PSYCHOLOGICAL DETERMINANTS OF ENERGY CONSERVATION BEHAVIOUR AMONG OFFICE BUILDING USERS

RAZLIN BINTI MANSOR

UNIVERSITI TEKNOLOGI MALAYSIA

PSYCHOLOGICAL DETERMINANTS OF ENERGY CONSERVATION BEHAVIOUR AMONG OFFICE BUILDING USERS

RAZLIN BINTI MANSOR

A report submitted in partial fulfillment of the
requirements for the award of the degree of
Master of Asset and Facilities Management

Faculty of Geoinformation and Real Estate
Universiti Teknologi Malaysia

August 2017

I dedicate this thesis to
My beloved mom and dad
Supportive supervisor
My family and friends
Without those support and inspiration
I would never have the courage to follow my dreams

ACKNOWLEDGEMENT

"In the Name of Allah, Most Gracious, Most Merciful"

I would like to thank to my God, who got me this for; who blessed me with the right people to help me during the different stage of my study.

It gives me great pleasure to express my deepest respect and sincere thanks to my supervisor, Dr. Low Sheau Ting for her encouragement, valuable suggestions, discussion and guidance throughout my graduate studies. She continually and convincingly conveyed a spirit of adventure in regard to research. She was patient with my writing style and taught me how to explain my thoughts and present them clearly in writing. Without her guidance and persistent help, this thesis would not have been possible.

It is with immense gratitude to thank my family for their love, helps and support, especially my parents, Mansor bin Mohammad and Rohaya binti Ahmad for being supportive and helping me and always pray for my success day and night. A big thank dedicate to all my friends for their encouragement and assistance in completing this thesis.

ABSTRACT

In this age of growing world, climate change is considered as one of the major threats to our Mother Earth. Energy sector represents the largest sources of emissions by far, which is accounted for almost 68% of greenhouse gases emission in the world. Buildings contribute to 32% of overall global final energy use. Energy conservation is one of the vital components to address in term of psychological behavior among building users towards energy saving action. However, energy conservation behavior among household often influenced by monetary incentive shall not be generalized into office building context whereby the users have no financial responsibility on its utilities expenses. At present, the challenge of how to encourage office building users towards energy conservation behaviour is one of an emerging topic that drawing the attention of researchers. A specific desired behavior such as energy conservation behavior is influencing by set of psychological determinants, hence a specific set of psychological determinants in local context should be identified in targeting effective behavior change. Thus, this study focuses to identify the psychological determinants of energy conservation behaviour among office building users and to determine the causal relationship of the psychological determinants of energy conservation behaviour. Using behavioural changes as an adaptation approaches, an extensive literature search has been carried out on 70 published literatures to explore the existing energy conservation model to specify the psychological determinants of energy conservation behaviour within office building context. The result of the content analysis indicated that the energy conservation behaviour among office building users attributed by few psychological determinants: Attitude, Subjective Norm, Perceived Behavior Control, Habits, Motivation and Energy Knowledge. In this context of study, an elicitation study was conducted among office building user in Kota Iskandar to gather input regarding the belief and thoughts on energy conservation behaviour. Then, a set of questionnaire survey was design based on the result of an elicitation study and distributed to the office building users in Kota Iskandar. A total of 126 convenience sample were gathered and submitted for SEM analysis. The causal relationship of the identified psychological determinants was tested by using smartPLS-SEM software version 3.0. In detailed, the results show that the psychological determinants that are significant towards energy conservation behaviour among office building users are the Subjective Norm, PBC and Past Experiences. The findings may serve as an initial reference to the management progress in fostering ESB among users in building context.

ABSTRAK

Pada zaman dunia yang semakin berkembang, perubahan iklim dianggap sebagai salah satu ancaman terhadap Bumi kita. Sektor tenaga telah membentangkan bahawa sumber terbesar adalah gas rumah hijau dimana sebanyak 68% dari pelepasan gas di dunia adalah gas rumah hijau. Bangunan telah menyumbang sebanyak 32% dari seluruh penggunaan tenaga di dunia. Penjimatan tenaga adalah salah satu komponen yang digariskan dari aspek tingkah laku psikologi dalam kalangan pengguna bangunan ke arah tindakan penjimatan tenaga. Walaubagaimanapun, tingkah laku penjimatan tenaga dalam kalangan isi rumah sering dipengaruhi oleh insentif kewangan dan tidak boleh diselaraskan dalam konteks bangunan pejabat dimana pengguna tidak mempunyai tanggungjawab kewangan terhadap perbelanjaan utiliti. Saat ini, cabaran berkenaan cara untuk menggalakkan pengguna bangunan pejabat ke arah tingkah laku penjimatan tenaga merupakan salah satu topik yang menarik perhatian pengkaji. Tingkah laku yang spesifik seperti penjimatan tenaga dipengaruhi oleh satu set penentu psikologi. Oleh itu, satu set penentu psikologi yang spesifik dalam konteks tempatan perlu dikenal pasti dalam mensasarkan perubahan tingkah laku yang efektif.. Dengan itu, kajian ini fokus untuk mengenalpasti penentu psikologi terhadap tingkah laku penjimatan tenaga dalam kalangan pengguna bangunan pejabat dan untuk menentukan hubungan kausal di antara penentu psikologi terhadap tingkah laku penjimatan tenaga. Dengan menggunakan perubahan tingkah laku sebagai pendekatan penyesuaian, satu carian secara meluas terhadap 70 kajian lepas yang telah diterbitkan telah dijalankan untuk meneroka model penjimatan tenaga yang sedia ada supaya penentu psikologi bagi tingkah laku penjimatan tenaga dalam konteks bangunan pejabat.dapat dikenalpasti Keputusan daripada carian tersebut mendapati bahawa tingkah laku penjimatan tenaga dalam kalangan pengguna bangunan pejabat dipengaruhi oleh beberapa penentu psikologi:- Sikap, Norma Subjektif, Kawalan Tingkah Laku, Tabiat, Motivasi dan Ilmu Tenaga. Dalam konteks kajian ini, satu kajian awalan telah dijalankan untuk mengumpul input berkenaan pandangan dan kepercayaan pengguna bangunan pejabat di Kota Iskandar terhadap tingkah laku penjimatan tenaga. Selepas itu, satu set borang soal selidik telah dibentuk berdasarkan keputusan kajian awalan dan ia telah diedarkan kepada pengunna bangunan pejabat di Kota Iskandar. Sejumlah 126 sampel kemudahan telah dikumpulkan dan dianalisis meggunakan analisis SEM. Hubungan kausal antara penentu psikologi telah dianalisis menggunakan perisian smartPLS versi ke 3. Keputusan analisis menunjukkan bahawa terhadap tiga penentu psikologi yang penting iaitu Subjektif Norma, Kawalan Tingkah Laku dan Pengalama Lepas. Dapatan kajian ini boleh dicadangan sebagai rujukan awalan bagi pihak pengurusan untuk memupuk ESB dalam konteks bangunan.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF ABBREVIATIONS

GHG	-	Greenhouse gases
CO^2	-	Carbon Dioxide
UK	-	United Kingdom
SEM	-	Structural Equation Modelling
PLS	-	Partial Least Square
EC	-	Energy Conservation
TPB	-	Theory of Planned Behavior
TRA	-	Theory of Reasoned Action
PBC	-	Perceived Behavioral Control
SPSS	-	Package for Social Sciences
CSEM	-	Covariance Based Structural Equation Modelling
CR	-	Composite Reliability
AVE	-	Average Variance Extracted

LIST OF APPENDICES

CHAPTER 1

INTRODUCTION

1.1 Introduction

In this age of growing world, climate change is considered as one of the major threats to our Mother Earth. Greenhouse gases (GHG) emissions include carbon dioxide, methane and nitrous oxide. The CO_2 emissions is known as the main contributor of global warming and other serious environmental problems. Moreover, rapid development in industrial sector and high dependency on fossil fuel nowadays had caused carbon dioxide (CO_2) emission increasing yearly. Due to the rising concern, the scientists and policy makers has heightened the focus on mitigating climate change issues by reduce the total of energy consumption by sector such as transportations, buildings, industrial and agriculture.

Potential contribution of buildings to global warming over the next 100 years is highly significant (Dumitru *et al.*, 2016). Academic debates had discussed on energy-related issues particularly on human behavior change as environmentally sustainable behavior can helps in reducing significant amount of GHG emissions from buildings. Energy conservation is one of the vital components to address in term of psychological behavior among building users towards energy saving action. Energy conservation could be defined as the activities to prevent the energy from being wasted more than its purpose.

Over recent years, energy conservation has attracted considerable attention from social scientist to focus on reducing energy consumption trend and improve the energy behavior. However, changes towards environmentally sustainable behavior is much more complex to adopt (Lokhorst *et al.*, 2015). A specific desired behavior such as energy conservation behavior is influencing by set of psychological determinants, hence a specific set of psychological determinants in local context should be identified in targeting effective behavior change. This study aims to identify the psychological determinants of energy conservation behaviour and its causal relationship in formulating the energy conservation behaviour. This chapter will further discuss on the problem statement, research objectives and research methodology. Generally, this chapter was divided into seven sections include introduction, problem statement, research objective, scope of study, significance of study, research methodology, layout of chapter and research methodology flowchart.

1.2 Problem Statement

Rapid development in many countries had caused rising of GHG emissions worldwide. Energy sector represents the largest sources of emissions by far is accounted for almost 68% of GHG worldwide (IEA, 2016). The latest global CO_2 concentration recorded is significantly higher than the maximum safe concentration limit suggested (Hansen *et al.*, 2013) and it could not be sustained easily. Globally, industry GHG emissions is accounted three times more than residential consumption and buildings are responsible for almost 32% of total global final energy use (IPCC, 2015).

Commercial buildings consider as one of the main contributors for the increasing level of GHG emissions in the world as commercial buildings account for a significant amount of total energy consumption that contributed to GHG emissions (Yang *et al.*, 2008). As example, commercial building in the United States consume approximately 20% of the electricity in 2011 (EIA, 2011) and commercial sector in Japan contribute for 26% of the country's total energy consumption (Uchiyama,

2002). In addition, office buildings within commercial and retail sectors in UK accounts for 17% of their total energy consumption and they found the highest energy consumption in an office is heating and air conditioning (Manika *et al.*, 2013). Furthermore, Australian office buildings also shown increasing trend of its total energy demand with increases from 740 ktoe in 2009 to 757 ktoe in 2011 (Australian Energy Statistic, 2014) and energy demand from office building in China is found 10-20 times higher than residential sector which is about 70-300kWh/m2 per annum (Yang *et al.*, 2008).

In Malaysia, dependency on natural gas and crude oil has contributed to the rise of GHG emissions over the years particularly CO_2 emissions (Malaysia Energy Commission, 2016). Commercial sector in Malaysia consume energy approximately 32% of energy which is higher than residential sector (Saidur, 2009) and energy consumption by office building has showed a significant growth, which is about 48% of total electricity generated as Malaysia is having high economic growth (Saidur and Masjuki, 2008). Therefore, Malaysia has pledged to reduce CO_2 emissions by 45% by 2030 as effort to mitigate climate change effects and other environmental problems.

Malaysian government has taking initiative to reduce energy use by introducing "24 Degree Celcius" policy where all the air conditional in government office building must set the minimum temperature at 24 Degree Celcius which consider as comfortable temperature within office building context in order to reduce the energy use (Ministry of Energy, Green Technology and Water, 2011). Other initiatives that have been taken to regulate and fostering energy conservation in Malaysia includes Green Energy Office (GEO) Building, Energy Performance Contracting (EPC) and Sustainability Achieved via Energy Efficiency Program (SAVE) (NEEAP, 2014). In further, GEO Building is referred to the building that had been designed with low energy features. Typical office building in Malaysia would consume energy approximately 200kWh/m² while GEO Building energy consumption was designed to be 50kWh/m² (NEEAP, 2014). EPC is one of the initiatives which started in January 2013 by Malaysian Government. EPC present the concept which allowed government building to improve energy consumption by

engaging energy service companies (ESCO). This initiative has eased the government's monetary burden on building energy bills and help to promote energy efficiency in government buildings where ESCO will provide the cost of investment to implement energy efficiency improvements and saving made from the improvements will be used to pay the cost of investment to ESCO. In addition, SAVE program was designed under Economic Transformation Program (ETP) of Malaysian Government in July 2011. This program has helped to create a market for energy efficient appliance by providing cash rebates for the purchase of energy-efficient refrigerator, air-conditioners and chillers (NEEAP, 2014).

Other than that, Malaysia also has developed energy efficiency initiatives such as rating and labelling of appliances. This initiative is among the effective tools to update consumers regarding the energy consumption limit of an appliance. As example, it has been applied for refrigerators, fans, air conditioner and televisions. However, this labelling is compulsory for selected items only (NEEAP, 2014). Besides that, many programs also had been developed to increase the awareness among energy users. As example, Malaysia had launched a national energy efficiency awareness campaign (SWITCH) to increase the awareness level among users regarding energy saving. This campaign aims to create awareness among public, to ensure the understanding and to encourage the practice of energy efficiency by switching off the appliances when not in used and use more energy efficiency appliances (SWITCH, 2011). In addition, a guideline on energy saving behavior has been developed and implemented to all government office buildings including guidelines to allow sunlight enter the office by draw the curtains, switch the computer and printer to sleep mode when not in used and apply the function of print preview. This initiatives aims to reduce 5% of energy consumption in all government buildings (Chua and Oh, 2011). Malaysian government also launched Earth Hour Program starting from 2009 till present as effort to encourage public to turn off their lights for one hour, from 8:30pm – 9:30pm on a day towards the end of March. This program aims to against global warming issues. All the initiatives have been successfully implemented among the users but failed to attract the attention on energy conservation behaviour in a long term practice. Unfortunately, energy

conservation behaviour required a voluntary behavioral change in order to sustain the practice.

As a consequence, energy reduction has become a key focus among the stakeholders with initiatives to reduce energy consumption in a buildings (Janda, 2011). It seems clear that reducing energy use is beneficial for environment and organization (Lokhorst *et al.*, 2015) because energy use in buildings is recognized as a significant contributor to GHG emissions (Coleman *et al.*, 2013). Basically, there are two common approaches to foster energy saving which are technological approaches and behavioural approaches (Mahon *et al.*, 1983). Previous research has primarily focused on technology based solution. However, more efficient energy use will require behavioural changes to adopt and improved the practices towards energy saving action (Yeboah and Kaplowitz, 2016). According to Carrico and Riemer (2011), behavioural intervention approaches has successfully encourage employees in university buildings to reduce the energy use. Other than that, study by Yuasa *et al.* (2014), found that lifestyle change among the household in Tokyo has resulted significant reduction of total energy consumption. Moreover, changes in individual behaviour on energy consumption also have great beneficial effects on GHG emissions and reduce the impact on natural environment (Lokhorst *et al.*, 2015).

Furthermore, study by Ayoub *et al.* (2014) found that improving energy conservation behaviour among users can saved energy consumption more than 10%. Energy reduction also can be achieved when people acknowledged about the importance of lifestyles change towards energy conservation behaviour (Von Borgstede *et al.*, 2013). Other than that, study by Masoso and Grobler (2010) found that promoting individual behavioural changes is one of the potential ways to reduce energy use where applicable to existing and new buildings. In addition, 56% of electricity in office building can be saved if the building occupants turning off the lights and equipment especially during non-working hour (Masoso and Grobler, 2010). At present, study by Khashe *et al.* (2016) found that behaviour changes among occupants towards energy savings can resulted higher savings compared to the investment cost made for technological approaches. These studies proved that

encouraging behavioural changes among building users towards energy conservation behaviour could result significant reduction of energy usage.

The participation of occupant plays an important role to reduce energy consumption in buildings despite of technological measures (Wang *et al.*, 2014). Furthermore, there are several different characteristic between energy saving within an office environment and household context (Lokhorst *et al.*, 2015). As example, the determinants directly influence the household behavior towards energy conservation will be slightly different compared to office building context due to financial responsibility. Some research found that household energy conservation behaviour has significant relationship with financial incentives while employees do not have any direct financial interest to conserve energy at workplace (Giddings, 2015). In recent time, employees interest to reducing energy use still vague because they may influenced by the fact that they are not paying for the bills and do not directly responsible for the energy saving practices within the organization (Coleman *et al.*, 2013). Moreover, energy consumption of office building has received substantial concern due to the increase demand of energy and comfort level in buildings from employees (Pérez-Lombard *et al.*, 2008). Therefore, it is essential to monitor the energy consumption of employee within office building context which more focused on individual behavioral changes. Besides that, the trend of transition towards sustainable environment and societies also has made development of sustainable employee behaviour at workplace as worthy issues in social science research.

The contribution of energy conservation behaviour in reducing overall building's energy consumption has been demonstrated in previous research. To target an effective behaviour change, a specific set of determinants that influencing the desired behaviour should be identified according to the local context. As according to (Ajzen, 1985), human behaviour is formulated by a set of psychological determinants. There are two elements should be considered in identifying the determinants to encourage users towards energy conservation behaviour which are contextual-specific factors and psychological factors (Boomsma *et al.*, 2016). The significant role of psychological factors in increasing pro-environmental behaviour

has been acknowledged in previous research. As depicted by Yu *et al.* (2011), users behaviour is one of the reasons why buildings energy consumption can be higher than it supposed to be. There are numerous psychological factors could influence individual behavioural changes towards energy conservation behaviour. For example, study by Thøgersen and Grønhøj (2010) has found that perceived control and self-efficacy has a strong contribution in fostering energy conservation behavior. Other psychological factor that has been successfully encourage pro-environmental behavior is social norm (Abrahamse and Steg, 2013). Social norm refers to individual's energy related behavior which influenced by the action and thinking of certain group member such as friends and family. Meanwhile, study by Wang *et al.* (2014) found that energy conservation behaviour among residents in Beijing is affecting by few factors such as attitudes, subjective norm, perceived behavioral control (PBC), living habits, energy knowledge and public information. According to Blok *et al.* (2015), there are several internal factor that can influence the pro-environmental behaviour, which are environmental awareness, values and attitude. While, the external factor include social norm and financial constraints (Pothitou *et al.*, 2016a). In addition, study by Boomsma *et al.* (2016) has discussed on four important factors which consider could influence individual's energy saving behaviour, which are knowledge, imageability, perceived control and social norm. In essence, there are various psychological determinants have been proven to have significant contributions in fostering desired behaviour.

In view of the previous studies presented above, the psychological determinants influencing the desired behaviour are indeed varying across the local context and culture. Most of the previous research has focused and highlighted the determinants of household energy conservation behaviour which significantly influence household practice towards energy conservation. However, similar set of psychological determinants in the household context may not be effective in the office building context. There are limited literatures on the psychological determinants of energy conservation behaviour among office building users in Malaysia. Thus, the research question arises are: (1) what are the psychological determinants of energy conservation behaviour among office building users? (2) Does causal relationship of the determinants exist in formulating energy conservation

behaviour? This research aims to identify the psychological determinants of energy conservation behaviour among office building users and the causal relationship of the determinants in formulating energy conservation behaviour among office building users.

1.3 Research Objective

The objectives of this research include:

i) To identify the psychological determinants of energy conservation behaviour among office building users

ii) To determine the causal relationship of the psychological determinants in formulating energy conservation behaviour among office building users.

1.4 Scope of Study

The scope of this study is focused on the government office buildings located in Kota Iskandar, Johor. The respondents are office building users in Kota Iskandar. The rationale to select Government Office Building in Kota Iskandar is because Kota Iskandar is one of the government office buildings which targeted to reduce carbon emissions in order to achieve sustainability environment as outlined in Low Carbon Society Action Plan 2025.

1.5 Significance of Study

The findings of this study are able to serve as an initial reference to management progress in fostering energy conservation behaviour among office building users and it contributes to existing literatures on the psychological

determinants in formulating energy conservation behaviour. Indeed, the psychological determinants allow future researchers to use as psychological variables in determining energy conservation behaviour in different context and area.

1.6 Research Methodology

This chapter is carried out in five stages include literature review, design survey instrument, data collection, data analysis and conclusion and recommendation. Figure 1.1 illustrates the research flow chart for present study. The detail descriptions for each stage is explained as below:

1. Stage One : Literature Review

Literature review was done by review journals, articles, conference paper, books and thesis. The relevant theory and psychological determinants that influenced pro-environmental behavior in previous studies had reviewed and summarized in this chapter. Such theoretical model developed in previous studies in determining the psychological determinants that can influence energy conservation behaviour has been identified by literature search.

2. Stage Two : Survey Instrument Designation

This stage is to design survey instrument which includes design of the questionnaires. An elicitation study was held to gather input to formulate the final questionnaire survey. An appropriate sampling strategy will be selected to gather the raw data. Pre-test of the questionnaires is needed before distributes to the respondents to ensure the survey instruments are free from technical error.

3. Stage Three : Data Collection

After the final questionnaire is revised accordingly based on the comments and feedbacks from the pre-testing stage, the final questionnaires were distributed to the targeted respondent (staffs of government office building in Kota Iskandar). This data collection stage is to collect empirical data on the psychological determinants of energy conservation behaviour among office building users.

4. Stage Four : Data Analysis

This stage is to analyze the raw data obtained from respondents. The collected data is compiled and analyzed in order to answer the research objective. Structural Equation Modeling (SEM) assisted by SEM-Smart-PLS software is used to analyze the raw data gathered.

5. Stage Five : Conclusion and recommendations

This stage is the final stage of the study where conclusion is derived from the findings. Recommendation and limitation is presented for further research purpose.

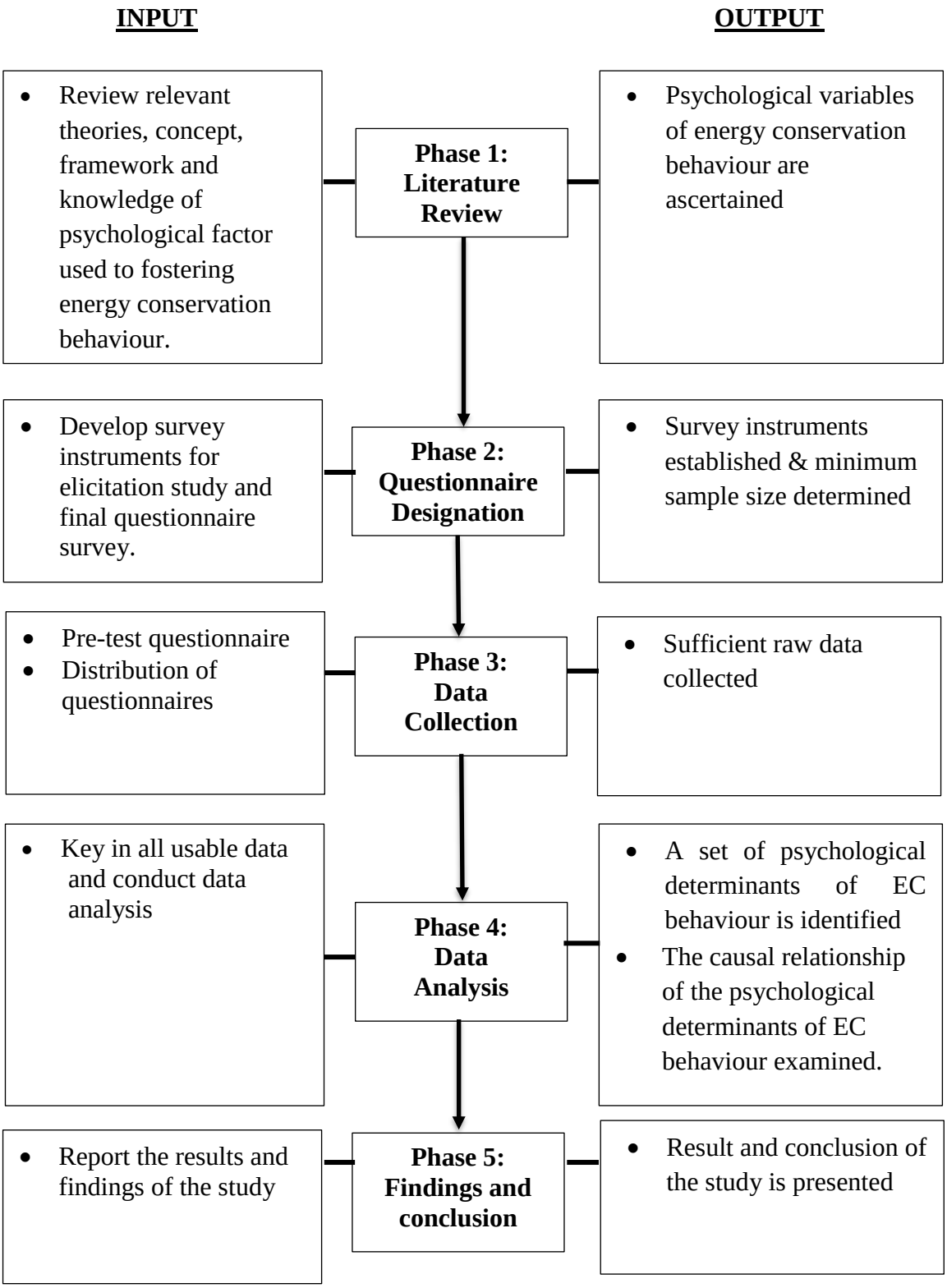

Figure 1.1 Research Methodology Flow Chart : Adopted from Low (2012)

1.8 Chapter Outline

The research consists of five chapters. Overall it focuses on the psychological determinants of energy conservation behaviour among office buildings users. Chapter one is about the introduction of energy consumption by commercial sector, energy challenges, government initiatives and importance of energy conservation behaviour among office building users. In this chapter, research objective was formulated based on the problem statement. The scope of study, significance of study, research methodology and the chapter outline are also included in this chapter.

Chapter two is literature review. It included the literature search and review where the theoretical part was carried out. It focuses mainly on the literature part of energy conservation and psychological variables that can foster energy saving behaviour. The relevant theories, concept, framework, model and knowledge are reviewed in this chapter.

Next, chapter three is research methodology. It discusses on the methodology used to achieve the research's objectives. This chapter explained further regarding survey instruments, sampling technique, elicitation study, data collection and method use to analyze the raw data.

Chapter Four is findings and discussions. The analyzed data discussed depth in this chapter. All analysis of data collected in this study is present. Graph, chart and figure are included for better understanding.

Lastly, chapter five is conclusions and recommendations. Conclusions are derived from previous chapter which is findings and discussions. All the objectives in this study were achieved. Recommendations are presented for future research and followed with limitation of study.

1.9 Summary

In conclusion, the problem statement and gaps of research have been identified in this chapter. Research objective is formulated and scope of study is defined. A brief research methodology diagram and the chapter outline are presented.

.

REFERENCE

Abrahamse, W., and Steg, L. (2009). How do Socio-Demographic and Psychological Factors relate to Households' Direct and Indirect Energy Use and Savings? *Journal of Economic Psychology, 30*(5), 711-720.

Abrahamse, W., and Steg, L. (2011). Factors related to Household Energy Use and Intention to Reduce it: The Role of Psychological and Socio-Demographic Variables. *Human Ecology Review, 18*(1), 30-40.

Abrahamse, W., and Steg, L. (2013). Social Influence Approaches to Encourage Resource Conservation: a Meta-Analysis. *Global Environmental Change, 23*(6), 1773-1785.

Abrahamse, W., Steg, L., Vlek, C., and Rothengatter, T. (2007). The Effect of Tailored Information, Goal Setting, and Tailored Feedback on Household Energy Use, Energy-related Behaviors, and Behavioral Antecedents. *Journal of Environmental Psychology, 27*(4), 265-276.

Adam, A. A., and Shauki, E. R. (2014). Socially Responsible Investment in Malaysia: Behavioral Framework in Evaluating Investors' Decision Making Process. *Journal of Cleaner Production, 80*, 224-240.

Ajit Prabhu, V., Nair, S. R., Ahmed, P. K., and Ganesh, C. (2013). Energy Conservation in Rural India: The Impact of Context and Attitudes on Behaviour. *Journal of Asian and African Studies, 48*(4), 469-483.

Ajzen, I. (1985). From Intentions to Actions: A Theory of Planned Behavior. In *Action Control* (pp. 11-39): Springer.

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

Ajzen, I. (2002). Perceived Behavioral Control, Self-Efficacy, Locus of Control, and the Theory of Planned Behavior1. *Journal of Applied Social Psychology, 32*(4), 665-683.

Ajzen, I., and Fishbein, M. (1980). Understanding Attitudes and Predicting Social Behaviour.

Andersson, M., and von Borgstede, C. (2010). Differentiation of Determinants of Low-Cost and High-Cost Recycling. *Journal of Environmental Psychology, 30*(4), 402-408.

Armstrong, D. (1982). Is Facility Management a fad? Why all the hoopla now. *Interiors*.

Ayoub, N., Musharavati, F., Pokharel, S., and Gabbar, H. A. (2014). Energy Consumption and Conservation Practices in Qatar—A case study of a Hotel building. *Energy and Buildings, 84*, 55-69.

Baden, D., and Prasad, S. (2016). Applying Behavioural theory to the Challenge of Sustainable Development: Using Hairdressers as Diffusers of More Sustainable Hair-Care Practices. *Journal of Business Ethics, 133*(2), 335-349.

Bamberg, S. (2003). How does Environmental Concern influence Specific Environmentally related Behaviors? A new answer to an old question. *Journal of Environmental Psychology, 23*(1), 21-32.

Bamberg, S., and Möser, G. (2007). Twenty Years After Hines, Hungerford, and Tomera: A New Meta-Analysis of Psycho-social Determinants of Pro-environmental Behaviour. *Journal of Environmental Psychology, 27*(1), 14-25.

Bamberg, S., and Schmidt, P. (2003). Incentives, Morality, or Habit? Predicting Students' Car Use for University Routes with the models of Ajzen, Schwartz, and Triandis. *Environment and behavior, 35*(2), 264-285.

Bandura, A. (1977). (1977a). Self-efficacy: Toward a unifying theory of behavioral change. Psychological Review, 84, 191-215.

Barr, S. (2007). Factors influencing environmental attitudes and behaviors: A UK case study of household waste management. *Environment and behavior, 39*(4), 435-473.

Barr, S., Gilg, A. W., and Ford, N. (2005). The household energy gap: examining the divide between habitual-and purchase-related conservation behaviours. *Energy policy, 33*(11), 1425-1444.

Barth, M., Jugert, P., and Fritsche, I. (2016). Still underdetected–Social norms and collective efficacy predict the acceptance of electric vehicles in Germany. *Transportation research part F: traffic psychology and behaviour, 37*, 64-77.

Blok, V., Wesselink, R., Studynka, O., and Kemp, R. (2015). Encouraging sustainability in the workplace: a survey on the pro-environmental behaviour of university employees. *Journal of cleaner production, 106*, 55-67.

Boomsma, C., Jones, R. V., Pahl, S., and Fuertes, A. (2016). Energy Saving Behaviours among Social Housing Tenants: Exploring The Relationship with Dwelling Characteristics, Monetary Concerns, and Psychological Motivations.

Botetzagias, I., Dima, A.-F., and Malesios, C. (2015). Extending the theory of planned behavior in the context of recycling: The role of moral norms and of demographic predictors. *Resources, conservation and recycling, 95*, 58-67.

Carrico, A. R., and Riemer, M. (2011). Motivating energy conservation in the workplace: An evaluation of the use of group-level feedback and peer education. *Journal of environmental psychology, 31*(1), 1-13.

Carrus, G., Passafaro, P., and Bonnes, M. (2008). Emotions, habits and rational choices in ecological behaviours: The case of recycling and use of public transportation. *Journal of environmental psychology, 28*(1), 51-62.

Chan, L., and Bishop, B. (2013). A moral basis for recycling: Extending the theory of planned behaviour. *Journal of Environmental Psychology, 36*, 96-102.

Chan, R. Y. (1999). Environmental attitudes and behavior of consumers in China: Survey findings and implications. *Journal of International Consumer Marketing, 11*(4), 25-52.

Chen, C.-f., and Knight, K. (2014). Energy at work: Social psychological factors affecting energy conservation intentions within Chinese electric power companies. *Energy Research & Social Science, 4*, 23-31.

Chen, M.-F. (2016). Extending the theory of planned behavior model to explain people's energy savings and carbon reduction behavioral intentions to mitigate climate change in Taiwan–moral obligation matters. *Journal of Cleaner Production, 112*, 1746-1753.

Chen, M.-F., and Tung, P.-J. (2014). Developing an extended theory of planned behavior model to predict consumers' intention to visit green hotels. *International journal of hospitality management, 36*, 221-230.

Chua, S. C., and Oh, T. H. (2011). Green progress and prospect in Malaysia. *Renewable and Sustainable Energy Reviews, 15*(6), 2850-2861.

Coleman, M. J., Irvine, K. N., Lemon, M., and Shao, L. (2013). Promoting behaviour change through personalized energy feedback in offices. *Building Research & Information, 41*(6), 637-651.

Conner, M., and 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.

Corral-Verdugo, V. (2003). Situational and personal determinants of waste control practices in northern Mexico: a study of reuse and recycling behaviors. *Resources, Conservation and Recycling, 39*(3), 265-281.

Corral-Verdugo, V., and Armendariz, L. I. (2000). The "new environmental paradigm" in a Mexican community. *The Journal of Environmental Education, 31*(3), 25-31.

Dalvi, S. D., Bhonsale, A. V., and Datar, R. M. (2015). Analysis of Indian residences in terms of energy efficiency through energy education – a case study of Mumbai megacity. *International Journal of Ambient Energy, 37*(6), 571-578.

De Groot, J. I., and Steg, L. (2010). Relationships between value orientations, self-determined motivational types and pro-environmental behavioural intentions. *Journal of Environmental Psychology, 30*(4), 368-378.

De Young, R. (1986). Some psychological aspects of recycling: the structure of conservation-satisfactions. *Environment and behavior, 18*(4), 435-449.

De Young, R. (1988). Exploring the difference between recyclers and non-recyclers: The role of information. *Journal of environmental systems, 18*(4), 341-351.

DeWaters, J. E., and Powers, S. E. (2011). Energy literacy of secondary students in New York State (USA): A measure of knowledge, affect, and behavior. *Energy Policy, 39*(3), 1699-1710.

Ding, Z., Wang, G., Liu, Z., and Long, R. (2017). Research on differences in the factors influencing the energy-saving behavior of urban and rural residents in China–A case study of Jiangsu Province. *Energy Policy, 100*, 252-259.

Donald, I. J., Cooper, S. R., and Conchie, S. (2014). An extended theory of planned behaviour model of the psychological factors affecting commuters' transport mode use. *Journal of environmental psychology, 40*, 39-48.

Dörnyei, Z. (2007). *Research methods in applied linguistics: Quantitative, qualitative, and mixed methodologies*: Oxford University Press.

Downs, D. S., and Hausenblas, H. A. (2005). Elicitation studies and the theory of planned behavior: a systematic review of exercise beliefs. *Psychology of sport and exercise, 6*(1), 1-31.

Dumitru, A., De Gregorio, E., Bonnes, M., Bonaiuto, M., Carrus, G., Garcia-Mira, R., et al. (2016). Low carbon energy behaviors in the workplace: A qualitative study in Italy and Spain. *Energy Research & Social Science, 13*, 49-59.

Ehrhardt-Martinez, K., and Laitner, J. A. (2010). *Rebound, technology and people: mitigating the rebound effect with energy-resource management and people-centered initiatives.* Paper presented at the ACEEE summer study on energy efficiency in buildings, 7-76.

EIA, U. (2011). Annual energy review. *Energy Information Administration, US Department of Energy: Washington, DC www. eia. doe. gov/emeu/aer*.

Ek, K., and Söderholm, P. (2010). The devil is in the details: Household electricity saving behavior and the role of information. *Energy Policy, 38*(3), 1578-1587.

Ellen, P. S. (1994). Do we know what we need to know? Objective and subjective knowledge effects on pro-ecological behaviors. *Journal of Business Research, 30*(1), 43-52.

Eluwa, S. E., and Siong, H. C. (2016). Behaviour of Ibadan City Households Towards Energy Conservation. *International Journal of Social Ecology and Sustainable Development, 7*(2), 39-55.

Eriksson, L., and Forward, S. E. (2011). Is the intention to travel in a pro-environmental manner and the intention to use the car determined by different factors? *Transportation research part D: transport and environment, 16*(5), 372-376.

Fang, S.-C., Yu, T.-K., Yu, T.-Y., and Chang, I.-C. (2016). Psychological Distance and Pro-Environmental Behavior: An Application of Behavior Model to Emerging Contaminants in Higher Education. *Journal of Baltic Science Education, 15*(6).

Fishbein, M., and Ajzen, I. (1977). Belief, attitude, intention, and behavior: An introduction to theory and research.

Fornell, C., and Larcker, D. F. (1981). Evaluating structural equation models with unobservable variables and measurement error. *Journal of marketing research*, 39-50.

Frederiks, E. R., Stenner, K., and Hobman, E. V. (2015). The Socio-Demographic and psychological predictors of residential energy consumption: A comprehensive review. *Energies, 8*(1), 573-609.

Fujii, S. (2006). Environmental concern, attitude toward frugality, and ease of behavior as determinants of pro-environmental behavior intentions. *Journal of environmental psychology, 26*(4), 262-268.

Giddings, B. (2015). The tyranny of energy conservation in the workplace: SAGE Publications Sage UK: London, England.

Goldemberg, J. (2000). United Nations Development Programme, United Nations, Department of Economic and Social Affairs and World Energy Council (2000). *World Energy Assessment: Energy and the Challenge of Sustainability*.

Greaves, M., Zibarras, L. D., and Stride, C. (2013). Using the theory of planned behavior to explore environmental behavioral intentions in the workplace. *Journal of Environmental Psychology, 34*, 109-120.

Gregory, G. D., and Leo, M. D. (2003). Repeated behavior and environmental psychology: the role of personal involvement and habit formation in explaining water consumption1. *Journal of Applied Social Psychology, 33*(6), 1261-1296.

Hair, J. F., Ringle, C. M., and Sarstedt, M. (2013). Editorial-partial least squares structural equation modeling: Rigorous applications, better results and higher acceptance.

Han, H., Hsu, L.-T. J., and Sheu, C. (2010). Application of the theory of planned behavior to green hotel choice: Testing the effect of environmental friendly activities. *Tourism management, 31*(3), 325-334.

Hansen, J., Kharecha, P., Sato, M., Masson-Delmotte, V., Ackerman, F., Beerling, D. J., et al. (2013). Assessing "dangerous climate change": required reduction of carbon emissions to protect young people, future generations and nature. *PloS one, 8*(12), e81648.

Harland, P., Staats, H., and Wilke, H. A. (1999). Explaining proenvironmental intention and behavior by personal norms and the theory of planned behavior1. *Journal of applied social psychology, 29*(12), 2505-2528.

Harvey, J. (2006). *The roles of attitudes, beliefs and risk perception as determinants of sustainable behavior: A framework for government action and further research.* Paper presented at the Safety and reliability for managing risk: Proceedings of the European safety and reliability conference (ESREL 2006), Estoril, Portugal, 18-22.

Heeren, A. J., Heeren, A. J., Singh, A. S., Singh, A. S., Zwickle, A., Zwickle, A., et al. (2016). Is sustainability knowledge half the battle? An examination of sustainability knowledge, attitudes, norms, and efficacy to understand sustainable behaviours. *International Journal of Sustainability in Higher Education, 17*(5), 613-632.

Hoang-Tung, N., Kojima, A., and Kubota, H. (2016). Impacts of travellers' social awareness on the intention of bus usage. *IATSS Research, 39*(2), 130-137.

Huijts, N. M., Molin, E. J., and Steg, L. (2012). Psychological factors influencing sustainable energy technology acceptance: A review-based comprehensive framework. *Renewable and Sustainable Energy Reviews, 16*(1), 525-531.

Hunecke, M., Haustein, S., Böhler, S., and Grischkat, S. (2010). Attitude-based target groups to reduce the ecological impact of daily mobility behavior. *Environment and Behavior, 42*(1), 3-43.

IEA. (2016). CO2 Emissions from Fuel Combustion Highlights 2016. *International Energy Agency*.

Ioannou, T., Zampetakis, L. A., and Lasaridi, K. (2013). Psychological determinants of household recycling intention in the context of the Theory of Planned Behaviour. *Fresenius Environmental Bulletin, 22*, 2035-2041.

IPCC, I. P. o. C. C. (2015). *Climate Change 2014: Mitigation of Climate Change* (Vol. 3): Cambridge University Press.

Ittiravivongs, A. (2012). Factors influence household solid waste recycling behaviour in Thailand: an integrated perspective. *WIT Transactions on Ecology and the Environment, 167*, 437-448.

Izagirre-Olaizola, J., Fernández-Sainz, A., and Vicente-Molina, M. A. (2015). Internal determinants of recycling behaviour by university students: a cross-country comparative analysis. *International Journal of Consumer Studies, 39*(1), 25-34.

Janda, K. B. (2011). Buildings don't use energy: people do. *Architectural science review, 54*(1), 15-22.

Johe, M. H., and Bhullar, N. (2016). To buy or not to buy: The roles of self-identity, attitudes, perceived behavioral control and norms in organic consumerism. *Ecological Economics, 128*, 99-105.

Kaiser, F. G., Hübner, G., and Bogner, F. X. (2005). Contrasting the Theory of Planned Behavior With the Value-Belief-Norm Model in Explaining Conservation Behavior1. *Journal of applied social psychology, 35*(10), 2150-2170.

Kaplowitz, M. D., Thorp, L., Coleman, K., and Kwame Yeboah, F. (2012). Energy conservation attitudes, knowledge, and behaviors in science laboratories. *Energy Policy, 50*, 581-591.

Karlin, B., Davis, N., Sanguinetti, A., Gamble, K., Kirkby, D., and Stokols, D. (2014). Dimensions of conservation: exploring differences among energy behaviors. *Environment and Behavior, 46*(4), 423-452.

Kato, T., Tran, A. Q., and Hoang, H. (2015). Factors affecting voluntary participation in food residue recycling: A case study in Da Nang, Viet Nam. *Sustainable Environment Research, 25*(2).

Khashe, S., Heydarian, A., Becerik-Gerber, B., and Wood, W. (2016). Exploring the effectiveness of social messages on promoting energy conservation behavior in buildings. *Building and Environment, 102*, 83-94.

Kim, M. J., Cho, M. E., and Kim, J. T. (2013). Energy use of households in apartment complexes with different service life. *Energy and Buildings, 66*, 591-598.

Kraft, P., Rise, J., Sutton, S., and Røysamb, E. (2005). Perceived difficulty in the theory of planned behaviour: Perceived behavioural control or affective attitude? *British Journal of Social Psychology, 44*(3), 479-496.

Kuller, R. (1991). Neuropsychological Perspective. *Environment, cognition, and action: An integrated approach*, 111.

Lee, J., and Tanusia, A. (2016). *Energy conservation behavioural intention: attitudes, subjective norm and self-efficacy.* Paper presented at the IOP Conference Series: Earth and Environmental Science, 012087.

Lee, Y. Y., Choong, W. W., Mohammed, A. H., and Abdullah, F. A. P. (2013). Preferred Communication Channels to Foster Energy Conservation Behaviour among Public Office Building Users: A Study in Kota Iskandar. *Sains Humanika, 64*(1).

Lindenberg, S., and Steg, L. (2007). Normative, gain and hedonic goal frames guiding environmental behavior. *Journal of Social issues, 63*(1), 117-137.

Lo, S. H., Peters, G.-J. Y., and Kok, G. (2012). Energy-Related Behaviors in Office Buildings: A Qualitative Study on Individual and Organisational Determinants. *Applied Psychology, 61*(2), 227-249.

Lokhorst, A. M., Hoon, C., le Rutte, R., and de Snoo, G. (2014). There is an I in nature: The crucial role of the self in nature conservation. *Land Use Policy, 39*, 121-126.

Lokhorst, A. M., Staats, H., and Van Iterson, J. (2015). Energy Saving in Office Buildings: Are Feedback and Commitment-Making Useful Instruments to Trigger Change? *Hum Ecol Interdiscip J, 43*(5), 759-768.

López-Mosquera, N., Lera-López, F., and Sánchez, M. (2015). Key factors to explain recycling, car use and environmentally responsible purchase behaviors: a comparative perspective. *Resources, Conservation and Recycling, 99*, 29-39.

Louis, W., Davies, S., Smith, J., and Terry, D. (2007). Pizza and pop and the student identity: The role of referent group norms in healthy and unhealthy eating. *The Journal of social psychology, 147*(1), 57-74.

Low, S. T. (2012). Factors affecting energy conservation behaviour of students in Malaysian universities.

Lülfs, R., and Hahn, R. (2014). Sustainable behavior in the business sphere: A comprehensive overview of the explanatory power of psychological models. *Organization & Environment, 27*(1), 43-64.

MA, B.-q., YAN, Z.-f., GUI, Z.-g., TAN, W., and HE, J.-c. (2007). Investigation and Analysis on Summer Energy Consumption Structure of Energy Efficient Residential Buildings in Xi'an [J]. *Building Science, 8*, 011.

Madden, T. J., Ellen, P. S., and Ajzen, I. (1992). A comparison of the theory of planned behavior and the theory of reasoned action. *Personality and social psychology Bulletin, 18*(1), 3-9.

Mahon, H. P., Kiss, M. G., and Leimer, H. J. (1983). *Efficient energy management: Methods for improved commercial and industrial productivity*: Prentice Hall.

Maleetipwan-Mattsson, P., Laike, T., and Johansson, M. (2016). Factors affecting optimal lighting use in shared hospital environments: A case-study. *Building and Environment, 96*, 260-269.

Manika, D., Wells, V. K., Gregory-Smith, D., and Gentry, M. (2013). The Impact of Individual Attitudinal and Organisational Variables on Workplace Environmentally Friendly Behaviours. *Journal of Business Ethics, 126*(4), 663-684.

Martinho, G., Pires, A., Portela, G., and Fonseca, M. (2015). Factors affecting consumers' choices concerning sustainable packaging during product purchase and recycling. *Resources, Conservation and Recycling, 103*, 58-68.

Masoso, O., and Grobler, L. J. (2010). The dark side of occupants' behaviour on building energy use. *Energy and buildings, 42*(2), 173-177.

Miller, H. K. (2016). Undergraduates in a Sustainability Semester: Models of social change for sustainability. *The Journal of Environmental Education, 47*(1), 52-67.

Moisander, J. (2007). Motivational complexity of green consumerism. *International journal of consumer studies, 31*(4), 404-409.

Mokhtar Azizi, N. S., Wilkinson, S., and Fassman, E. (2015). Strategies for improving energy saving behaviour in commercial buildings in Malaysia. *Engineering, Construction and Architectural Management, 22*(1), 73-90.

Monroe, M. C. (2003). Two avenues for encouraging conservation behaviors. *Human Ecology Review, 10*(2), 113-125.

Murtagh, N., Nati, M., Headley, W. R., Gatersleben, B., Gluhak, A., Imran, M. A., et al. (2013). Individual energy use and feedback in an office setting: A field trial. *Energy Policy, 62*, 717-728.

NEEAP. (2014). <NEEAP For Comments Final January 2014.pdf>.

Ohnmacht, T., Schaffner, D., Weibel, C., and Schad, H. (2017). Rethinking social psychology and intervention design: A model of energy savings and human behavior. *Energy Research & Social Science, 26*, 40-53.

Oikonomou, V., Becchis, F., Steg, L., and Russolillo, D. (2009). Energy saving and energy efficiency concepts for policy making. *Energy policy, 37*(11), 4787-4796.

Onel, N., Onel, N., Mukherjee, A., and Mukherjee, A. (2016). Consumer knowledge in pro-environmental behavior: An exploration of its antecedents and consequences. *World Journal of Science, Technology and Sustainable Development, 13*(4), 328-352.

Ouellette, J. A., and Wood, W. (1998). Habit and intention in everyday life: The multiple processes by which past behavior predicts future behavior. *Psychological bulletin, 124*(1), 54.

Oztekin, C., Teksöz, G., Pamuk, S., Sahin, E., and Kilic, D. S. (2017). Gender perspective on the factors predicting recycling behavior: Implications from the theory of planned behavior. *Waste Management*.

Pakpour, A. H., Zeidi, I. M., Emamjomeh, M. M., Asefzadeh, S., and Pearson, H. (2014). Household waste behaviours among a community sample in Iran: an application of the theory of planned behaviour. *Waste management, 34*(6), 980-986.

Pearson, H. C., Dawson, L. N., and Breitkopf, C. R. (2012). Recycling attitudes and behavior among a clinic-based sample of low-income Hispanic women in southeast Texas. *PloS one, 7*(4), e34469.

Pedersen, M., and Hydro, B. (2008). Segmenting residential customers: energy and conservation behaviors. *Proceedings of the 2008 ACEEE Summer Study on Energy Efficiency in Buildings, 7*, 229-241.

Pérez-Lombard, L., Ortiz, J., and Pout, C. (2008). A review on buildings energy consumption information. *Energy and buildings, 40*(3), 394-398.

Perlaviciute, G., and Steg, L. (2014). Contextual and psychological factors shaping evaluations and acceptability of energy alternatives: integrated review and research agenda. *Renewable and Sustainable Energy Reviews, 35*, 361-381.

Petschnig, M., Heidenreich, S., and Spieth, P. (2014). Innovative alternatives take action–Investigating determinants of alternative fuel vehicle adoption. *Transportation Research Part A: Policy and Practice, 61*, 68-83.

Petter, S., Straub, D., and Rai, A. (2007). Specifying formative constructs in information systems research. *Mis Quarterly*, 623-656.

Pimdee, P., Thiengkamol, N., and Thiengkamol, T. (2012). Causal relationship model of electrical energy conservation. *European Journal of Social Sciences, 32*(3), 306-315.

Poortinga, W., Steg, L., and Vlek, C. (2004). Values, environmental concern, and environmental behavior: A study into household energy use. *Environment and behavior, 36*(1), 70-93.

Pothitou, M., Hanna, R. F., and Chalvatzis, K. J. (2016a). Environmental knowledge, pro-environmental behaviour and energy savings in households: An empirical study. *Applied Energy, 184*, 1217-1229.

Pothitou, M., Kolios, A. J., Varga, L., and Gu, S. (2016b). A framework for targeting household energy savings through habitual behavioural change. *International Journal of Sustainable Energy, 35*(7), 686-700.

Pothitou, M., Varga, L., Kolios, A. J., and Gu, S. (2015). Linking energy behaviour, attitude and habits with environmental predisposition and knowledge. *International Journal of Sustainable Energy, 36*(4), 398-414.

Prete, M. I., Piper, L., Rizzo, C., Pino, G., Capestro, M., Mileti, A., et al. (2017). Determinants of Southern Italian Households' Intention to Adopt Energy Efficiency Measures in Residential Buildings. *Journal of Cleaner Production*.

Russell, S., and Fielding, K. (2010). Water demand management research: A psychological perspective. *Water Resources Research, 46*(5).

Saidur, R. (2009). Energy consumption, energy savings, and emission analysis in Malaysian office buildings. *Energy Policy, 37*(10), 4104-4113.

Saidur, R., and Masjuki, H. (2008). Energy and associated emission analysis in office buildings. *International Journal of Mechanical and Materials Engineering, 3*(1), 90-96.

Saphores, J.-D. M., and Nixon, H. (2014). How effective are current household recycling policies? Results from a national survey of US households. *Resources, Conservation and Recycling, 92*, 1-10.

Sardianou, E. (2005). *Household energy conservation patterns: evidence from Greece.* Paper presented at the 2005-06-01)[2012-12-30]. http://www2.se.ac.uk/europeanInstitute/research/hellenicObservatory/pdf/2nd-Symposium/Eleni-Sardianou-paper. pdf.

Sarkis, A. M. (2017). A comparative study of theoretical behaviour change models predicting empirical evidence for residential energy conservation behaviours. *Journal of Cleaner Production, 141*, 526-537.

Schipper, L., Bartlett, S., Hawk, D., and Vine, E. (1989). Linking life-styles and energy use: a matter of time? *Annual review of energy, 14*(1), 273-320.

Scott, D., and Willits, F. K. (1994). Environmental attitudes and behavior a Pennsylvania survey. *Environment and behavior, 26*(2), 239-260.

Segev, S. (2015). Modelling household conservation behaviour among ethnic consumers: the path from values to behaviours. *International Journal of Consumer Studies, 39*(3), 193-202.

Steg, L. (2008). Promoting household energy conservation. *Energy Policy, 36*(12), 4449-4453.

Steg, L., and Vlek, C. (2009). Encouraging pro-environmental behaviour: An integrative review and research agenda. *Journal of environmental psychology, 29*(3), 309-317.

Stern, P. C. (2000). New environmental theories: toward a coherent theory of environmentally significant behavior. *Journal of social issues, 56*(3), 407-424.

Tang, Z., Chen, X., and 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.

Terry, D. (1993). Self-efficacy expectancies and the theory of reasoned action. *The theory of reasoned action: Its application to AIDS-preventive behaviour. International series in experimental social psychology, 28*, 135-151.

Tertoolen, G., Van Kreveld, D., and Verstraten, B. (1998). Psychological resistance against attempts to reduce private car use. *Transportation Research Part A: Policy and Practice, 32*(3), 171-181.

Tetlow, R. M., Beaman, C. P., Elmualim, A. A., and Couling, K. (2014). Simple prompts reduce inadvertent energy consumption from lighting in office buildings. *Building and Environment, 81*, 234-242.

Tetlow, R. M., van Dronkelaar, C., Beaman, C. P., Elmualim, A. A., and Couling, K. (2015). Identifying behavioural predictors of small power electricity consumption in office buildings. *Building and Environment, 92*, 75-85.

Thøgersen, J., and Grønhøj, A. (2010). Electricity saving in households—A social cognitive approach. *Energy Policy, 38*(12), 7732-7743.

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

Uchiyama, Y. (2002). Present efforts of saving energy and future energy demand/supply in Japan. *Energy Conversion and Management, 43*(9), 1123-1131.

Van den Bergh, J. C. (2008). Environmental regulation of households: An empirical review of economic and psychological factors. *Ecological Economics, 66*(4), 559-574.

Varotto, A., and Spagnolli, A. (2017). Psychological strategies to promote household recycling. A systematic review with meta-analysis of validated field interventions. *Journal of Environmental Psychology*.

Verplanken, B., and Holland, R. W. (2002). Motivated decision making: effects of activation and self-centrality of values on choices and behavior. *Journal of personality and social psychology, 82*(3), 434.

Vining, J., Ebreo, A., Bechtel, R., and Churchman, A. (2002). Emerging theoretical and methodological perspectives on conservation behaviour. *Urbana, 51*, 61801.

Von Borgstede, C., Andersson, M., and Johnsson, F. (2013). Public attitudes to climate change and carbon mitigation—Implications for energy-associated behaviours. *Energy Policy, 57*, 182-193.

Wan, C., Shen, G. Q., and Yu, A. (2015). Key determinants of willingness to support policy measures on recycling: A case study in Hong Kong. *Environmental Science & Policy, 54*, 409-418.

Wang, Z., Zhang, B., and Li, G. (2014). Determinants of energy-saving behavioral intention among residents in Beijing: Extending the theory of planned behavior. *Journal of Renewable and Sustainable Energy, 6*(5), 053127.

Wang, Z., Zhang, B., Yin, J., and Zhang, Y. (2011). Determinants and policy implications for household electricity-saving behaviour: evidence from Beijing, China. *Energy Policy, 39*(6), 3550-3557.

Webb, D., Soutar, G. N., Mazzarol, T., and Saldaris, P. (2013). Self-determination theory and consumer behavioural change: Evidence from a household energy-saving behaviour study. *Journal of Environmental Psychology, 35*, 59-66.

Wedge, R. (2003). Energy efficiency: key to managing costs. *NZ Forest Industries*.

White, K. M., and Hyde, M. K. (2012). The role of self-perceptions in the prediction of household recycling behavior in Australia. *Environment and Behavior, 44*(6), 785-799.

Wold, H. (1975). *Path models with latent variables: The NIPALS approach*: Acad. Press.

Wu, D. W. L., DiGiacomo, A., and Kingstone, A. (2013). A sustainable building promotes pro-environmental behavior: an observational study on food disposal. *PloS one, 8*(1), e53856.

Wu, S. R., Greaves, M., Chen, J., and Grady, S. C. (2016). Green buildings need green occupants: a research framework through the lens of the Theory of Planned Behaviour. *Architectural Science Review, 60*(1), 5-14.

Yang, L., Lam, J. C., and Tsang, C. L. (2008). Energy performance of building envelopes in different climate zones in China. *Applied Energy, 85*(9), 800-817.

Yeboah, F. K., and Kaplowitz, M. D. (2016). Explaining Energy Conservation and Environmental Citizenship Behaviors Using the Value-Belief-Norm Framework. *Human Ecology Review, 22*(2), 137.

Yen, N. S., Shakur, E. S. A., and Wai, C. W. (2010). Energy conservation opportunities in Malaysian universities. *Malaysian Journal of Real Estate, 5*(1), 26-35.

Yik, F. W., and Lee, W. (2002). A preliminary inquiry into why buildings remain energy inefficient and the potential remedy. *HKIE Transactions, 9*(1), 32-36.

Young, W., Davis, M., McNeill, I. M., Malhotra, B., Russell, S., Unsworth, K., et al. (2015). Changing behaviour: successful environmental programmes in the workplace. *Business Strategy and the Environment, 24*(8), 689-703.

Yu, Z., Fung, B. C., Haghighat, F., Yoshino, H., and Morofsky, E. (2011). A systematic procedure to study the influence of occupant behavior on building energy consumption. *Energy and Buildings, 43*(6), 1409-1417.

Yuan, Y., Nomura, H., Takahashi, Y., and Yabe, M. (2016). Model of Chinese Household Kitchen Waste Separation Behavior: A Case Study in Beijing City. *Sustainability, 8*(10), 1083.

Yuasa, K., Yata, M., Nakano, Y., and Fujii, S. (2014). Reduction in Residential Energy Consumption Owing to Lifestyle Changes—A Survey Research for Meguro Ward in Tokyo, Japan. *Journal of Asian Architecture and Building Engineering, 13*(3), 665-671.