

THE BARRIER OF CONSUMER'S DECISION-MAKING TOWARD
IMPLEMENTATION OF SOLAR PHOTOVOLTAIC PANEL IN MALACCA

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DECLARATION

“I admit that this report is the result of my own and quotes that for everything I have explained the sources.”

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DEDICATION

I would like to dedicate this research project to my beloved parents, my sibling and my friend. Their encouragement and unconditioned have allowed me able to complete this research project smoothly. In addition, I want to thanks to my PSM Supervisor, En. Mukhiffun Bin Mukapit for his fully supervision, guidance and teaching along the whole project. I also want to thanks to my PSM Panel, Dr. Haslinda Musa for the advice in my research and thanks to all lecturers, staff in UTeM.

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ABSTRACT

Environmental issues are complicated problem and need every one of us to solve it together. For this reason, the solar photovoltaic panel is one of the ways which is rapidly in this era to overcome this problem. However, the solar energy is very suitable usage in Malacca, Malaysia, but this technology is only adopted by small populations in Malacca. Therefore, the purpose of this is to investigate the awareness levels of the consumer, to study potential barriers and need to identify the dominant barrier of consumer's decision-making toward implementation of solar photovoltaic panel in Malacca. There are several barriers such as economic, environmental institutional and sociotechnical studied by Adachi (2009), Eronini (2014) and Karakaya et al. (2015). This study is conducted in Taman Rembia at Alor Gajah, Malacca and there are 100. The result need to analysis by using the Pearson correlation due to determine the strength between the independent variable and dependent variable. The result of this study indicated that environmental barrier and institutional barrier have significant that affect the consumer decision making toward the implementation of solar photovoltaic panel in Malacca. The environmental barrier has the most significant that affect the consumer decision making toward the implementation of solar photovoltaic panel in Malacca

ABSTRAK

Isu alam sekitar rumit masalah dan memerlukan setiap seorang daripada kita untuk menyelesaikannya bersama-sama. Atas sebab ini, panel photovoltaic solar adalah salah satu cara yang pesat dalam era ini untuk mengatasi masalah ini. Walau bagaimanapun, tenaga solar adalah penggunaan sangat sesuai di Malacca, Malaysia, tetapi teknologi ini hanya diguna pakai oleh penduduk kecil di Melaka. Oleh itu, tujuan ini adalah untuk menyiasat tahap kesedaran pengguna, untuk mengkaji halangan yang berpotensi dan perlu mengenal pasti halangan yang dominan dalam membuat keputusan pengguna ke arah pelaksanaan panel photovoltaic solar di Melaka. Terdapat beberapa halangan seperti ekonomi, alam sekitar dan institusi sociotechnical dikaji oleh Adachi (2009), Eronini (2014) dan Karakaya et al. (2015). Kajian ini dijalankan di Taman Rembia di Alor Gajah, Melaka dan terdapat 100. Hasilnya perlu analisis dengan menggunakan korelasi Pearson kerana menentukan kekuatan antara pembolehubah bebas dan pembolehubah bersandar. Hasil kajian ini menunjukkan bahawa halangan alam sekitar dan halangan institusi mempunyai signifikan yang mempengaruhi keputusan pengguna membuat ke arah pelaksanaan panel photovoltaic solar di Melaka. Halangan alam sekitar mempunyai yang paling penting yang mempengaruhi keputusan pengguna membuat ke arah pelaksanaan panel photovoltaic solar di Melaka

TABLE OF CONTENTS

CHAPTER	TITLE	PAGE
	DECLARATION	Ii
	DEDICATION	Iii
	ACKNOWLEDGEMENT	Iv
	ABSTRACT	V
	ABSTRAK	Vi
	TABLE OF CONTENTS	Vii
	LIST OF TABLES	Xii
	LIST OF FIGURES	Xiv
	LIST OF ABBREVIATIONS	Xv
	LIST OF APPENDICES	Xvi
CHAPTER 1	INTRODUCTION	1
	1.1 Introduction	1
	1.2 Problem Statement	2
	1.3 Research Question	4
	1.4 Research Objective	4
	1.5 Importance of Study	5
	1.6 Research Scope	6
	1.7 Limitation of Research	6
	1.8 Hypothesis	7
	1.9 Summary	8
CHAPTER 2	LITERATURE REVIEW	9
	2.1 Introduction	9

2.2	Overview of Photovoltaic Solar Energy Generation	9
2.3	Consumer	10
2.4	Consumer Decision Making	11
2.5	Potential Barriers That Affect Consumer's Decision Making Toward Implementation of Solar Photovoltaic Panel	13
2.5.1	Economic Barrier	14
2.5.2	Environmental Barrier	15
2.5.3	Social Barrier	16
2.5.4	Technological Barrier	17
2.5.5	Institutional Barrier	18
2.6	Four Dimension of Barrier	19
2.6.1	Sociotechnical Barrier	19
2.6.2	Management Barrier	21
2.6.3	Policy Barrier	21
2.6.4	Economic Barrier	22
2.7	Theoretical Framework	23
2.8	Summary	24
CHAPTER 3	RESEARCH METHODOLOGY	25
3.1	Introduction	25
3.2	Research Design	25
3.3	Quantitative Method	26
3.4	Data Collection Method	27
3.4.1	Primary Data	27
3.4.2	Secondary Data	28
3.5	Research Strategy	28
3.5.1	Questionnaire	29
3.6	Location of Research	30
3.7	Sampling Design	31
3.7.1	Population	31

3.7.2	Sampling size	32
3.8	Pilot Test	32
3.9	Reliability and Validity	33
3.10	Data Analysis	33
3.11	Summary	35
CHAPTER 4	DATA ANALYSIS AND RESULTS	36
4.1	Introduction	36
4.2	Reliability Test and Validity Test	37
4.2.1	Reliability Test and Validity Test For Pilot Study	37
4.2.2	Reliability and Validity For Actual Study	39
4.3	Descriptive Analysis	41
4.3.1	Gender	41
4.3.2	Age	42
4.3.3	Race	43
4.3.4	Occupation	44
4.3.5	Income of Household	45
4.4	Analysis the Awareness Levels of the Consumer Toward Implementation of Solar Photovoltaic Panel in Malacca	46
4.5	Correlate Analysis	48
4.6	Linear Regression Analysis	49
4.6.1	Hypothesis 1	50
4.6.2	Hypothesis 2	51
4.6.3	Hypothesis 3	53
4.6.4	Hypothesis 4	55
4.7	Multiple Regression Analysis	56
4.8	Summary	59

CHAPTER 5	DISCUSSION, RECOMMENDATIONS AND CONCLUSION	60
5.1	Introduction	60
5.2	Discussion the Research Objective	60
5.2.1	Demographic Analysis Discussion	61
5.2.2	Discussion of the Awareness Level of the Consumer Toward Implementation of the Solar Photovoltaic Panel in Malacca	62
5.2.3	Discussion of the Economic Barriers That Affects Consumer's Decision Making To the Implementation of Solar Photovoltaic Panel in Malacca	63
5.2.4	Discussion of the Environmental Barriers That Affects Consumer's Decision Making To the Implementation of Solar Photovoltaic Panel in Malacca	63
5.2.5	Discussion of the Institutional Barriers That Affects Consumer's Decision Making To the Implementation of Solar Photovoltaic Panel in Malacca	64
5.2.6	Discussion of the Sociotechnical Barriers That Affects Consumer's Decision Making To the Implementation of Solar Photovoltaic Panel in Malacca	65
5.2.67	Discussion the Dominant Barriers That Affects Consumer's Decision Making	65

To the Implementation of Solar Photovoltaic Panel in Malacca		
5.3	Discussion the Multiple Regression Analysis	66
5.4	Recommendation for Future Researcher	67
5.5	Summary	68
	REFERENCES	69
	APPENDICES	77

LIST OF TABLES

TABLE	TITLE	PAGE
3.1	Sections in Questionnaires	30
3.2	5-point Likert Scale	30
3.3	Summary of Research Analysis Based on Detail	35
4.1	Cronbach's Alpha Coefficient (Source: Tavakol, M. & Dennick, 2011)	37
4.2	Cronbach's Alpha Value for each variable	38
4.3	Overall Cronbach's Alpha Value of Pilot Study	38
4.4	Cronbach's Alpha Value for Actual Study	40
4.5	Overall Cronbach's Alpha Value of Actual Study	40
4.6	Frequency and Percentage of Respondents' Gender	41
4.7	Frequency and Percentage of Respondents' Age	42
4.8	Frequency and Percentage of Respondents' Race	43
4.9	Frequency and Percentage of Respondents' Occupation	44
4.10	Frequency and Percentage of Respondents' Income	45
4.11	Descriptive Statistic of the level awareness among the consumer	46
4.12	Level awareness among respondent	47
4.13	Rule of Thumb for Interpreting the Size of a Correlation Coefficient	48
4.14	Correlate Analysis Data	49
4.15	Model Summary of Hypothesis 1	50

4.16	ANOVA of Hypothesis 1	51
4.17	Coefficients of Hypothesis 1	51
4.18	Model Summary of Hypothesis 2	52
4.19	ANOVA of Hypothesis 2	52
4.20	Coefficients of Hypothesis 2	53
4.21	Model Summary of Hypothesis 3	54
4.22	ANOVA of Hypothesis 3	54
4.23	Coefficients of Hypothesis 3	54
4.24	Model Summary of Hypothesis 4	55
4.25	ANOVA of Hypothesis 4	56
4.26	Coefficients of Hypothesis 4	56
4.27	Model Summary of Multiple Regressions	57
4.28	ANOVA of Multiple Regressions	57
4.29	Coefficients of Multiple Regressions	58
5.1	Demographic Data	61

LIST OF FIGURES

Figure	Content	Page
2.1	Shown the Maslow's Hierarchy of needs	13
2.2	The Conceptual Framework of Study	23
4.1	Respondents' Distribution by Gender	41
4.2	Respondents' Distribution by Age	42
4.3	Respondents' Distribution by Race	43
4.4	Respondents' Distribution by Occupation	44
4.5	Respondents' Distribution by Income of household	45
4.6	Level awareness among the respondents	47

LIST OF ABBRAVIATIONS

%	-	Percentage
GWh	-	Gigawatt Hour
PV	-	Photovoltaic
TNB	-	Tenaga Nasional Berhad
FiT	-	Feed in Tariff
SPSS	-	Statistical Package for Social Science

LIST OF APPENDICES

Appendix	Content	Page
A	Gantt chart for Project Sarjana Muda (PSM) 1	77
B	Gantt chart for Project Sarjana Muda (PSM) 2	78
C	Survey Questionnaire	79
D	Pilot Test Result	85
E	Linear Regression Test Result	91

Chapter 1

Introduction

1.1 Introduction

Nowadays, the global warming has become a critical issue to the world. The fossil fuels are the one of source pollution that will make negative impact on the environment. However, according to the Joshua (2006), the environmental challenges which face the modern time society are substantial with the most serious threat coming from anthropogenic obstruct with global climate system.

Apart from that, according to the Energy Commission of Malaysia report of National Energy Balance 2012, the share of electricity consumption in residential is 21.2% (about 24,666 GWh from total electricity consumption of 116,353 GWh). Besides, National Energy Balance report 2013 show that the usage of electricity by residential is 21.4% (about 26,338 GWh from total usage of 123,076 GWh). The increase of the consumption of electricity is about 1,672 GWh in a year which indicated that Malaysians are still lack of awareness in saving the electricity consumption.

As we know solar is one of the renewable energy, it is derived from the sun is practically free and does not required any fuel to generate the electricity. The use of solar energy indirectly will reduce the health costs as it is environmentally friendly. This is because solar energy is a clean, renewable and sustainable energy which does

not pollute our environment. Furthermore, the low maintenance made it a beneficial energy to be used in the future (Johari, 2010).

Photovoltaic Panel is a product that using technology call photovoltaic (PV). Generally, solar photovoltaic energy conversion is a sustainable and environmentally friendly method of producing energy which is converts the sunlight directly into electricity. (Abdelhamid et al., 2012). According to Robert et al. (2010) state, “PV is a process that produces direct electrical current from the radiant energy of the Sun”. Malacca, Malaysia is a state located within the equatorial region, where a tropical rainforest climate is apparent all year round.

Malacca State always pursuit to become a city of green technology that through several strategy, this strategies implemented to achieve the vision of “Green Technology City” that is launch of the Green City Malacca. One of the strategies is to enhance usage of solar PV panel among resident (Mustaffa, 2015). PV technology is very suitable in Malacca, Malaysia. However, this technology do not wisely use. Researcher suggests that the solar energy is very suitable usage in the Malacca. This is because the weather in Malaysia is tropical country which is favorable for the implementation of the solar energy. According to the by Tsoutsos and Staltiboulis (2004) that indicates the several potential barriers which is technological barrier, government policy and regulatory framework, cultural and psychological barrier, demand barrier, production barrier, infrastructure and maintenance requirements, undesirable societal and environmental effects, economic barrier.

1.2 Problem Statement

Malaysia has high solar energy potential with the daily average solar radiation of 4000–5000Wh/m² and the average sunshine duration is around 4-8h/day (Nugroho, 2010). Hence, the climate in Malaysia is very suitable for solar energy (Mekhilef et al., 2011). However, according to the Perbadanan Teknologi Hijau Melaka indicated that 10 homes have been fitted with solar panels and sell electricity to TNB for FiT. Even

though the solar energy is very suitable in Malacca, Malaysia, however, this technology is only adopted by small populations in Malacca.

There are several barriers of the implementation of solar photovoltaic panel for resident in Malacca. One of the barriers is the highly initial installment costs and lengthy payback periods (Adachi, 2009). Besides that, most of the citizens are lack of awareness to solar PV panel. Based on the Trudgill (1990) methodology, people awareness is still one of the main barriers in consumption of renewable energy in electricity generation especially solar PV in Malaysia. (Muhammad-Sukki et al., 2012, Yuan et al., 2011 and Haw et al., 2009).

In addition, electricity source from non-renewable fossil fuels such as natural gas, coal, and crude oil is a traditional source for people. People are born with these resources to gain electricity. Thus, electricity is easily available and inexpensive. In fact, it is hard to notice the existence of power grid. Most customers, except for the few who might be called “tree-huggers”, are unlikely to choose a complicated product even if it might help them to save money, as well as environment (Zhai and Eric, 2012).

Furthermore, other barrier are faced by consumers which is include the lack of information to the solar PV panel, lack of time to understanding the function of the solar, lack of knowledge and trust in the solar system provider, concern over solar system performance, fear buying the product which is poor brand image and lack of information on environmental (K. H. Solangi et al., 2015). Therefore, the researcher executes this research due to study the dominant barriers of consumer’s decision-making toward implementation of solar photovoltaic panel in Malacca.

1.3 Research Question

1. What are the awareness levels of the consumer toward implementation of solar photovoltaic panel in Malacca?
2. What are the potential barriers that affect consumer's decision-making to the implementation of solar photovoltaic panel in Malacca?
3. What are the dominant barriers of consumer's decision-making toward implementation of solar photovoltaic panel in Malacca?

The purpose of the researcher is to understand the awareness level of the consumer toward implementation of solar photovoltaic panel and potential barriers that affect consumer's decision-making to the implementation of solar photovoltaic panel in Malacca. Besides, the researcher also needs to know dominant barriers of consumer's decision-making toward implementation of solar photovoltaic panel in Malacca.

1.4 Research Objective

Based on the research items mentioned, this research aimed:

1. To investigate awareness levels of the consumer toward implementation of solar photovoltaic panel in Malacca.
2. To study the economic barriers that affects consumer's decision-making to the implementation of solar photovoltaic panel in Malacca.
3. To study the environmental barriers that affects consumer's decision-making to the implementation of solar photovoltaic panel in Malacca
4. To study the institutional barriers that affects consumer's decision-making to the implementation of solar photovoltaic panel in Malacca
5. To study the sociotechnical barriers that affects consumer's decision-making to the implementation of solar photovoltaic panel in Malacca
6. To identify the dominant barrier of consumers decision-making toward implementation of solar photovoltaic panel in Malacca.

The objective is to investigate the awareness levels of the consumer toward implementation of solar photovoltaic panel in Malacca. Besides, the researcher needs to study potential barriers that affect consumer's decision-making to the implementation of solar photovoltaic panel in Malacca. There are several barriers such as economic, environmental, institutional and sociotechnical. From this, the researcher needs to identify the dominant barrier of consumer's decision-making toward implementation of solar photovoltaic panel in Malacca.

1.5 Importance of Study

The main focus is to understand the potential barrier that affects consumer's decision-making to the implementation of solar photovoltaic panel in Malacca. Besides that, in this research also needs to identify dominant barriers of consumer's decision-making toward implementation of solar photovoltaic panel in Malacca. The purpose for this research is to reduce the negative impact to the environment and achieve the vision of "Green Technology City" in Malacca.

In addition, the researcher can find out the dominant barriers are faced by the consumer which is unwilling to install the solar PV panel. Therefore, the researcher may aware the barriers of solar photovoltaic panel among the resident and may reduce this barriers of the future solar photovoltaic panel. Beside, this study is to make the awareness for the public about the environmental friendly of the solar photovoltaic and encourage the people to consumption of renewable energy in electricity generation especially solar PV in Malacca, Malaysia.

1.6 Research scope

This study focuses on the awareness levels of the consumer and potential barrier that affects consumer's decision-making to the implementation of solar photovoltaic panel in Malacca only, but not in other state in Malaysia. There are several barriers such as economic, sociotechnical, environmental and institutional. From this, the researcher needs to identify the dominant barrier of consumer's decision-making toward implementation of solar photovoltaic panel in Malacca. Other aspect such as exploitation of the solar energy in industry, agriculture and so on will not be covered in this research.

1.7 Limitation of Research

In this research paper, there are several limitations has been identified. Firstly, the time is a constraint for this research. A study of the best research requires a long time to complete. However, for this study is just a research project for students, but this research just a year because need to fulfill the requirement of the university. So, this leads to time constraints to do better. Second, the researcher assuming the respondents answers with logical and honestly that variety of category respondent will be taken to ensure this research becomes more precise and reliable. Third, research limit of in Malacca only not on the whole Malacca usage of solar photovoltaic panel and lack of cost to gain the more information. Thus, the quantitative will be applied as a research strategy in this case.