

**THE INFLUENCE OF GREEN PRODUCT INNOVATION TOWARD  
BUSINESS PERFORMANCE**

**AHMAD HAIREE BIN MAT SHAPFI**

**Report submitted in fulfilment of the requirement for Bachelor Degree of  
Technology Management in Innovation Technology**

**Faculty of Technology Management and Technopreneurship**

**Universiti Teknikal Malaysia Melaka**

**JUNE 2015**

## DECLARATION

"I admit that this report is the result of my own work except summaries and citations  
that everything I have explained the source"

Signature : .....

Name : .....

Date : .....

## DEDICATION

This project is dedicated to my father, who taught me that the best kind of knowledge to have is that which is learned for its own sake. It is also dedicated to my mother who taught me that even the largest task can be accomplished if it is done one step at time.

## ACKNOWLEDGEMENT

Beyonce thanked Allah S.W.T for the bounty and bless, I was able to prepare and complete assignments undergraduate project despite the challenges and trials that all completed this task. Thank for D.r Hidayah Mohamad that has been the ideal project supervisor. Her sage advice, insightful criticisms, and patient encouragement aided the writing of this project in innumerable ways. I would also like to thank for Madam Mariam Miri Abdullah as my panel whose steadfast support of this project was greatly needed and deeply appreciated. I do not forget also to thank my friends that always give me advice.

## ABSTRACT

In the globalization era today, green product innovation has been recognized as one of the key factors to achieve growth, environmental sustainability, and a better quality of life. Recently, many companies have recognized the concepts of green or environmental innovation. However, relatively little research attention has been devoted to the consideration of relations between green product innovation, firm performance and competitive capability. This study was conducted to assess the influence of green product innovation toward business performance on any selected industry. This study aims to identify the advantage of green product innovation and the factors that influence the green product innovation. This study also to investigate the relationship between green product innovation and business performance. This report is about the influence of green product toward business performance where the research is to identify the business interaction among the consumers and producers which they acting together to make the innovation to the new product in protecting and preserving our environment. In this study, the influence of green product innovation toward business performance had selected 2 companies as the sample where consists from 100 respondents. The questionnaire had been analyzed using SPSS version 20.0. The result shown that, green product innovation had influence the business performance of the company. The advantages of the green product innovation and competitive advantages can enhance business performance in other way to complete with other competitors in the market place. The research result can contribute for the company that involve in manufacture green products as can create new environment and enhance on their business performance.

## **ABSTRAK**

*Dalam era globalisasi hari ini, inovasi produk hijau telah diiktiraf sebagai salah satu faktor utama untuk mencapai pertumbuhan, kemampanan alam sekitar dan kualiti hidup yang lebih baik. Baru-baru ini, banyak syarikat telah mengiktiraf konsep inovasi hijau atau alam sekitar. Walau bagaimanapun, perhatian yang agak sedikit penyelidikan telah ditumpukan kepada pertimbangan hubungan antara inovasi produk hijau, prestasi syarikat dan keupayaan berdaya saing. Kajian ini dijalankan untuk menilai pengaruh inovasi produk hijau ke arah prestasi perniagaan di mana-mana industri terpilih. Kajian ini bertujuan untuk mengenal pasti kelebihan inovasi produk hijau dan faktor-faktor yang mempengaruhi inovasi produk hijau. Kajian ini juga untuk mengkaji hubungan antara inovasi produk hijau dan prestasi perniagaan. Laporan ini adalah mengenai pengaruh produk hijau ke arah prestasi perniagaan di mana kajian ini adalah untuk mengenal pasti interaksi perniagaan di kalangan pengguna dan pengeluar yang mereka yang bertindak bersama-sama untuk membuat inovasi untuk produk baru dalam melindungi dan memelihara alam sekitar kita. Dalam kajian ini, pengaruh inovasi produk hijau ke arah prestasi perniagaan telah memilih 2 syarikat sebagai sampel di mana terdiri daripada 100 responden. Soal selidik telah dianalisis menggunakan SPSS versi 20.0. Hasilnya menunjukkan bahawa, inovasi produk hijau mempunyai mempengaruhi prestasi perniagaan syarikat. Kelebihan inovasi produk hijau dan kelebihan berdaya saing boleh meningkatkan prestasi perniagaan dengan cara lain untuk melengkapkan dengan pesaing lain dalam pasaran. Hasil penyelidikan boleh menyumbang untuk syarikat yang terlibat dalam pembuatan produk hijau seperti yang dapat mewujudkan persekitaran yang baru dan meningkatkan prestasi perniagaan mereka.*

## TABLE OF CONTENTS

CHAPTER	CONTENT	PAGE
	DECLARATION	ii
	DEDICATION	iii
	ACKNOWLEDGEMENT	iv
	ABSTRACT	v
	<i>ABSTRAK</i>	vi
	TABLE OF CONTENT	vii
	LIST OF TABLE	xi
	LIST OF FIGURES	xiii
	LIST OF APPENDIX	xiv
<b>CHAPTER 1</b>	<b>INTRODUCTION</b>	<b>1</b>
	1.1 Background of Study	2
	1.2 Problem Statement	3
	1.3 Research Questions	4
	1.4 Research Objectives	5
	1.5 Scope of Study	5
	1.6 Limitation of Study	5

<b>CHAPTER</b>	<b>CONTENT</b>	<b>PAGE</b>
	1.7 Significance of Study	6
	1.8 Summary	6
<b>CHAPTER 2</b>	<b>LITERATURE REVIEW</b>	<b>7</b>
	2.1 Introduction	7
	2.2 Green Product	7
	2.3 Green Innovation	8
	2.4 Green Product Innovation	9
	2.5 Green Product Innovation Advantages	10
	2.6 Factors Influence Green Product Innovation	11
	2.7 Green Product Competitive Advantages	14
	2.8 Business Performance	16
	2.9 Research Framework	19
	2.10 Hypothesis	20
	2.11 Summary	20
<b>CHAPTER 3</b>	<b>RESEARCH METHOD</b>	<b>21</b>
	3.1 Introduction	21
	3.2 Research Design	21
	3.3 Methodological Choice	22
	3.4 Primary and Secondary Data Source	23
	3.5 Location of Research	23
	3.6 Research Strategy	24
	3.6.1 Survey	24
	3.7 Time Horizon	25
	3.8 Scientific Canon	28
	3.8.1 Internal Validity	28
	3.8.2 Reliability	28
	3.9 Summary	29
<b>CHAPTER 4</b>	<b>RESULTS AND ANALYSIS</b>	<b>30</b>
	4.1 Introduction	30
	4.2 Demographic Analysis	31
	4.3 Descriptive Analysis For Dependent Variables and Independent Variables	33



<b>CHAPTER</b>	<b>CONTENT</b>	<b>PAGE</b>
	4.4 Reliability Test	65
	4.5 Pearson Correlation Coefficient	68
	4.6 Simple Linear Regression	71
	4.7 Multiple Linear Regression (MRA)	76
	4.8 Summary	78
<b>CHAPTER 5</b>	<b>CONCLUSION AND RECOMMENDATIONS</b>	<b>79</b>
	5.1 Introduction	79
	5.2 Discussion Of Research Objectives	79
	5.3 Discussion On Hypothesis	82
	5.4 Recommendation and Contribution	84
	5.5 Conclusion	86
	<b>REFERENCES</b>	<b>87</b>
	<b>APPENDICES</b>	<b>92</b>

## LIST OF TABLES

<b>TABLE</b>	<b>TITLE</b>	<b>PAGE</b>
4.1	Demographic of Respondent's Detail	31
4.2	Statistics of Environment Friendly Product	33
4.3	Important of Environment Friendly Product	33
4.4	Statistics of Protect Environment	34
4.5	Protect Environment	35
4.6	Statistics of Leverage Product Value	36
4.7	Leverage Product Value	36
4.8	Statistics of Cover The Cost of Improving Environmental Impact	37
4.9	Cover The Cost of Improving Environmental Impact	37
4.10	Statistics of Enhanced Product Brand	38
4.11	Enhanced Product Brand	39
4.12	Statistics of Minimize Carbon Risk and Improve Energy Efficiency	40
4.13	Minimize Carbon Risk And Improve Energy Efficiency	40
4.14	Statistics of Increase Employee Recruitment	41
4.15	Increase Employee Recruitment	41
4.16	Statistics of Policy	43
4.17	Policy	43
4.18	Statistic of Government Rule	44
4.19	Government Rule	44
4.20	Statistics of Industrial Relation	45
4.21	Industrial Relation	45
4.22	Statistics of Technology Innovation Relation	46

<b>TABLE</b>	<b>TITLE</b>	<b>PAGE</b>
4.23	Technology Innovation Relation	47
4.24	Statistics of Networking and Calibration	48
4.25	Networking and Calibration	49
4.26	Statistics of Firm Structural	49
4.27	Firm Structural	51
4.28	Statistics of Corporate Environmental Ethics	51
4.29	Corporate Environmental Ethics	52
4.30	Statistics of Resources And Capabilities	52
4.31	Resources and Capabilities	53
4.32	Statistics of Product Improvement	54
4.33	Product Improvement	54
4.34	Statistics of Environmental Management	55
4.35	Environmental Management	55
4.36	Statistics of Green Innovation Capability	56
4.37	Green Innovation Capability	56
4.38	Statistics of Resource Productivity	57
4.39	Resource Productivity	57
4.40	Statistics of Opportunity To Cut Cost	59
4.41	Opportunity To Cut Cost	59
4.42	Statistics of Income Of Company Increase	60
4.43	Income of Company Increase	60
4.44	Statistics of Share Holder and Employee Increase	61
4.45	Share Holder and Employee Increase	62
4.46	Statistics of Lead In The Industry	63
4.47	Lead In The Industry	63
4.48	Statistics of New Customers and Suppliers	64
4.49	New Customers and Suppliers	64
4.50	Cronbach's Alpha Coefficient Range and Its Strength of Association	66
4.51	Pilot Test Result	67
4.52	Rule of Thumb About Correlation Coefficient	68
4.53	Pearson Correlation Coefficient of All Variables	69

<b>TABLE</b>	<b>TITLE</b>	<b>PAGE</b>
4.54	Simple Linear Regression For Green Product Innovation Advantage	71
4.55	Simple Linear Regression For Factor Influence Green Product Innovation	73
4.56	Simple Linear Regression For Green Product Competitive Advantage	74
4.57	Model Summary of Multiple Regressions	76
4.58	Anova	77
4.59	Table of Coefficients	77

## LIST OF FIGURES

<b>FIGURES</b>	<b>TITLE</b>	<b>PAGE</b>
2.1	Theoretical Framework	19
3.1	Gantt Chart For PSM 1	26
3.2	Gantt Chart For PSM 2	27
4.1	Respondents Responds In Environment Friendly Product	31
4.2	Respondents Responds In Protect Environment	34
4.3	Respondents Responds In Leverage Product Value	35
4.4	Respondents Responds In Cover The Cost of Improving Environmental Impact	36
4.5	Respondents Responds In Enhanced Product Brands	38
4.6	Respondents Responds In Minimize Carbon Risk and Improve Energy Efficiency	40
4.7	Respondents Responds In Increase Employee Recruitment	42
4.8	Respondents Responds In Policy	43
4.9	Respondents Responds In Government Rule	44
4.10	Respondents Responds In Industrial Relation	46
4.11	Respondents Responds In Technological Innovation Relation	47
4.12	Respondents Responds In Networking and Calibration	48
4.13	Respondents Responds In Firm Structural	50
4.14	Respondents Responds In Corporate Environmental Ethics	51
4.15	Respondents Responds In Resources and Capabilities	53
4.16	Respondents Respond In Product Improvement	54
4.17	Respondents Respond In Product Improvement Management	55
4.18	Respondents Responds In Green Innovation Capability	56
4.19	Respondents Responds In Resource Productivity	58

<b>FIGURES</b>	<b>TITLE</b>	<b>PAGE</b>
4.20	Respondents Responds In Opportunity To Cut Cost	59
4.21	Respondents Respond In Income Of Company Increase	61
4.22	Respondents Respond In Share Holder And Employee Increase	62
4.23	Respondents Respond In Lead In Industry	63
4.24	Respondents Responds In New Customers and Suppliers	65

**LIST OF APPENDICES**

<b>NO</b>	<b>TITLE</b>	<b>PAGE</b>
A	Questionnaire	92
B	SPSS 2.0 Output	98

## CHAPTER 1

### INTRODUCTION

Nowadays, environmental issues have emerged recently and have attracted the people attention toward, shifting the consumers behaviour toward green energy is important to save and protect the environment. As a manufacturer, they should try the best way to keep innovation in product to meet the customers need. In today's highly competitive environment the goal of each organisation is to defeat competition and win new customers. Individuals who are holders of knowledge represent a tool for the generation of innovations. Thanks to their personal creativity, their knowledge, skills and abilities it is possible to generate new innovative ideas that will help organisations to achieve a competitive advantage. The organisations find it important to innovate and support an innovative culture. Knowledge too is very significant in the innovation process since it represents not only important input, but also output of the transformation process.

Investing in green technology now is a potential way out towards sustainable development and new job creation. Stimulus packages, made possible by borrowing from future generations, must be designed to prevent a further worsening of the current crisis, while creating investments that yield great benefits in the future. Interest in green products has grown in recent years, as indicated by increased consumer demand (Chen,2008), increased supply by companies (Chung and Wee, 2008), consumer and environmental protection offered by nongovernmental entities, universities developing specific green marketing courses, and increased number of research publications.

Although green products are increasingly prevalent, many controversies are related to the concept, especially the high number of green washing cases (Peatie and



Crane, 2005). This phenomenon strengthens the element of doubt in consumers' minds about the "greenness" of products (Laufer, 2003). Indeed, whether in academic research or professional studies, we note that consumers increasingly question the green nature of products on the market. In recent years, an increased debate and interest in green product innovation was clearly observed. Pujari (2006) points out that green product innovation is increasingly being portrayed as an opportunity, while some also considers it as a wine win logic of being 'green and competitive' (Lin and Geng, 2013).

With the rapid growth of global economy, the issues on resources and the environment, which become the key bottlenecks of sustainable economic development, have aroused common concern. How to ease the conflicts between economic growth and high energy consumption as well as environmental deterioration is a challenge for the whole world (Juan, 2011). Thus, one of the challenges of this time is how to achieve ecologically sustainable living standards (Huber, 2004).

Under the growing environmental considerations, many countries have implemented environmental protection laws to reduce the environment impact of industry (Yang and Chen, 2011). Therefore, the efforts of industry to improve the environmental performance of its production cycles are has increased and it has become a primary objective in many contexts (Barbiroli , 2003). Innovations which obtain total or partial improvements to the environmental performance or that show a quicker or slower return on investment is gathered (Raggi, 2003). Under the trends of strict international environmental regulations, conventions of environmental protection and popular environmental awareness of consumers impact the rules and patterns of the global industrial competition in the industries around the world (Chen, 2008). Therefore, the green product innovation will be focused by the manufacture.

## **1.1 BACKGROUND OF THE STUDY**

Corporate environment or green management emerged in the 1990s and became popular internationally in the 2000s. Corporate social responsibility and

green management are becoming major topics of discussion in the world include our country, Malaysia. The scope of this research is on green product innovation toward business performance on Auo Sunpower Sdn Bhd and Komitmen Mantap Sdn Bhd which the company is one from the green company on Malaysia. The company is one of the manufactures of the solar cell on Malaysia. The significance of this research is to identify whether the Malaysia's green company going success among the other competitors through the product interactions. This report is going too discussed on what factor and type of interaction that most suited for the development and success of the product and on the same time it gives the impact on the business performance.

The purpose of this study was to explore whether the performance of the green product innovation brought positive effect to the competitive advantage. This study found that the performances of the green product innovation positively correlated to the corporate competitive advantage. Therefore, the result meant that the investment in the green product innovation helpful to the businesses. This study argued that the businesses should cognize the correct value and positioning of the green innovation.

This first chapter of the research discussed about the background of the study, the problem statement, the objective, scope and significance of the study. This whole chapter gives a brief introduction towards what will be presented in this research.

## **1.2 PROBLEM STATEMENT**

This research aim is to define the relationship between green product innovations toward the business performance. Additionally the study will also determine the factor that influence green product innovation and advantage of the product. According to the Porter (2002), assert that stringent environmental regulations can spur efficiency and induce innovations that help the economic performance of a firm. The issue on this study is to identify the factor where firm of green product innovation decision influence the company performance in order to compete in the market competition.

Environmental problems are caused directly or indirectly by the patterns of production by industries, patterns of consumption and behaviour of the consumers. The shaping of attitude and values, commitment and skills needed to preserve and protect the environment begins at an early age. Management of the natural environment is becoming an increasingly important issue to manufacturing firms, yet their managers are also challenged to implement changes that improve competitiveness.

One of the most notable trends of corporate behaviour in recent decades is the growing sensitive of business toward environment issue (Lynes,2008).Environmental problems are global issues, pollution, global warming, climate change and green house effect create the action among business to control the environmental acts. People more aware of the environmental impacts of human activities and are more willing to make behavioural changes for environment al reasons. Consumers and producers have realized that, acting together, they can make big differences in protecting and preserving our environment.

### **1.3 RESEARCH QUESTIONS**

The research questions in this study are:

- i. What are the advantages of green product innovation?
- ii. What are the factors that influence green product innovation?
- iii. What is the relationship between green product and business performance?

#### **1.4 RESEARCH OBJECTIVES**

The research objectives in this study are:

- i. To determine the advantages of green product innovation on any selected industry.
- ii. To identify the factors that influences the green product innovation.
- iii. To investigate the relationship between green product interaction and business performance.

#### **1.5 SCOPE OF STUDY**

The scope of this research is focus on green product innovation and business performance among related manufacturing industry. In order to collect the data, questionnaire will be used as a method of gathering data to the respondents. Usage of questionnaires sometimes becomes not efficient because of lack of validity. Other than that, there is no way to tell how truthful the respondents might feel.

#### **1.6 LIMITATION OF STUDY**

The literary works regarding green product innovation is varied and complicated. The limitation of this study is the respondent which the questionnaire will be answer to complete the source of the data collection. The collection of the data by the researcher may have some difficulties in term constraint and cooperate from the respondent in term they are from multiple disciplines in the company.

## **1.7 SIGNIFICANT OF THE STUDY**

The study is important to establish the connection between company performance and their green product in order to make sure the product will give the advantages to the company, people and environment. Green product become the trends nowday among people whose care about the environment and global warming. This study will identify the factors of green product innovation creation and competitive advantage among the green product industry in order to gain their business performance.

## **1.8 SUMMARY**

This first chapter of the research discussed about the background of the study, the problem statements, the objective, scope and also significance of the study. As a quick recap, this whole chapter give a brief introduction toward what will presented in this research.

## **CHAPTER 2**

### **LITERATURE REVIEW**

#### **2.1 INTRODUCTION**

The literature review as the utilization of idea in the literature to justify the specific approach to the topic, the choice of method, and display that the studies contributes something new (Hart, 1998). He also mentioned when it comes to literature review, quality indicates proper breadth and depth, rigor and consistency, clarity and brevity, and effective analysis and synthesis. According Shields and Rangarajan (2013) comment distinguish between the process of reviewing the literature and a finished work or product known as literature review. Granell (2001) comment link the activities of doing a literature review with Benjamin Bloom's revised taxonomy of the cognitive domain ways of thinking, remembering, understanding, applying, analyzing, evaluating and creating.

#### **2.2 GREEN PRODUCT**

According to Liu and Wu (2009) green product is the products whose functions or ideas deal with the process of material retrieval, production, sales, utilization and waste treatment available for recycling, reduced pollution and energy saving. Green product attributes may be environmentally sound production processes, responsible product uses, or product elimination, which consumers compare with those possessed by competing conventional products (Hartman, 2006).

The definition of green product varies according to the domain of the study. Within the literature, not only the type of product studied is never the same, but the definitions themselves concentrate on different elements such as environmental impacts (Albino, Balice and Dangelico, 2009). Product designed to minimize its environmental impacts during its whole life-cycle. In particular, non renewable resource use is minimized, toxic materials are avoided and renewable resource use takes place in accordance with their rate of replenishment.

According to Pickett Baker and Ozak (2008), defining environmentally sustainable products is complex. In a strict sense, there is no such thing as a truly sustainable or green product, as all products we buy, own, use and discard in our everyday lives will have negative environmental impacts at some stage in their life cycles.

### **2.3 GREEN INNOVATION**

Green innovation can be defined as hardware and software innovation that is related to green products or process, through energy saving, pollution prevention, waste recycling, green product designs, and corporate environmental management (Chen, 2006). Green innovation can leverage the product value and, thus cover the cost of improving environmental impact. This study divides green innovation in to two aspects green product innovation and green process innovation. Companies require the motivation and ability to produce creative and innovative ideas to develop new products or process (Chen, 2009).

Andersen (2008), states that environmental innovation research is still in its early phase, and there are worldwide very few actual innovation researchers working with environmental issues. Particularly in the innovation management field we are aware of only a few scholars who conduct research dedicated to new product or service development of green innovations. Oltra and Saint Jean (2009), define environmental innovation as innovations that consist of new or modified processes, practices, systems and products which benefit the environment and so contribute to environmental sustainability.

Chen (2006), define green innovation as hardware or software innovation that is related to green products or processes, including the innovation in technologies that are involved in energy saving, pollution prevention, waste recycling, green product designs, or corporate environmental management. Arundel and Kemp (2009), conclude that eco innovation is a new concept of great importance to business and policy makers. It is about innovations with lower environmental impact than relevant alternatives.

## **2.4 GREEN PRODUCT INNOVATION**

Green product innovation is a multi faceted process wherein three key types of environmental focus materials, energy, and pollution are highlighted based on their major impact on the environment at different stages of the products physical life cycle manufacturing process, product use, and disposal. The green product innovation measurement consists of three main elements related to new product development. First, the company has to choose the materials that produce the least amount of pollution, second, the company has to use the fewest amount of materials to manufacture products, and third the company has to circumspectly deliberate whether the product is easy to recycle, reuse, and decompose (Guoyou, 2013).

The development of green product innovation is becoming a need and an opportunity for firms to reduce the negative influences of production on the environment and gain competitive advantage with competitors (Dangelico and Pontrandolfo, 2010). In other words, green product innovation has become the critical basic for improving a large productivity by maintain their competitive advantage and achieving larger market share.

Green product innovation does address environmental issues very explicitly, but it is far from certain whether these products can truly achieves market success (Pujari, 2006). Furthermore, there is little empirical support that clearly demonstrates how green product innovation affects firm performance. Some of the empirical findings demonstrated a positive relationship between product innovation and firm performance.