

‘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 Ijazah Sarjana Muda Pengurusan Teknologi (Inovasi Teknologi)’

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* *Potong yang tidak berkenaan*

COMMERCIALIZING TOOL FOR TECHNOLOGY BASED PRODUCT:

A CASE STUDY OF USM

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“I declare that this project 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 :

Name :

Date :

DEDICATION

I would like to dedicate the success of this project report especially to both of my parents, Mohd Radzi Bin Ahmad and Rokiah Binti Shaari. 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 honored to have them as my parents. Secondly, dedications to all my siblings which have help me a lot in term of moral and financial support. Last but not least, to my lecturer whom also as my supervisor for this final year project, Dr. Norain Binti Ismail and also not to be forgotten my fellow friends.

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ABSTRACT

There has been a sharp increase in patenting by universities. However, both the number and proportion of exploited patents is small. Patenting is considered waste of resources for some universities. Consequence of this matter is the universities were unable to benefit from the research carried out by their own staff. This study aim to identify various tools used and how effective each tool in commercializing technology based product in the universities. This, will involves exploring the researchers who plays an important role in the decision to patent and commercialize research result and take it forward for commercialization. By identifying various commercialization tools, it will assist researchers and technology transfer offices in deciding which inventions to patent and commercialize. The study uses qualitative methods incorporating a case study approach. The patented research product along with patent policy from the University Science of Malaysia is used in this case study. Interviews with five different researchers from different background of studies and two staff from Innovation and Commercialization Office were undertaken to understand the general process of patent and commercialization. The study found that whether a patent is commercially exploited, and way in which it is exploited is influenced by three factors: (i) the entrepreneurs and the inventors, their characteristics and motivations. (ii) the characteristics and nature of the technologies (scope, stage) (iii) the universities policy. The study concludes with guideline for other researchers to protect and exploit their research result in universities.

ABSTRAK

Terdapat peningkatan mendadak dalam paten oleh universiti. Walau bagaimanapun, kedua-dua bilangan dan bahagian paten yang dieksploitasi adalah kecil. Paten dianggap pembaziran sumber bagi sesetengah universiti. Akibat perkara ini universiti tidak dapat mendapat manfaat daripada penyelidikan yang telah dijalankan oleh kakitangan mereka sendiri. Matlamat kajian ini adalah untuk mengenal pasti pelbagai alat yang digunakan dan keberkesanan setiap alat dalam mengkomersilkan produk berasaskan teknologi di universiti. Ini, akan melibatkan meneroka penyelidik yang memainkan peranan penting dalam keputusan untuk paten dan mengkomersilkan hasil penyelidikan dan membawa ia ke hadapan untuk dikomersialkan. Dengan mengenal pasti pelbagai alat pengkomersilan, ia akan membantu penyelidik dan pejabat pemindahan teknologi dalam menentukan ciptaan mana untuk dipaten dan dikomersialkan. Kajian ini menggunakan kaedah kualitatif menggabungkan pendekatan kajian kes. Produk penyelidikan yang dipaten bersama-sama dengan polisi paten dari Universiti Sains Malaysia digunakan dalam kajian kes ini. Temubual dengan lima penyelidik yang berbeza dari latar belakang pengajian yang berbeza dan dua kakitangan dari Pejabat Inovasi dan Pengkomersialan telah dijalankan untuk memahami proses umum paten dan pengkomersilan. Kajian mendapati bahawa sama ada paten dieksploitasi secara komersil, dan cara di mana ia dieksploitasi dipengaruhi oleh tiga faktor: (i) usahawan dan pencipta, ciri-ciri dan motivasi mereka. (ii) ciri-ciri dan sifat teknologi (skop, peringkat) (iii) polisi universiti. Kajian ini diakhiri dengan garis panduan kepada penyelidik lain untuk melindungi dan mengeksploitasi hasil penyelidikan mereka di universiti.

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LIST OF ABBREVIATIONS

ICO	Innovation and Commercialization Office
USM	University Science of Malaysia
IP	Intellectual Property
KPI	Key Performance Indicator

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CHAPTER 1

INTRODUCTION

1.1 Background of The Study

Patents contain vast amounts of technical data, consisting of information pertaining to the assignee and country of assignee amongst many data variables and the data contained is supplied on an entirely voluntary basis which makes them important if only considering the information contained within (Hall 2000). Patents are, in very basic terms, the right to appropriate returns from research (Reitzig 2004). They, in effect, exclude other firms from practicing or producing the same processes and products. A patent delineates a piece of knowledge, by placing, in writing, the knowledge contained within the claims and descriptions within the patent document into a legal realm where the knowledge is protected by law against infringement. In order for a patent to be granted, the knowledge contained within the claim must be novel, inventive, industrially applicable, and useful.

A patent is a set of exclusive rights granted by a sovereign state to an inventor or assignee for a limited period of time in exchange for detailed public disclosure of an invention. An invention is a solution to a specific technological problem and is a

product or a process. Patents are a form of intellectual property. The procedure for granting patents, requirements placed on the patentee, and the extent of the exclusive rights vary widely between countries according to national laws and international agreements. Typically, however, a granted patent application must include one or more claims that define the invention.

A patent may include many claims, each of which defines a specific property right. These claims must meet relevant patentability requirements, such as novelty, usefulness, and non-obviousness. The exclusive right granted to a patentee in most countries is the right to prevent others, or at least to try to prevent others, from commercially making, using, selling, importing, or distributing a patented invention without permission. Patent provide competitive advantage to a business, eventually manage to create wealth to organization including university. Patent is not only for wealth creation it is also as a commercializing tool for the business company as well as research institution including universities.

There are several tools can be choose from in commercializing research product, depends on the suitability. Each tool need to be chosen carefully as it will determine the success of commercialization process. The commercialization of technologies within universities is increasingly important to generate university income and create of new businesses as well as jobs. It is no coincidence that universities of late are increasingly viewed upon as local economic contributors (Etzkowitz, 2003); especially when the 21st century economy placed so much emphasis on knowledge as one of the factors of production (Friedman, 2009).

Being traditionally a source that pushes the frontier of knowledge through research and development (R&D); universities are expected to translate their superior research and development results into useful and marketable products (Sheft, 2008; Wonglimpiyarat, 2009). Universities responded to this challenge by creating various entities such as industrial science park and incubation centers (Colyvas et. al., 2002; Rothaermel et. al, 2007), spin-offs centers (Swamidass and Vulasa, 2008) and

technology transfer offices (Harman and Harman, 2004; Rothaermel et. al, 2007) to fulfilled its dual role of achieving academic excellence and R&D commercialization.

Most of the researchers in universities only have basic understanding regarding the importance and functions of patent and commercialization. This is because they are trained to do what they actually good at that is conducting research. When the research is done, they doesn't really know what to do with the research outcome and ending up with no effort to patent or even commercialize it. How far will a research result go depends on the researcher determination itself. When there is awareness about patent and commercializing, they will try their best to protect what they worked on and make good use out of it. Because of that, there is need for a proper guideline in protecting research result and commercializing it. The guideline will provide some brief idea about different avenues for commercializing.

The purpose of this study is to examine commercialization tools for commercializing technology based product in the University Science of Malaysia. This study is adopting qualitative method instead of quantitative method in order to provide more in-depth and better understanding about the research topic. The interview was conducted using semi-structured interview with respondent from University Science of Malaysia. Interviews with five different researchers from different background of studies and two staff from Innovation and Commercialization Office were undertaken to understand the general process of patent and commercialization

1.2 Problem Statement

Lately, there had been private consultant company that actively engaging with researchers in their effort to take advantage from the lack of awareness about protecting intellectual property among researchers. A lecturer from University Science of Malaysia had managed to patent one of his findings regarding the benefit of “kesinai” tree or scientifically known as *streblusasper* in preventing oral cancer.

This study will be focusing on patent and commercializing path chosen by the respondent because they are both related to each other. Patenting procedure rather complicated and most of the researcher does not really understand well. If a researcher does not understand well about patent, he cannot proceed to the commercialization process.

Patent has not been seen as an important tool for a researcher, because there is lack of awareness about patenting among them. It has been a norm for them to only teach and conduct research which is their main activity. So when patent comes, it would a whole new things for them. Patent procedure is rather complicated, that is why many organizations do not proceed for patent.

There are several tools available in commercializing patented product such as joint venture, partnership, licensing and assignment. This study will test on which tools was selected for patent commercialization and what are the effective tools in commercializing technology based product. It is expected that a researcher will not just only rely to a commercialization tools but will make use of several tools in commercializing their research product.

In universities, researchers had been conducting ongoing research either to find solution to a problem that have been bothering them for so long or to find cure

for a particular disease. Eventually, not all of the research result managed to be patented and not to mention being commercialized. It would be a waste if research result were left as it is without any further effort to commercialize it. Most of the researchers in universities only have basic understanding regarding the important and functions of patent in protecting their intellectual property. This problem may occur anywhere either in public or private university. Consequence of this matter is the universities were unable to benefit from the research carried out by their own staff. Because of that, there is need for a proper guideline in protecting research result and commercializing it. The guideline will provide some brief idea about different avenues for commercializing.

In US for example, the rate of universities' commercialization success has fall short from the initial expectation and excitement by the stakeholders (Lehrer et al., 2009). While it is irrefutable that the number of patent applications has been growing in a rather exponential rate especially after the introduction of Bayh-Dole Act in the US (Berman, 2008); the number of successful venture creations remains rather mundane. To avoid such thing from happening in Malaysia, there must be a deep understanding about various tools of commercialization and the patent itself.

Universities that practice very highly selective procedures would only patent an invention after a very thorough market analysis. But still, there are universities that practiced low selective procedures where they file for patent as long as the invention fulfills an expectation of potential value. Most of the universities based their selection criteria on motivations of the inventors, either to patent or not and which commercialization tools to utilize for their inventions.

Most of the lecturers in universities only have basic understanding regarding the importance and functions of patent and commercialization, they does not know all the tools available for commercializing their research product. Because of this problem, patents were unable to be fully utilized.

1.3 Research Question

A research question is an answerable inquiry into a specific concern or issue. It is the initial step in a research project. The 'initial step' means after the researcher have an idea of what to study, the research question is the first active step in the research project. This research will explore the following key question:

- 1) What are the tools used in research commercialization?
- 2) What are the effective tools for commercializing technology based product?
- 3) What are the guidelines for commercializing technology based product in the universities?

1.4 Research Objectives

According to Saunders et al. (2012), research objectives express „how“ you intend to structure the research process to answer your question. Researcher indicated the objective of this study base on the research questions. Further, the objective should relate with the questions as it influences the results at the end of this study. The objectives are as follows:

- 1) To identify tools for research commercialization.
- 2) To determine the effective tools for commercializing technology based product
- 3) To develop a guideline for commercializing technology based product in the universities.

1.5 Scope of the Study

The scope of this study is about patented research product in University Science of Malaysia and how commercialization tools play an important role in commercializing research product. This study covers employees of University Science of Malaysia. Respondents of this study are researchers located at University Science of Malaysia main campus, Penang and Advanced Medical and Dental Institute (AMDI), Kepala Batas. As much as five researchers which may represent different background of studies and two staff from Innovation and Commercialization Office will be interviewed. The researcher must at least have one research product that had been patented under University Science of Malaysia. The product should have element of technology in it or use any kind of technology while developing the product.

1.6 Limitation

Due to some limitations, the research will only covers University Science of Malaysia's employees who are working at main campus, Penang and Advanced Medical and Dental Institute, Kepala Batas. Both of the campuses are chosen based on its accessibility which is near to the researcher hometown. The researcher will able to visit University Science of Malaysia's innovation and commercialization office (ICO) located at main campus, Penang in order to retrieve information related to this study. There are also time limitation in conducting this study, students are only given short period of time to conduct their study. Before this, the researcher have been attached to University Science of Malaysia for industrial training for six month, from there the researcher have some networking and know well about of the University Science of Malaysia's surroundings.

1.7 Importance of the Study

The commercialization of technologies within universities is increasingly important to generate university income and creation of new businesses as well as jobs. In universities, researcher had been collaborating with industries and conducting ongoing research. Eventually, not all of the research result end up being patented and not to mention being commercialized. It would be such a waste if research result were left as it is without any further effort towards commercialization.

Most of the researchers in universities only have basic understanding regarding the important and functions of patent in protecting their intellectual property. This problem may occur anywhere either in public or private university. Consequences of this matter are the universities unable to benefit from their research efforts. Because of that, there is need for a proper guideline in protecting research result and commercializing it. The guideline will provide some brief idea about different avenues available for patent commercializing. This study will provide more understanding to the researcher whenever they want to commercialize their research product. This study could give a picture to government regarding the important of patenting and commercializing research result, and how it could contribute in improving nation's economy.

1.8 Summary

In conclusion, this chapter will provide an introduction, background of the study and explains the reasons for undertaking this study. This study discusses all the challenges a researcher may encounter during the process of patenting and commercializing their research product. Not all of the research product made it to the