

**THE MODERATING EFFECTS OF KNOWLEDGE SHARING MECHANISMS  
ON THE ADOPTION PROCESS OF GREEN TECHNOLOGY PRODUCTS  
AMONG SMEs**

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## **PENGESAHAN**

‘Saya/Kami akui bahawa telah membaca karya ini dan pada pandangan saya/kami karya ini adalah memadai dari segi skop dan kualiti untuk tujuan penganugerahan

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## PENAKUAN

“Saya akui laporan ini adalah hasil kerja saya sendiri kecuali ringkasan dan petikan yang tiap-tiap satunya saya telah jelaskan sumbernya”

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## DEDICATION

Alhamdulillah, with the grace and blessings of The Almighty ALLAH, I manage to complete this research. First and foremost, I would like to thank and express my deepest gratitude and warmest affection to my lovely parents, Amrani bin Sabri and Sadiyah Bt Kurdi for their love and motivational support along my journey to complete this research. Thank you for your unconditional support with my studies. I am blessed to have both of you as my parents. Thanks again for giving me a chance to prove and improve myself through all my walks of life.

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Sincerely,

Naqiah

## ABSTRACT

In Malaysia, adoption process of green technology products among small and medium enterprises (SMEs) is still new. This is because organization has little knowledge about environmental management and do not understand the concept of going green in their companies. The concept for green process and products in Malaysia is at the infancy stage. The purpose of this research is to analyze how far the acceptance of green technology products among SMEs through knowledge sharing mechanism. Knowledge sharing is a process where the individual exchange his/her knowledge and idea through discussions to create new knowledge or ideas. According to Wallace (2007), knowledge sharing is frequently closely linked to the concept of best practices- the notion that in any organization there will be a variety of approaches to solving common problems or performing standard tasks, and that it should be possible to identify the best approaches and share them across the organization. The method used in this research is by using questionnaire survey on small and medium enterprise between the organization for selected SMEs industry in Malacca, Selangor and Johor. Then, the data collected were analyzed quantitatively. In a nutshell, knowledge sharing mechanisms has strong influences towards SMEs adoption process of green technology products which is more environmentally friendly companies.

## ABSTRAK

Di Malaysia, proses penerimaan produk-produk berteknologi hijau di kalangan perusahaan kecil dan sederhana masih lagi baru. Ini kerana organisasi tersebut kurang mempunyai pengetahuan tentang pengurusan persekitaran dan tidak memahami konsep hijau di dalam syarikat mereka. Produk berkonsepkan teknologi hijau di Malaysia masih berada di peringkat permulaan. Penyelidikan ini bertujuan adalah untuk menganalisis sejauh mana penerimaan produk-produk berteknologi hijau di kalangan IKS melalui mekanisme perkongsian ilmu. Perkongsian ilmu ialah suatu proses di mana pertukaran idea dan pengetahuan antara satu sama lain berlaku melalui perbincangan untuk mendapatkan ilmu baru atau idea. Menurut Wallace, perkongsian ilmu sangat berkait rapat dengan konsep pengertian, amalan-amalan terbaik yang ada dalam organisasi melalui pelbagai pendekatan penyelesaian masalah atau menjalankan tugas-tugas standard, dan ianya boleh mengenal pasti pendekatan terbaik terhadap organisasi. Kaedah yang digunakan dalam penyelidikan ini ialah adalah menggunakan kajian soal selidik di perusahaan sederhana dan kecil terhadap organisasi dalam industri IKS yang terpilih di Melaka, Selangor dan Johor. Kemudian, data dikumpulkan untuk dianalisis secara kuantitatif. Secara ringkasnya, mekanisme perkongsian ilmu mempunyai pengaruh kuat terhadap proses penerimaan produk-produk berteknologi hijau dalam industri IKS yang mana ianya boleh menjadikan syarikat tersebut lebih mesra alam.



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## **CHAPTER 1**

### **INTRODUCTION**

#### **1.0 Introduction**

The main purpose of this research is to examine the knowledge sharing mechanisms on the adoption process of green technology products among SMEs industry in Malacca, Selangor and Johor. This study also wants to investigate how far the acceptance of SMEs company towards the green technology products. The interest of this research is to analyze the effects of knowledge sharing activities on the successful adoption of green technology products.

#### **1.1 Background of the Study**

In Malaysia, green technology has been recognized as a driver for future economic growth because it has strong potentials to spur economic growth while mitigating environmental degradation. With increasing awareness of environmental issues, there has been rising demand for environmental friendly business practices (Moorthy, 2012). However, the concept of green technology product among Malaysian SME owners/managers is still new although many conferences, seminars and campaigns have been carried out for quite some time (Krishna, et al., 2012). In the researcher

opinion, the knowledge for green product and process in Malaysia is at the infancy stage. Therefore, the SMEs industry are still lack of knowledge about green technology and how they apply the knowledge sharing mechanisms in their organization due to the adoption process of green technology products in the organization. In this research, the researcher need to identify the level of green technology products adoption among SMEs based on the knowledge sharing mechanisms.

### **1.1.1 Definitions of Green Technology Products**

According to Moorthy et al., (2012), green products is defined as the products that promote environmental awareness, social awareness, biodegradable and recyclable. In Malaysia, the concept of green is still very new to Malaysian SME owners/managers, although many conferences, seminars and campaigns have been carried out for quite some time (Moorthy et al., 2012). As mentioned by Moorthy et al., (2012), the concept for green process and products in Malaysia is still lack among SMEs industry. They only have a little knowledge about the green concept in Malaysia despite all efforts from governmental and private institutions.

The issue here is that “are Malaysian SME owners/managers familiar with the green concept and concerned about the environment”?. The impact of owners/managers perception and attitude towards green concept are important, as the environmental awareness of consumers caused them to seek for environmental friendly products. Prior researches have shown that the implementation of environmental management practices is influenced by existing and potential stakeholder groups in the form of external pressures from legislators, environmental groups, financial institutions and suppliers, as well as internally, by employees and owner/manager attitudes and knowledge (Moorthy et al., 2012). However, there is need to determine the extent to which Malaysian SMEs owners/managers are actually aware of green concept and the underlying advantages come along with this concept.



**1.1.2 Definition of Small and Medium Sized Enterprises (SMEs)**

There is no accepted worldwide definition of SMEs (Hooi, 2006). In Malaysia, the definitions are solely based on a fixed quantitative measure; for instance the total number of workers, the total number of capital, total assets and lately by determining sales turnover (Hashim and Abdullah, 2000). According to the Third Industrial Master Plan (2006), *SMEs in the manufacturing sector are defined as ‘enterprises with full time employees not exceeding 150 or annual sales turnover not exceeding RM25 million whereas SMEs in the services and primary agriculture sectors and ICT are enterprises with full time employees not exceeding 50 or annual sales turnover not exceeding RM5 million’.*

These SMEs are further categorized into medium-sized companies, small enterprises and micro-enterprises.

Sector	Services, Primary Agriculture and Information & Communication Technology (ICT)	Manufacturing, Manufacturing-Related Services and Agro-based industries
Micro	Less than 5 employees	Less than 5 employees
Small	Between 5 and 19 employees	Between 5 and 50 employees
Medium	Between 20 and 50 employees	Between 51 and 150 employees

*Source: Secretariat to National SME Development Council*

Table 1.2.2.1 : SMEs definition based on number of full time employees

Sector	Services, Primary Agriculture and Information & Communication Technology (ICT)	Manufacturing, Manufacturing-Related Services and Agro-based industries
Micro	Less than RM200,000	Less than RM250,000
Small	Between RM200,000 and less than RM1 million	Between RM250,000 and less than RM10 million
Medium	Between RM1 million and RM5 million	Between RM10 million and RM25 million

*Source: Secretariat to National SME Development Council*

Table 1.2.2.2 : SMEs definition based on annual sales turnover

Therefore, small and medium enterprise (SMEs), which make up 99 % of the companies in corporate in Malaysia, stand to benefit from the country's foray into sustainable consumption and production (SCP) under a programme called MyHijau that will help them tap new markets ( Eleanor Chen, 2012).

This is in keeping with world trends in sustainable products. In developed economies, such products carry information on their packaging, like their carbon footprint, energy efficiency and organic or fair-trade standards. Likewise with green services, the companies that provide them display their certification or sustainability standards prominently at their office, on their vehicle as well as in their marketing materials (Eleanor Chen, 2012).

In the researcher opinion, adoption process of green technology products need to be strengthen because it will bring more benefit to the economic growth of SMEs industry. The organization itself should play an important role to ensure the adoption process of green technology products can be accomplished. According to Noor Akmar Shah Mohd Nordin, chief operating officer of the Malaysian Green Technology Corporation (GreenTech Malaysia) (2012), “ *A low carbon economy is vital for Malaysia's growth globally. In the line with this philosophy, the government aims to regulate green technology in products, appliances, equipment and systems in the local market through a standard rating and labeling programme*”. It was with this aim in mind that the MyHijau Programme was established in 2012. It is the “brand name” for a clutch of programmes that have or are being developed to support objectives of the National Green Technology Policy.

However, moving to a greener economy may be more difficult for SMEs than large firms, although SMEs can be more flexible than large business in adapting to the fast changing market environment. The willingness and capability of SMEs to adopt sustainable strategies or seize green business opportunities generally meet with size-related resource constraint, skills deficits and knowledge limitations, not to mention the crucial business or survival, especially in the aftermath of a grave crisis. Therefore,

organization need to analyze how far the acceptance of SMEs industry towards the green technology products in their development and what are the effects of knowledge sharing mechanism among SMEs industry on their adoption of green technology products.

There are two mechanisms that approaches the knowledge sharing among SMEs which are formal and informal mechanisms. Through managing knowledge in organization can be both formal and informal in nature. According to Hutchinson and Quinta (2008), state that formal knowledge management is deliberate and that formal knowledge management concern policies, plans, structures, initiatives, projects and practices that are named and governed by the concepts of knowledge management. In contrast, the informal management of knowledge refers to practices that are concerned with knowledge processes, but are not so rigid (Ida and Charles, 2011).

Organization currently need to focus on their organization learning process which involve with knowledge sharing of green technology products among SMEs industry in economic growth. By developing organizational knowledge and integrating that knowledge into everyday practice can be a powerful tool for multiplying an organization's impact, especially as it grows. According to Vissar (2011), in order to share a knowledge the process of learning will takes place when members of organizations share their skills which must be reformed, enriched and translated to related to the enterprise's identity. Taking the previous words in to account it becomes clear that individual members of organizations are the ones who learn and thereby create knowledge by sharing their skills (Vissar, 2011). If individuals within the organization share their ideas, experiences, information and knowledge through discussions and mutual interactions then learning can take place. Therefore the knowledge about green technology products among SMEs industry could be developed.

## 1.2 Problem Statement

According to Robinson (2008), the purpose of going green is to use products and methods that would not negatively impact the environment through pollution or depleting natural resources. If the use of natural resources is reduced by using alternative sources, it will have positive outcomes such as keeping the environment footprint small, reducing waste and re-using materials as much as possible (Dallas, 2008). Furthermore, it will result in using scarce natural resources efficiently and effectively, while keeping the environment free from detrimental products (Smith and Perks, 2010).

According to Eltayeb and Zailani (2009), local organization in Malaysia has very low involvement in green initiatives compare to MNC (Multinational Company). Therefore, SMEs industry need to compete with MNCs in order to acquired green technology products in their organization as it is fast market changing of technology. Moreover, by informal and oral culture of communication within SMEs, tacit nature of knowledge will give rise to the knowledge retention problem, therefore sharing need to be adopted immediately (Thorpe et al, 2005).

Besides, SMEs are known to be of lacking of knowledge management practices (knowledge sharing) even though they have a strong communication links and social networks in the organization (Thorpe et al, 2005). Thorpe has said that, “ *knowledge sharing especially tacit knowledge, is highly and actively interacted in SMEs*”. “ *As more and more researches are interested in exploring this tacit knowledge sharing which is very valuable and difficult to codify, SMEs could benefit from this advantage compared to bigger organization*”.

In the researcher opinion, adoption process of green technology products in SMEs is beneficial towards sustainable development of market growth. Thus, the organization can increase their cost saving in terms of energy, raw material, technology and so forth. An increasing number of companies all over the world are constantly under pressure to develop environmentally responsible and friendly operations, and regard

commitment to the natural environment as an important variable within the current competitive scenarios (Yi Hui Ho & Chieh Yu Lin, 2012 ). Through knowledge sharing mechanism among organization in SMEs industry the concept of green technology products can be expand in higher level apart that can reduce environmental impact of their production and service activities. By using green technology products organization can make an improvement in the environmental performance, addressing the environmental concerns of their customers, and mitigating the environmental impact of their production and service activities (Weng, 2011).

### **1.3 Research Questions**

By referring to the problem statement as above, few research questions are formulated:

- I. What are the knowledge sharing mechanisms used by SMEs during the green technology products adoption?
- II. What are the effects of knowledge sharing activities on the successful adoption of green technology products.

### **1.4 Research Objectives**

By referring to the problem statement as above, few research objectives are formulated:

- I. To examine the knowledge sharing mechanisms used by SMEs during the green technology products adoption process.
- II. To analyze the effects of knowledge sharing activities among SMEs on their adoption of green technology products.

### **1.5 Scope, Limitations and Key Assumptions of the Study**

The scope of this project is to investigate the moderating effects of knowledge sharing mechanisms on the adoption process of green technology products among SMEs industry in Malacca. There are two mechanisms that approaches of knowledge sharing on the adoption process of green technology products which is formal and informal mechanisms. The research is conducted among 70 SMEs industry which are divided into 30 companies from Malacca, 20 companies from Selangor and 20 companies from Johor in order to gain more comprehensive information about the study. There are two group of respondent that involved in my research methodology which is top management level and middle management level like marketing managers, operation managers and human resource managers. There are 70 structured questionnaires that being used to collect the information from the respondent. Besides, there are three limitation are identified in this study. Firstly, the survey questionnaires are used to investigate the effects of knowledge sharing mechanisms on the adoption process of green technology products among SMEs industry in Malacca, Selangor and Johor. Therefore the result and outcome of this research are only applicable for SMEs industry in Malacca and Selangor only. Secondly, time and money consumption for the data collected through survey questionnaires in Selangor and Johor are quite limited because the location is far from the Malacca areas. Thirdly, the respondents may have bias towards the questionnaires provided and due to the different background and different level of experience they may answer the questions based on their own perceptions.

### **1.6 Significance of the Study**

This study will explore the mechanism that approaches the knowledge sharing in adoption process of green technology products among SMEs industry in Malacca, Selangor and Johor. By understanding the reasons why adoption process of green technology products are still at infancy stage in SMEs, it will allow the local SMEs to

apply the knowledge sharing mechanism in their organization. It allows the Malacca government and federal government to take further actions to improve and promote the awareness of green initiatives in the SMEs industry. According to Eltayeb and Zailani (2009), local organization in Malaysia has very low involvement in green initiatives compare to MNC (Multinational Company). Therefore, SMEs industry need to be compete with MNCs company in order to acquired green technology products in their organization as it is fast market changing of technology. This is because implementation of green technology in their organization could reduce the environmental impact of their products and services. Hence it also can increase the cost saving of the company.

## **1.7 Summary**

Basically, the adoption process of green technology products are still at lower level of SMEs industry. This is because most of the company lack of knowledge to acquire or share from the other competitors or outside. In this research, the researcher will analyzed what are the knowledge sharing mechanisms used by SMEs during the adoption of green technology products.

## CHAPTER 2

### LITERATURE REVIEW

#### 2.0 Introduction

This chapter provides an overview of knowledge sharing mechanism towards the adoption process of green technology products among SMEs industry in Malacca, Selangor and Johor. Some people might agree with the principle that the sharing of relevant knowledge is important in the industry. But the significance of knowledge sharing mechanism which can influences the adoption process of green technology products in SMEs industry are still low. In this research, the researcher need to analyze how the knowledge sharing mechanism in terms of formal and informal mechanisms influences the successful adoption of green technology products in SMEs. This research is based on quantitative research method including a literature review and questionnaire survey involving SMEs industry in Malacca, Selangor and Johor. This research highlights the results from the questionnaire survey only. By understanding the effectiveness of formal and informal approaches to knowledge sharing may assist organizations to improve their organization performance on the successful adoption of green technology products for their cost saving.