



**Faculty of Technology Management and Technopreneurship**

**MODELLING ENTREPRENEURIAL OPPORTUNITY  
CREATION ON GREEN TECHNOLOGY RESEARCHERS IN  
SELANGOR AND MELAKA, MALAYSIA**

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**Master of Science in Entrepreneurship**

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**MODELLING ENTREPRENEURIAL OPPORTUNITY CREATION ON GREEN  
TECHNOLOGY RESEARCHERS IN SELANGOR AND MELAKA, MALAYSIA**

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**A thesis submitted  
in fulfilment of the requirements for the degree of Master of Science  
in Entrepreneurship**

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**2019**

## DECLARATION

I declare that this thesis entitled “Modelling Entrepreneurial Opportunity Creation on Green Technology Researchers In Selangor and Melaka, Malaysia” is the result of my own research except as cited in the references. The thesis has not been accepted for any degree and is not concurrently submitted in candidature of any other degree.

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Date : 8<sup>th</sup> APRIL 2019

## APPROVAL

I hereby declare that I have read this thesis and in my opinion this thesis is sufficient in terms of scope and quality for the award of Master of Science in Entrepreneurship.

Signature : .....

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Date : 8<sup>th</sup> APRIL 2019

## **DEDICATION**

First and foremost, I thank Allah for the blessing He has bestowed upon me. To my wonderful wife, Faridatul Sakinah Binti Othman, for your unwavering love, and patience: I love you. To my boy Muhammad Ammar Firas, you are always in my heart. To my parents, Huslan Hussein and Mahura Muhamad, for always being there, and for the prayers and Doa' you have made to get this challenging task done. You have always been steadfast in encouraging and supporting me in my thirst for knowledge.

## ABSTRACT

Entrepreneurship and opportunity creation are closely related to the survivability of entrepreneurs. Most researchers have debated whether entrepreneurial opportunities are discovered or created. Many researchers have often overlooked the importance of the various factors that stimulate and shape the process of entrepreneurial opportunity. The objective of this study is to explore the opportunities that green technology may bring to entrepreneurs by complying with new business success factors, especially for Malaysian academic and industrial researchers. The research contains six themes of opportunity creation on green technology researchers in Malaysia which are influenced by three main factors: individual, institutional and social cultures. The primary source of empirical data for this study was developed through a series of qualitative interviews. Adopting a case study method, this paper includes in-depth interviews with fifteen green technology researchers in Malaysia to understand how they shape their research to create potential business opportunities. This research provides two case studies between green technology researchers in the academic field with green technology researchers in the industrial field. A conceptual framework was developed based on previous literatures and existing adoption models, which were discussed and merged. The study employs Dubin's theory-building framework to propose a model of opportunity creation among green technology researchers. The findings of this study will enrich the body of entrepreneurship knowledge. Finally, some recommendations were made for future research on opportunity creation among green technology researchers in Malaysia. For further research, a more in-depth understanding of opportunity creation must be developed to strengthen the findings. The research needs to be expanded to a wider scope which includes respondents from other institutions and a larger sample to further strengthen the reliability of the research.

## **ABSTRAK**

*Keusahawanan dan peluang penciptaan adalah berkait rapat di kalangan usahawan. Banyak penyelidik telah membahaskan sama ada peluang keusahawanan ditemui atau dicipta. Kebanyakan para penyelidik selalunya tidak melihat pentingnya pelbagai faktor yang merangsang dan membentuk proses peluang keusahawanan. Objektif kajian ini adalah untuk meneroka peluang-peluang yang boleh membawa teknologi hijau kepada usahawan dengan mematuhi faktor kejayaan perniagaan baru terutamanya penyelidik akademik dan industri di Malaysia. Penyelidikan ini mengandungi enam tema peluang penciptaan pada penyelidik teknologi hijau di Malaysia yang dipengaruhi tiga faktor utama; budaya individu, budaya institusi dan sosiobudaya. Sumber utama data empirikal untuk kajian ini dikembangkan melalui satu siri wawancara kualitatif. Kajian ini menggunakan kaedah kajian kes di mana kajian ini merangkumi wawancara mendalam dengan lima belas penyelidik teknologi hijau di Malaysia untuk memahami bagaimana mereka membentuk penyelidikan mereka bagi mewujudkan peluang perniagaan yang berpotensi. Di dalam penyelidikan ini, terdapat dua kajian kes iaitu penyelidik teknologi hijau dalam bidang akademik dan penyelidik teknologi hijau dalam bidang perindustrian. Rangka kerja konsep dibangunkan, berdasarkan kepada literatur terdahulu dan model penggunaan sedia ada dibincangkan dan digabungkan. Kajian itu menggunakan teori Dubin, sebuah rangka kerja pembinaan teori untuk mencadangkan model penciptaan peluang pada penyelidik teknologi hijau. Tinjauan dalam kajian ini termasuk memperkayakan pengetahuan keusahawanan. Akhirnya, beberapa cadangan dibuat untuk membangunkan lebih banyak penyelidikan mengenai penciptaan peluang pada penyelidik teknologi hijau di Malaysia. Bagi penyelidikan di masa hadapan, kajian pemahaman mengenai penciptaan peluang perlu lebih mendalam bagi memperkukuhkan dapatan yang diperolehi. Penyelidikan ini perlu mengkaji ruang lingkup yang lebih luas yang dengan merangkumi responden dari institusi lain dan sampel yang lebih besar untuk memperkukuh lagi kebolehpercayaan penyelidikan.*

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## LIST OF ABBREVIATIONS

CRIM	-	Centre for Research and Innovation Management
CTRM	-	Composite Technology Research Malaysia
DOE	-	Department of the Environment
EA	-	Entrepreneurial Alertness
EQA	-	Environmental Quality Act
FDI	-	Foreign Direct Investment
FKM	-	Faculty of Mechanical Engineering
FKP	-	Faculty of Manufacturing Engineering
FPTT	-	Faculty of Technology Management and Technopreneurship
GT	-	Green Technology
MMU	-	Multimedia University
MOSTI	-	Ministry of Science Technology and Innovation
MOHE	-	Ministry of High Education
MTDC	-	Malaysian Technology Development Corporation
PhD	-	Doctor of Philosophy
PRGS	-	Prototype Research Grant Scheme
RI	-	Research Institute
SME	-	Small Medium Enterprise
SERI	-	Solar Energy Research Institute
TVET	-	Technical and Vocational Education and Training
UKM	-	Universiti Kebangsaan Malaysia
UNCTAD	-	United Nations Conference on Trade and Development
UPM	-	Universiti Putra Malaysia
UTeM	-	Universiti Teknikal Malaysia Melaka

## LIST OF PUBLICATIONS

### Journal

1. Huslan, M.A.A., Ahamat, A., Rajiani, I., and Ahmad, S. 2016. Modeling opportunity creation: The case study of green technology researchers in Malaysia. *International Information Institute*, 19 (8A), pp. 3239-3244.



# CHAPTER 1

## INTRODUCTION

### 1.1 Introduction

This chapter introduces the structure of the research to provide the context and the foundation of this study covering several key elements and the empirical focus of this study, which includes drafting and framing the investigation with concepts of entrepreneurial opportunity. The chapter provides the context to the area of study, which is on opportunity creation for green technology researchers in Malaysia. This chapter also sets out the objectives, significance of the study and the conceptual approach of the thesis. Finally, by providing the thesis organization, this chapter explains how this research is conducted.

### 1.2 Framing the context of the study

Entrepreneurship and opportunity are closely related for the survivability of entrepreneurs, especially in green technology. In this global age, green technologies, an environmentally friendly technology that has become a hot topic, is developed and used in a way that protects the environment and conserves natural resources (Bhardwaj, 2015). Only going green can help us come out of the present tough situation. It is important to note that there is a lot of debate about what exactly constitutes as green technology. Identifying and choosing the right opportunities for new businesses are important abilities of a successful entrepreneur (Ardichvili, Cardozo and Ray, 2003). Therefore, explaining the discovery and development of opportunities is a key part of entrepreneurship research

(Venkataraman, 1997). This study looks into specific policy initiatives by fully understanding the elements that contribute to the success of entrepreneurial opportunity creation in Malaysia and provides recommendations for policy makers to foster and encourage entrepreneurship through targeting.

The context of the study is on Malaysian green researchers. Researchers and key technologies have the potential to work together to reduce environmental effects, which include production technologies, application technologies, recycling technologies and end-of-pipe technologies (Larsson, 2002). This reinforces the idea that environmental/green technology should not be limited to any part of the production chain in the market to bring bigger opportunities to green researchers in Malaysia. Identifying and selecting the right opportunities for new businesses are among the most important abilities of a successful entrepreneur. The primary source of empirical data for this study is developed through qualitative methods. Interviews were conducted within green technology companies and researchers in academic fields. This research intends to explore the opportunities that green technology may bring to entrepreneurs by complying with new business success factors, particularly for the researchers.

### **1.3 Problem statement**

Many researchers have debated whether entrepreneurial opportunities are discovered or created (Ahamat, 2013). This study looks into this significant debate about where opportunities come from (Alvarez, Barney and Young, 2010), though many researchers have overlooked the importance of various factors that encourage and create the process of entrepreneurial opportunity. This debate by realists and constructionists from the past four decades is embedded in a larger philosophy of science (Alvarez et al.,

2010), which is at the core of the debate between created opportunities and discovered opportunities (Mcmullen and Shepherd, 2006). Casson (2005) pointed out that the evolution of the field of entrepreneurship in the realist perspective on how opportunities are formed and exploited has dominated the field, while the constructionist and evolutionary realist approaches have received much less attention. This different to Gartner, (1985) who says that constructionist or evolutionary realist's work have not been done in the field of entrepreneurship (Baker and Nelson, 2005).

Hence, this research identifies the process where green technology research is translated into business opportunities. This study is important to identify and shape the various factors that encourage green technology research into business opportunities. Technology and innovation are viewed as key drivers in the move towards a greener environment. Many governments see the application of green manufacturing technologies in the pursuit of eco-innovations as the cornerstone of their policies for economic growth (Bartlett and Trifilova, 2010). Green technology is emerging as a new development trend in the world because the global economy is facing environmental and ecosystem risks. For developing economies, green technology is seen as an opportunity and optimal choice to change conventional economic growth and give opportunities to entrepreneurs in Malaysia.

The success of commercialization is determined by academic entrepreneurialism and collaboration among PRIs (Klofsten and Jones-evans, 2000). The aim of this study is two-fold: to identify the various factors driving and shaping green technological researchers into discovering entrepreneurial opportunity, and to model the process of opportunity creation for green technological research into business opportunities. Malaysia has established millions of Ringgit under the Eleventh Malaysia Plan to the fund capital towards the development of green technology entrepreneurs. According to the Ministry of

Energy, Green Technology and Water (KeTTHA) in 2018, green technology is the preferred choice of products and services, and there are improved green technology applications in most economic sectors. Green technology in Malaysia is mostly complete with high class facilities. There are many initiatives to generate great ideas from the green technology industry and support given by building business talent, which have created ventures that have the capability to succeed. The emphasis that the Malaysian government has put for the development of successful green technology indicates its importance to the continuity of the nation's development.

#### **1.4 Research objectives**

This study embarks on the following objectives:

1. To investigate how green researchers describe the driving forces of the researchers engaging with green technology research in Malaysia.
2. To identify the parameters that drives and shape green technological research into identifying business opportunities in Malaysia.
3. To propose a model of opportunity creation for green technological researchers in Malaysia.

## **1.5 Research questions**

The following research questions were developed to achieve the objectives of this study:

1. What are the driving forces of the researchers engaging with green technology research in Malaysia?
2. What are the parameters that drive and shape green technological researchers into identifying business opportunities in Malaysia?
3. How green technological researcher translated research output into profitable business opportunity in Malaysia?

## **1.6 Scope of study**

This research is centred on the process of entrepreneurial opportunity, which is defined as a set of ideas, beliefs and actions that enable the creation of future goods and services in the absence of current markets (Sarasvathy, Dew, Velamuri and Venkataraman, 2003).

Acs and Audretsch (2003) outlined the benefits of being involved in discussions on whether opportunities are discovered or created by entrepreneurs by addressing entrepreneurial action. The theory of entrepreneurial action explicates human behaviour by looking at the impact of a behaviour on the ability of individuals to accomplish their purposes (Alvarez and Barney, 2007). This underlines the context of this thesis, which is to explain the process of how entrepreneurs discover and create opportunities. The discovery and creation views seek to explain the same issues – actions that entrepreneurs take to form and exploit opportunities (Shane and Venkataraman, 2000). Both views have much in

common. However, these views generate different predictions about the specific contexts on the drive of entrepreneurs to effectively execute opportunities.

### **1.7 Research limitations**

Given that green technology is new and emerging, the scarcity of materials in terms of academic discussion and case laws are expected. This was the main difficulty encountered by the researcher when finding relevant materials, especially in the Malaysian context. When researchers select certain methodologies and designs, for example opportunity process, it come with limitations over which the researcher may have little control. The second is time constraint, as this research adopted the case study approach via interviews which often come with time constraints as noted by Delva, Kirby, Knapper, and Birtwhistle (2002). Interviews are problematic as people struggling with real or perceived time constraints are less likely to respond because these possible respondents feel overworked and do not have the time to complete the interview. A case study often suffers the limitation of forcing respondents into categories of a particular response, thereby limiting the range of responses.

The last is access to data, as the researcher could not cover all the fields of the green technology industry. This research is only targeted to green technology researchers, including academic and industrial researchers in Malaysia.

### **1.8 Significance of the study**

The proposed study is important to opportunity creation in green technology among researchers by interviewing the green researchers in Malaysia. This study proposes to fill the gap in the body knowledge in opportunity creation. In terms of theoretical significance,

the findings of this study will be useful to green technology researchers in Malaysia as it is important to stay current with what is happening around the world. Today's technology and conveniences are more focused on making more luxuries available to people. With a new model of opportunity creation, it will give more advantages to green technology researchers.

This study will also be useful to policy makers of green technology in the light of today's pressing economic and environmental challenges, in which national and international efforts to promote 'green' as a new source of growth have intensified in recent years. By adapting green technology, businesses can accelerate progress towards sustainable development and poverty reduction through, for example, more sustainable use of natural resources, efficiencies in the use of energy, and valuation of ecosystem services.

In the practical perspective, the necessity to increase the awareness of people towards the knowledge on the impact of green technology must be put into the highest priority possible to educate humanity on how they can benefit from the advancement of technology without harming the earth. Also, this creates more opportunities to entrepreneurs to profit in their business.

## **1.9 Operational definitions**

Green technology relates to products or innovation used to promote sustainability, reduce greenhouse gas emissions, or otherwise diminish the impact on climate change (Chu, 2013). In Malaysia, the application of green technology is considered an important solution which have been followed by many countries worldwide to identify and overcome the issues of energy and environment (Islam, et al. 2009). Furthermore, the establishment

of the Ministry of Energy, Green Technology and Water (KeTTHA) in 2009 illustrates the nation's intention to indoctrinate the message of 'clean and green' as the practical way forward towards creating an economy based on sustainability. The practices of green manufacturing and green technology has created a new business in the area of green supply and demand throughout companies in Malaysia (Bakar, et al. 2011).

Acs and Audretsch (2003) outlined the benefits of engaging in discussions on whether opportunities are discovered or created by entrepreneurs. The theory of entrepreneurial action explains human behaviour by looking at the impact of the behaviour on the ability of individuals to accomplish their purposes (Alvarez and Barney, 2008) and in the context of this thesis, to explain the process of how entrepreneurs discover and create opportunities. The discovery and creation views seek to explain the same issues and actions that entrepreneurs take to form and exploit opportunities (Shane and Venkataraman, 2000).

## **1.10 Organization of thesis**

The thesis comprises of five chapters:

**Chapter one:** This chapter provided an overview about the research. It highlighted important issues to give a clear insight and picture to the readers regarding the research, which included framing the context of the study, problem statement, purpose of research, objectives of study, research questions, scope of study, research limitation and significance of study.

**Chapter two:** This chapter is devoted to the literature review regarding the issues related to entrepreneurship, entrepreneurial opportunity, opportunity creation, and other