



UNIVERSITI PUTRA MALAYSIA

***OPEN INNOVATION IMPLEMENTATION PRACTICES AND FIRM
COMPETITIVENESS IN MALAYSIAN MANUFACTURING INDUSTRY***

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FK 2015 26



**DEVELOPMENT OF AN OPEN INNOVATION IMPLEMENTATION
FRAMEWORK FOR MALAYSIAN INDUSTRIES**

By

HOUSSAM SAID ABDELRAHMAN ISMAIL

**Thesis Submitted to the School of Graduate Studies, Universiti Putra Malaysia, in
Fulfilment of the Requirements for the Degree of Master of Science**

March 2015

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DEDICATIONS

First and foremost, I would like to thank God, my creator, for giving me the intellectual capacity to learn about His creation. Without His gift and grace to me, I could do nothing.

This thesis is especially dedicated to my dear family and long-time friends: firstly to my Father and kind hearted mother who has been very instrumental in my religious, social and academic upbringing;

My kind wife Ebtesam for her support and her encouragements

My lovely kids, Fatimah, Etaf, Abdelaziz and Nour

My country Palestine

My city Gaza



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Abstract of thesis presented to the Senate of Universiti Putra Malaysia in fulfilment of the requirement for the degree of Master of Science

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March 2015

Chairman: Professor, Rosnah Binti Mohd Yusuff, PhD

Faculty: Engineering

Malaysia has successfully transformed from an agriculture-based economy into a resource-based economy. However, Malaysia's endeavor to transform into an innovation-led economy is presently hindered by the lack of innovation capabilities important for business, as well as by the Malaysian policies' lack of focus on modern concepts of innovation, such as open innovation. Despite the fact that the implementation of an open innovation concept will enhance the competence of innovation in the manufacturing sector; a theoretical framework for enhancing this implementation in Malaysia is still absent. Furthermore, the relationship between open innovation concept and firms' competitiveness indicators is still unclear.

This thesis determined the effectiveness of the local innovation policy, investigated the level of open innovation practices in the Malaysian manufacturing sector and identified the factors that influence the adoption of open innovation practices. The thesis also examined the relationship between implementing open innovation practices and firms' competitiveness indicators.

A quantitative method with a descriptive and inferential analysis was used to obtain the results of this research. The study population were 1100 manufacturing firms located in Selangor state. Based on the proposed framework which was developed by the author, a valid questionnaire was used in a self-administrated survey to collect the data. The questionnaires were answered by conducting face-to-face interviews with the participants. The participants were 281 manufacturing firms out of the 1100 firms in Selangor. The inferential analysis used was the Parametric Test (One-sample T-test), to investigate the factors included in the proposed framework. After data analyses, the author modified the proposed framework and revealed nine key factors affecting the adoption of open innovation in Malaysia. These factors were grouped into three main areas, intellectual property management in universities, government policies including laws and intellectual property management in industries. This research supports the claim that open innovation concepts have a positive impact on firms' performance, as

the study revealed a significant relationship between open innovation adoption and firms' competitiveness indicators. It was determined that if a firm increases the implementation of open innovation practices, its ability to compete in business will increase. Finally, the study showed that the Malaysian innovation policy has a significant influence on the innovation atmosphere. However, this policy needs improvement in order to support a modern approach to innovation.



Abstrak tesis yang dikemukakan kepada Senat Universiti Putra Malaysia
Sebagai memenuhi keperluan untuk ijazah Master Sains

PEMBANGUNAN RANGKA KERJA PELAKSANAAN INOVASI AN OPEN UNTUK INDUSTRI MALAYSIA

Oleh

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Malaysia telah berjaya menjurus ke arah transformasi ekonomi yang dahulunya berasaskan pertanian kepada ekonomi berasaskan sumber keperluan. Namun, usaha Malaysia untuk beralih kepada ekonomi berasaskan inovasi dihalang oleh kekurangan keupayaan inovasi yang penting untuk perniagaan dan juga oleh kekurangan dalam dasar negara untuk memberi tumpuan kepada konsep inovasi moden, seperti inovasi terbuka. Pelaksanaan konsep inovasi terbuka akan meningkatkan kecekapan inovasi dalam sektor pembuatan, tetapi kerangka teori bagi meningkatkan pelaksanaan ini di Malaysia masih tidak kelihatan. Tambahan lagi, hubungan antara konsep inovasi terbuka dan daya saing firma juga masih tidak jelas.

Tesis ini telah menyiasat tahap amalan inovasi terbuka dalam sektor pembuatan Malaysia dan telah mengenal pasti faktor-faktor yang mempengaruhi amalan inovasi terbuka tersebut, Tesis ini turut menentukan kaitan antara pelaksanaan amalan inovasi terbuka dan penunjuk daya saing firma. Objektif kedua tesis ini adalah untuk menentukan keberkesanan dasar inovasi tempatan.

Para peserta terdiri daripada 281 firma pembuatan daripada 1100 yang didapati di Selangor. Kaedah kuantitatif dengan analisis deskriptif dan inferensi telah digunakan untuk mendapatkan hasil kajian ini. Analisis inferensi yang digunakan ialah Ujian berparameter (T- Ujian satu-sampel), untuk menyiasat faktor-faktor yang memberi kesan kepada penggunaan inovasi terbuka di Malaysia. Sembilan faktor yang mempengaruhi penggunaan inovasi terbuka di Malaysia telah dikenal pasti. Faktor-faktor ini telah dikumpulkan ke dalam tiga kategori utama iaitu pengurusan harta intelek di universiti, dasar-dasar kerajaan termasuk undang-undang dan pengurusan harta intelek dalam industri. Kajian ini menyokong dakwaan bahawa konsep inovasi terbuka mempunyai kesan positif ke atas prestasi firma, kerana kajian menunjukkan bahawa terdapat hubungan yang signifikan antara penggunaan inovasi terbuka dan penunjuk daya saing firma. Kajian ini juga memperlihatkan bahawa jika sebuah firma meningkatkan pelaksanaan amalan inovasi terbuka, keupayaannya untuk bersaing dalam perniagaan akan meningkat. Akhirnya, kajian ini juga menunjukkan bahawa

dasar inovasi Malaysia mempunyai pengaruh yang besar ke atas amalan budaya inovasi. Walau bagaimanapun, dasar ini memerlukan peningkatan bagi menyokong pendekatan moden terhadap inovasi.



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Finally, words alone cannot express the thankfulness to my parents, wife and friends for helping me in so many ways.

I certify that a Thesis Examination Committee has met on (05 March 2015) to conduct the final examination of Houssam Said Abdelrahman Ismail on his thesis entitled “Development of an Open Innovation Implementation Framework for Malaysian Industries ” in accordance with the Universities and University Colleges Act 1971 and the Constitution of the Universiti Putra Malaysia [P.U.(A) 106] 15 March 1998. The Committee recommends that the student be awarded the Master of Science.

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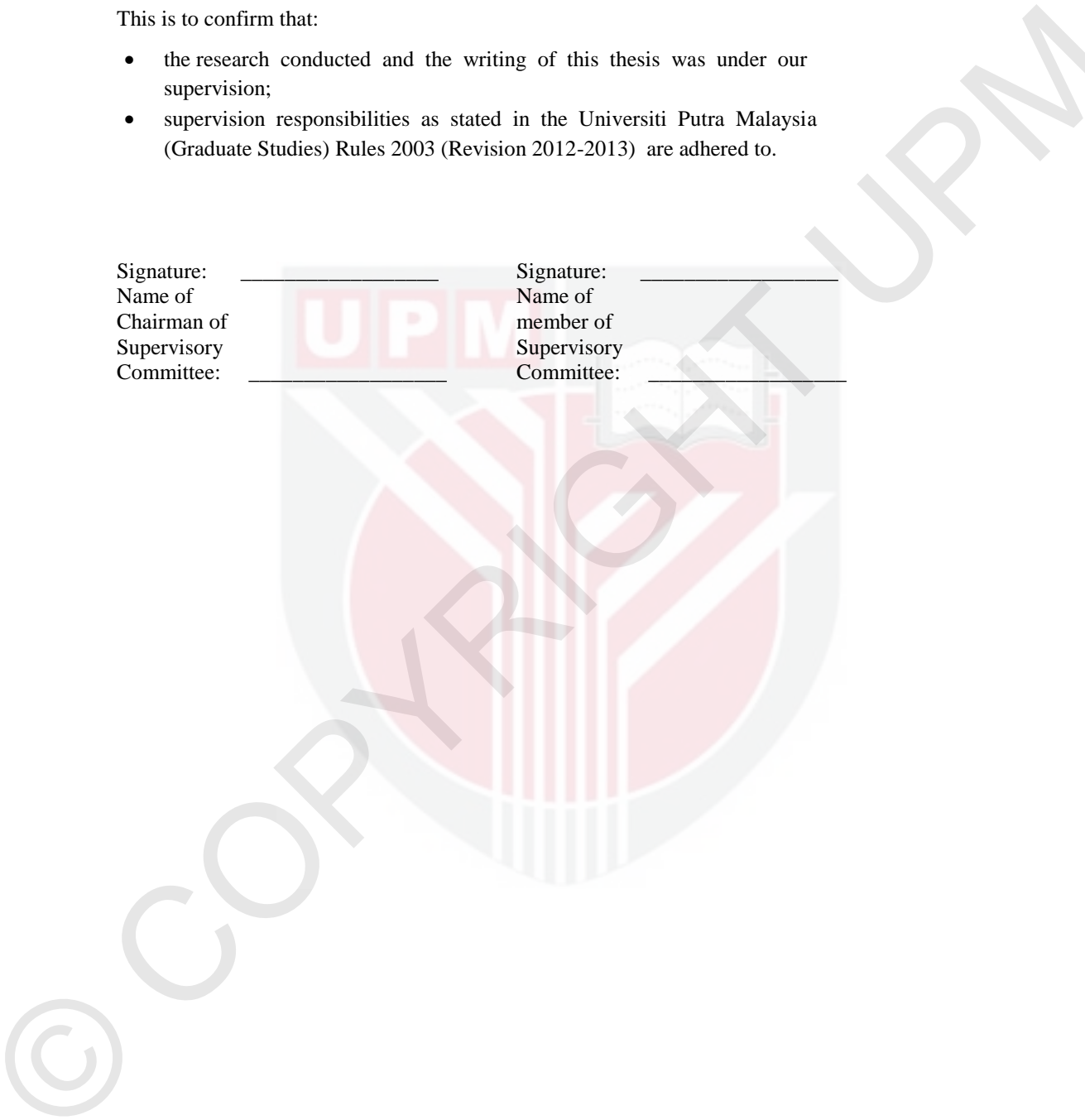


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LIST OF ABBREVIATIONS

OI	Open innovation
IP	Intellectual property
ISIC	International standard industrial classification
R&D	Research and development
IPR	Intellectual property right
FMM	Federation of Malaysian firms



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CHAPTER 1

INTRODUCTION

1.1 Background

Under globalization, an innovation-oriented and competitive strategy became the key factors for firms, industries and countries to achieve sustainable growth (Şener and Sarıdoğan, 2011). Innovation became the heart of economic growth, therefore countries must have economic policies that encourage development in the society (Manual, 1997). Meanwhile, competitiveness as a new concept refers to the ability to produce services and products which meet the quality standards at reasonable prices for markets (Murcko, 2014). Innovation has a critical effect on competitiveness and economic growth, by decreasing the cost and increasing the productivity, which are the main factors of firms' competitiveness. Consequently, the ownership of innovation keys grants the monopoly of power (Şener and Sarıdoğan, 2011).

In 2003, Henry Chesbrough showed a new approach of innovation called open innovation. Open innovation (OI) is one of the contemporary concepts of innovation. Open innovation provides firms with an opportunity to move beyond traditional perspectives, creating values by considering alternative paths to innovation and achieve profitable advantages. The openness towards suppliers, customers and universities was found to have a positive impact on the innovation performance (Inauen and Schenker-Wicki, 2011). Open innovation concept is defined as 'the purposive use of inflows and outflows knowledge to accelerate internal innovation and expand the markets for external use of innovation' (Chesbrough, 2003). Open innovation is a business concept which promotes companies to exploit outside sources of innovation to improve the products. In addition to releasing internal innovation that is not related to the company's business, it could be effectively used elsewhere (Murcko, 2014). The importance of implementing OI in the industry sector has been studied by many researchers to identify its impact on performance, such as that carried out by Lichtenthaler (2009). A lot of studies tackled the explanation of OI such as those by Chiaroni et al. (2011) and Almirall et al. (2014), while a few studies focused directly on OI practices, like those by Gassmann and Enkel (2004) and Chesbrough (2004).

In the past ten years, many studies tried to explore the OI concept and despite the swift growth of this paradigm; it is still in its infancy. Furthermore, OI has been studied in terms of firms' performance, practices and external cooperation. Thus, there are still a number of unclear issues in the OI concept (Abulrub and Lee, 2012). The relationship between OI practices and competitiveness indicators is also still unclear.

1.2 Problem Statement

Malaysia has successfully transformed its agriculture-based economy to a resource-based economy. The time has come to move on towards an innovation-led economy and achieving the vision of wealth creation through technology, knowledge and innovation. But, according to the Global Competitiveness Report (Schwab, 2013), the insufficient capacity to innovate is a crucial problematic factor for doing business in Malaysia. Moreover, through the investigation on the readiness of Malaysian innovation from a macroeconomic perspective, Govindaraju and Sundram (2005) showed that currently Malaysia is not innovating at the frontier.

The national innovation strategy study conducted by Pawanchik et al. (2011b) also suggested that Malaysia must widen the scope of innovation by following these two ways:

- i. Supporting contemporary approaches of innovation such as OI.
- ii. Creating talented, cultured communities by creating innovative communities.

Despite the importance of implementing open innovation to improve the industrial sector performance, the level of implementation of this approach in Malaysia is still unclear (Pawanchik et al., 2011b). There is a limited number of researches on this topic in Malaysia. Until now no studies have been implemented to develop a framework to promote the adoption of open innovation in Malaysia and to improve Malaysian innovation policy culture. Towards the achievement of these demands, studying the factors influential in the implementation of open innovation became a critical issue, in order to encourage the implementation of open innovation approach and achieving the Malaysian Vision.

According to Monsef et al. (2012) Malaysian industries' competitiveness is currently lagging behind some Asian countries, such as: Singapore and south Korea. Therefore, Malaysian firms must improve their competitiveness. Despite the positive impact of innovation on firms' competitiveness, the relationship between open innovation concept and firms' competitiveness as well as how both interact are still unclear. Lichtenthaler (2009) and many other researchers stated that a further research on OI and firm performance is needed. The era of globalization demands studying this key issue for the betterment of business worldwide.

1.3 Research objectives

The objectives of this research are:

- i. To identify the factors that influence the implementation of open innovation practices.

- ii. To propose a framework for the implementation of open innovation practices.
- iii. To determine the relationship between open innovation practices and firms' competitiveness.

1.4 Scope of research

In any quantitative study, a large sample size is essential to determine the accuracy of the results. The study was conducted only on Malaysian manufacturing firms in Selangor, because of the fact that the highest number of Malaysian firms are located in the state. The study sample was selected from four clusters according to the United Nations system for classifying economic data “international standard industrial classification ISIC” (OECD, 2003) as shown in table 1.1.

Table 0-1: ISIC Classification of industry sectors

Industry sector	Industry type
High-technology	Medical, Pharmaceuticals, precision and optical instruments
Medium-high-technology	Chemical excluding pharmaceuticals and Electrical machinery
Medium-low-technology	Rubber and plastic products
Low-technology	Pulp, Wood, paper, paper products printing and publishing Beverage, Food products and Textiles

1.5 Significance of the research

Open innovation, a new concept in innovation management, has a critical impact on a firm's performance. Implementing open innovation increases the innovation and ideas in firms. Because of the absence of theoretical framework to encourage OI implementation, this study aims to find out the factors that influence the implementation of OI in the Malaysian manufacturing sector. These factors will encourage Malaysian manufacturing firms to implement open innovation practices, therefore creating and exchanging innovations. In addition, these factors will be utilized to help Malaysian firms to increase their competitiveness. This study will also investigate the extent of open innovation adoption in Malaysia and its contribution in developing the Malaysian innovation policy; to support the innovation environment and its potential.

Previous studies focused on the financial impact of open innovation, but this study attempts to identify the relationship between open innovation practices and a firm's competitiveness indicators. Clarifications on this relationship will encourage the adoption of open innovation practices, because firm competitiveness becomes among the key factors for an organization's survival.

1.6 Thesis layout

This study began with chapter one, providing a background and context of innovation competitiveness and OI, as well as research objectives. Chapter two presents a critical literature review of OI phenomenon, OI environment factors and competitiveness concept in addition to a review on the studies that focused on the impact of OI on a firm's performance. Chapter two focuses on the innovation status and firms' competitiveness in Malaysia. Chapter three presents and describes in detail the research framework. Chapter four presents and describes the research methodology, including the specific steps taken to address research questions presented in Chapter one. Chapter four presents a comprehensive presentation of the results and discussion of the data analysis. Finally, chapter six contains a conclusion and implications, as well as recommendations for future research.

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