and recycleable components rate of Kuala Lumpur: Perspective study. *International Conference on Environment 2008 (ICENV 2008): Environmental Management On Technology Towards Sustainable Development*, (pp. 1-7). Penang, Malaysia.

Said, H., Badru, B. B., & Shahid, M. (2011). Confirmatory factor analysis (CFA) for testing validity and reliability instrument in the study of education. *Australian Journal of Basic and Applied Sciences , 5* (12), 1098-1103.

Samsudin, M. D., & Don, M. M. (2013). Municipal solid waste management in Malaysia: Current practices, challenges and prospect. *Jurnal Teknologi (Sciences & Engineering) , 62* (1), 95-101.

Sidique, S. F. (2008). *Analyses of recycling behavior, recycling demand, and effectiveness of policies promoting recycling*. (Doctoral Dissertations, Michigan State University, East Lansing, Michigan, United States). Retrieved from http://psasir.upm.edu.my/6956/1/TLN_2008_4(1-24).pdf

Sirat, M. B. (2009). Strategic planning directions of Malaysia's higher education: University autonomy in the midst of political uncertainties. *Higher Education , 59* (4), 461-473.

Sommer, L. (2011). The theory of planned behaviour and the impact of past behaviour. *International Business & Economics Research Journal , 10* (1), 92-110.

Stratified random sampling. (2012). Retrieved December 8, 2011, from StatTrek.com: http://stattrek.com/survey-research/stratified-sampling.aspx

Suhr, D. D. (2006). Exploratory or confirmatory factor analysis. *SAS Users Group International Conference (SUGI31)*, (pp. 200-231). San Francisco, CA.

Takiyama, S. (2008). *Factors influencing household recycling behavior, A study of japanese consumer behavior*. (Master's Thesis, University of Nottingham, Nottingham, United Kingdom). Retrieved from http://edissertations.nottingham.ac.uk/1854/1/08MA_Marketing_Takiyama.pdf

Tan, B. C., & Lau, T. C. (2009). Examining sustainable consumption patterns of young consumers: Is There a cause for concern? *The Journal of International Social Research , 2* (9), 465-472.

Tang, Z., Chen, X., & Luo, J. (2011). Determining socio-psychological drivers for rural household recycling behavior in developing countries: A case study from Wugan, Hunan, China. *Environment and Behavior , 43* (6), 848–877.

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

Tekkaya, C., Kilic, D., & Sahin, E. (2011). A study on teacher candidates' recycling

behaviors: A model approach with the theory of planned behavior. *Western Anatolia Journal of Educational Science* (Special Issue: Selected papers at the WCNTSE), 29-36.

Terry, D., Hogg, M., & White, K. M. (1999). The theory of planned behaviour : Selfidentity, social identity and group norms. *British Journal of Social Psychology , 38* (3), 225-244.

Th ̄gersen, J., & Grunert-Beckmann, S. C. (1997). Values and attitude formation towards emerging attitude objects: From recycling to general, waste minimizing behavior. (M. Brucks, & D. J. MacInnis, Eds.) *Advances in Consumer Research Volume , 24*, 182-189.

Thomas, C., Yoxon, M., Slater, R., & Leaman, J. (2004). Changing recycling behaviour: An evaluation of attitudes and behaviour to recycling in the Western Riverside area of London. *Waste 2004 Integrated Waste Management and Pollution Control Conference.* Stratford upon Avon, UK.

Tih, S., & Zainol, Z. (2012). Minimizing waste and encouraging green practices. *Jurnal Ekonomi Malaysia , 46* (1), 157 - 164.

Tonglet, M., Phillips, P. S., & Read, A. D. (2004a). Using the theory of planned Behaviour to investigate the determinants of recycling behaviour: A case study from Brixworth, UK. *Resources, Conservation and Recycling , 41* (3), 191-214.

Tonglet, M., Phillips, P., & Bates, M. (2004b). Determining the drivers for householder pro-environmental behaviour: waste minimisation compared to recycling. *Resources, Conservation and Recycling , 42* (1), 27–48.

University Putra Malaysia. (2011). Retrieved December 8, 2011, from Prospectus2011: http://euidec.upm.edu.my/webV10/unrelease/dokumen/prospectus2011_110217.pdf

University Putra Malaysia. (2012). Retrieved May 8, 2012, from University Putra Malaysia: http://www.upm.edu.my/?aktvt=content&kat=D&kod=2007061917020450817216988 8

UPM Placed sixth in Green Metric World University Ranking 2010. (2010). Retrieved December 18, 2011, from ResearchSEA: http://www.researchsea.com/html/announcements.php/aid/5772/cid/4/research/upm_placed_sixth_in_greenmetric_world_university_rankings_2010.html?PHPSESSID=v5jn68cgan31ejmpbhut287af6

Valle, P., Rebelo, E., Reis, E., & Menezes, J. (2005). Combining behavioral theories to predict recycling involvement. *Environment and Behavior , 37* (3), 364-396.

Van Blerkom, M. L. (2009). *Measurement and statistics for teachers.* New York: Taylor and Francis.

Veeraiah, L. S. (2006). *Landfill method not the best way-Federation of Malaysian Consumers Associations*. Retrieved November 22, 2011, from The Waste Management Association of Malaysia (WMAM): http://www.wmam.org/index.php?option=com_content&task=view&id=30&Itemid=2

Velagic, A. (2009). Assessment of factors influencing behavioural change in the recycling system: A Bosnian case study. *8th International Conference of the European Society for Ecological Economics.* Ljubljana, Slovenia.

White, K. M., Smith, J. R., Terry, D. J., Greenslade, J. H., & McKimmie, B. M. (2009). Social influence in the theory of planned behaviour: The role of descriptive, injunctive, and ingroup norms. *British Journal of Social Psychology , 48* (1), 135–158.

Zahran, S., Brody, S., Grover, H., & Vedlitz, A. (2006). Climate change vulnerability and policy support. *Society and Natural Resources , 19* (9), 771-789.

Zelezny, L. C., Chua, P. P., & Aldrich, C. (2000). Elaborating on Gender Differences in Environmentalism. *Journal of Social Issues , 56* (3), 443-457.

Zhou, Y. (2010). *Determining sustainable waste management practices in college and university dining services using the theory of planned behavior.* (*Master's thesis*, Kansas State University, Manhattan, Kansas, United States). Retrieved from http://krex.k-state.edu/dspace/bitstream/2097/4153/1/yingzhou2010.PDF..pdf

Zikmund, W. G., Babin, B. J., Carr, J. C., & Griffin, M. (2009). Chapter 16: Sampling designs and sampling procedures. In W. G. Zikmund, B. J. Babin, J. C. Carr, & M. Griffin, *Business Research Methods* (8th ed., p. 401). USA: Cengage Learning.