A STUDY ON THE CHALLENGES OF NEW TECHNOLOGY ADOPTION BY COMPOSITE INDUSTRIES IN MALAYSIA

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"I / We hereby declare that I have read this report and in my/our opinion, this report is sufficient in terms of quality and scope to qualify for academic award of Bachelor of Technology Management (Innovation) with Honours."

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Date : 7th June 2016

DECLARATION

"I declared that this thesis project entitle "A Study on The Challenges of New Technology Adoption by Composite Industries in Malaysia" is the result of my own research except as cited in the references. The research project has not been for any degree and is not concurrently submitted in candidature of any other degree."

Signature : 

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Date : 7th June 2016

DEDICATION

I would like to dedicate this thesis to my family especially to my father Mr. Mohd Yassin Bin Ibrahim and my lovely mother Mdm. Noraini Binti Abd Jalil. The sacrifices that they had made for me to further studies would not be enough by just submitting the report, but it is beyond that. Thus, I am honoured to have them as my parents. Secondly, dedication to all my siblings which have helped me a lot in term of spirit, encouragement, finance support and for giving timely advice in all the ways. I express a deep sense of gratitude to my lecturer whom also my supervisor for this Final Year Project, Datin Suraya binti Ahmad and also my fellow friends.

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ABSTRACT

This research is approaching on the study of the challenge of technology adoption by the composite industries in Malaysia. The scope of the research is at the composite industry companies in Malaysia. In addition, the researcher defines on the challenge of technology adoption influence the organization, then, the researcher is will investigates the factor of financial support, lack of knowledge and resistant to change as the challenges of technology adoption for Malaysian composite industry companies. Next, the method use by the researcher in this research is survey by distributing the questionnaire to the employees who are working in the composite industry companies. The respondents for this distribution is involving a number of respondents that being calculated using sampling data table.

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CHAPTER 1

INTRODUCTION

1. 1 Background of the Study

A composite material is a material in which two or more distinct materials are combined together but remain uniquely identifiable in the mixture. With the growing demand for lightweight, high performance material, coupled with the escalating cost of energy and petrochemical feedstock, the last few years have seen a tremendous surge of interest in polymeric based composite. The product would be a material with high strength and hardness, which would be useful in the industry of manufacturing. Basically, in Malaysia there are plenty composite industries that are already adopting technology from outside to increase their market growth. However, it also has the challenges of adopting technology that are needed to overcome by the composite industries.

According to Robert *et. al.*, (2011), he stated at present the composite materials industry is growing steadily in many locations around the world as the expected global demand for carbon fiber will grow from 46,000 tons in 2011 to 140,000 tons by 2020 with production capacity being increased from 102,000 tons in 2011 to 129,000 tons in 2015, with the potential for further growth to 185,000 tons by 2020. For this to be possible organization should visualize at early stage about the challenge ahead as the

awareness action, in order, to compete with the competitors and for maintaining as well as increasing the sales growth. The focus of this study is to build a theoretical model to understand the technology adopt by Malaysian composite industries. This paper, therefore, examines the challenge of adoption technology faced by composite industries in Malaysia and which is the most challenges for them that taken back of company progression.

The purpose of this chapter gives a brief background to the subject of the study, which give the reader a comprehensive overview of study. This is will followed by providing the statement of research problem, research question and highlight the exact goals for this research. At the end of this chapter concludes with the significance, scope and limitation and brief key concept of this study.

1.2 Problem statement

According to Sarah Smith (2014), she states that the Asian region, which has already emerged as the largest growth area for the composites industry, is expected to further consolidate its leadership. Asia is anticipated to have a market share of approximately 49.5% by volume in 2019. Mohd Yusoff Sulaiman (2012), said that Malaysia's domestic composite industries is growing about 10 percent a year, and involves about 120 companies, including one supplying composite components to aircraft makers Boeing and Airbus. He noted that Malaysia, a country with about 27 million people, plans to spend at least US$20 billion on upgrades of rail networks, including high-speed train links to Singapore, another market for composites. This statistics provided indicates that Malaysia is one of the competitive countries. However, the barrier from adopting technology is a major issue for composites industries. Organization always has tried to overcome the challenge to ensure they can sustain in the market.

1.3 Research Questions

In seeking to achieve objectives research, the following questions were highlighted to be the framework providing guideline for the research work;

I. What are the financial factors faced by the company in order to adopt the technology?
II. What is the level of employee knowledge toward technology adoption?
III. What is the action used by organization to overcome change factor?

1.4 Research Objectives

The objective of this research is to assess the challenge of adopting technology by the composite company in Malaysia. Therefore, the primary purpose is listed as below:

I. To identify financial factors faced by the company in order to adopt the technology.
II. To identify the level of employee knowledge toward technology adoption.
III. To identify the action used by organization to overcome change factor.

1.5 Scope and Limitation and Key Assumption

1.5.1 Scope

This study focused on the challenge for technology adoption by composite industries and challenge factors as the independent variable and technology adoption as the dependent variable. This research will be conducted over for months period which from February 2016 to June 2016. Besides that, the geographic research was carries in

area Melaka and Selangor. Thus, the researcher is chosen a potential of Malaysia's composite industries which are have stable and good achievement. The method that be used in this study is by distributed through direct survey. The questionnaire was based on the literature study conducted during phase one of this study. The targeted respondents were among top management level in the composite industries. The respondents will be selected from first level, second level and third level in organization including top management, supervisor and leader and also worker.

1.5.2 Limitation

Throughout to this research, there has encountered the several limitation. First, this research is due to time and resources constraints the study covered six month only. The researcher will have limitation in getting permission from the company authorities to obtain and distribute survey was seen as a possible constraints in conducting this study. Besides that, next limitation is the researcher faced with the management staff that are willing to cooperate and unwillingness to participate by most employees especially the supervisor and manager indicated that they are overloaded with work and do not have time incomplete the questionnaire. Besides that, some of respondents will not return the questionnaire after completion the survey.

1.5.3 Key Assumption

The respondents who participate in the study are assuming to have given their honest to reply to the question in order to draw valid conclusion from the empirical data. The researcher illustrates that respondents have enough knowledge about challenge of technology adoption by the composite industry.

1.6 Importance of the Study

This research will be a great importance for Malaysian composite industries to know the challenge of adopting technology. This research will help the industry to grow well by making preparation and well understanding after adopting the technology. Management can identify the challenge that might be faced by discover effective practice in managing the technology adoption. The reason is technology adoption can be the most valuable asset for an organization because a successful and advance technology will bring company a competitive advantage in the market. Next, this study will also benefit the future researchers, who are interest to carries out the same topic of technology adoption and will learn more about factors the influence in adopting technology. Moreover, by encourages the understanding of adopting the technology to the organization will be beneficial for them to do preparation before adopting the technology. It will enhance company performance and smoothing the company operation after adopting the technology.

1.7 Summary

This chapter introduces the reader to the background, research question, research objectives, scope, limitation, significance of study and key assumption. It also outlines the main problem that was addressed and how researcher intended to explore it. The next chapter describes the findings from literature study on the technology adoption factors that are generally influences in Malaysian composite industries.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

This chapter reviews related empirical literature subject matter. The relevant literature will be reviewed under the following outline: technology adoption theory, the innovation decision process, and adopter categories. This section brings to light what can be done in order to understand about technology adoption and the challenges to implement the technology. Technology adoption in Malaysian composites industries is selecting as the dimension to study the several barriers that taken back company progression.

2.2 Technology Adoption

According to Sherry & Gibson (2002), they state the process of adopting new innovation or technology has been studied for over 30 years, and one of the most popular adoption models is described by Rogers in his book, *Diffusion of Innovations*. This theory has been used for a research as a model framework. Dooley (1999) and Stuart

(2000) mentioned there are several Rogers theory has used widely as a theoretical framework in the area of technology adoption which are technology, education, political, science, history, economic and public health.

According to Roger (2003), he states a technology is a design for instrumental action that reduces the uncertainty in the cause-effect relationship involved in achieving a desired outcome. It is involve between two parts which are hardware and software. While hardware is the tool that embodies the technology in the form of material or physical object, software is the information base for the tool. Adoption is a decision of full use of an innovation as the best course of action available and rejection is a decision not to adopt an innovation (Rogers, 2003). Rogers defines diffusion as the process in which an innovation is communicated thorough certain channels over time among the members of a social system.

Apart from that, there are four key components of the diffusion of innovation:

1. Innovation

Rogers offered the following description of an innovation: An *innovation* is an idea, practice, or project that is perceived as new by an individual or other unit of adoption (Rogers, 2003). An innovation may have been invented a long time ago, but if individuals perceive it as new, then it may still be an innovation for them. Uncertainty is an important obstacle to the adoption of innovations. An innovation's consequences may create uncertainty: *Consequences* are the changes that occur in an individual or a social system as a result of the adoption or rejection of an innovation, (Rogers, 2003). To reduce the uncertainty of adopting the innovation, individuals should be informed about its advantages and disadvantages to make them aware of all its consequences.

2. Communication Channel

For Rogers (2003), he stated communication is a process in which participants create and share information with one another in order to reach a mutual understanding.

This communication occurs through channels between sources. Rogers states that a source is an individual or an institution that originates a message. A channel is the means by which a message gets from the source to the receiver. Rogers states that diffusion is a specific kind of communication and includes these communication elements: an innovation, two individuals or other units of adoption, and a communication channel. Mass media and interpersonal communication are two communication channels. While mass media channels include a mass medium such as TV, radio, or newspaper, interpersonal channels consist of a two-way communication between two or more individuals. On the other hand, diffusion is a very social process that involves interpersonal communication relationships (Rogers, 2003). Thus, interpersonal channels are more powerful to create or change strong attitudes held by an individual.

3. Time

According to Rogers (2003), the time aspect is ignored in most behavioral research. Rogers argues that including the time dimension in diffusion research illustrates one of its strengths. The innovation-diffusion process, adopter categorization, and rate of adoptions all include a time dimension.

4. Social System

According to Rogers (2003), he mentioned of defined the social system as a set of interrelated units engaged in joint problem solving to accomplish a common goal. Since diffusion of innovations takes place in the social system, it is influenced by the social structure of the social system. Structure is the patterned arrangements of the units in a system, (Rogers, 2003). He further claimed that the nature of the social system affects individual's innovativeness, which is the main criterion for categorizing adopters.

2.3 The Innovation Decision Process

According to Rogers (2003), he described the innovation-decision process as an information-seeking and information-processing activity, where an individual is