

Chapter 2

Market Orientation Conception on Commercialization of University Research Products with Moderating Effect of Organizational Culture

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Abstract The purpose of this study is to investigate the relationship between market orientation and commercialization of university research products with the moderating effect of organizational culture. This is due to a report that indicates that Malaysian public universities score low in commercialization of their research products. Quantitative approach method will be applied in this study with 354 sets of questionnaires distributed to 5 research universities in Malaysia. Since this paper is intended to focus on its conceptual nature, it discusses only the synthesis of literature findings. Limitations are not going to be discussed in the empirical discussion. The conceptual contribution of this paper goes one step further by suggesting the factors that may influence the enhancement of commercialization of university research products in Malaysia.

Keywords Market orientation • Commercialization • Organizational culture • Customer orientation • Competitor orientation, inter-functional coordination

2.1 Introduction

Nowadays, research commercialization has been receiving significant attention from scholars due to its capability in promoting the growth of a nation economy and in playing a role as future investment of the nation [1, 2]. It is proven from

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developed countries, such as the United States and Canada that are involved in research commercialization activities earlier and have managed to generate more than \$1 billion income annually for their respective countries [3].

Realizing the importance of research commercialization, Malaysia sees it as an agent of generating new source of income for the nation. Besides, commercialization of university research products may assist Malaysia to achieve the status of high-income nation by the year 2020. The Malaysian Government has started to create many initiatives to support this activity, namely, establishing policies and programs as well as raising the research and development (R&D) funds to accelerate the commercialization interest. As part of the plan for innovation, the government has allocated RM 1.6 billion in the Eighth Malaysia Plan (2001–2005), appropriated for research, development, and commercialization of technology compared to RM 1 billion during the Seventh Malaysia Plan (1996–2000).

The Malaysian Government expected universities to play a vital role in supporting innovation and technology commercialization. The university role is not only to train and teach undergraduate and postgraduate students but also to be involved in research and development. From these activities, the next conventional role of the university is to commercialize its research products. Furthermore, the university must create start-up or spinout companies [4].

The government has delegated huge responsibility on the universities because of the recognition it has given on the ability of universities to be part of the distribution, creation, and application of knowledge and the capability of universities to be engaged in science-based entrepreneurial activities. These activities will fruitfully produce innovative research and will lead to the successful product commercialization [5]. Since the Ninth Malaysia Plan (2006–2010), RM 3.101 billion of public fund was channeled to research and development (R&D) in the university. Meanwhile, under the Tenth Malaysia Plan (2011–2015), the government again allocated RM 741 million for universities in the first 2 years of the 5-year plan. The allocation was to be managed by the Ministry of Higher Education (MOHE). In line with the new directives, the ministry announced a set of four research and development schemes which are (1) Fundamental Research Grant Scheme (FRGS); (2) Exploratory Research Grant Scheme (ERGS), Long-Term Grant Scheme (LRGS), and Prototype Research Grant Scheme (PRGS); (3) Research Incentive; and (4) MOHE Special Project to utilize the RM 741 million allocations. The increase in the amount in spending of research grants has indicated that the Malaysian Government is serious in walking the talk toward commercializing research products as this is one of the critical agenda in the Malaysia Plan [1].

2.2 Statement of Problem

Commercialization is crucial as it has cost huge spending of the public funds. The government obligates high expectation to the universities to take this prospect to commercialize their research products. However, the commercialization activities in universities were below satisfactory level and very limited [6, 7].

According to the report by the Ministry of Higher Education website [8], the performance on commercialization of university research products was under satisfaction despite having allocated huge budget to fund research and development activities. The report highlighted that out of 313 identified with commercially potential, only 58 products were successfully commercialized from 16 public universities in Malaysia. Meanwhile, the current report illustrated until 2010, in which 20 public universities are involved in commercialization activities. However, the commercialization rate was still low. The number of research and development projects conducted by 20 public universities was 2,059. However, only 442 products were selected as commercially potential products, and about 6 % (125 products) were successfully commercialized. Hence, this has indicated that there is an urgent necessity to address the circumstances and drive the universities to a better performance level [4]. It is identified by Kamisah et al. [7] that a minimum knowledge of market orientation is stipulated as the main obstacles in commercializing university research. As a result, the research products fail to meet market expectation.

This study discusses the importance of the market orientation (MO) in commercializing university research and development products. It has been reported that MO is continuously helping organizations to achieve higher performance and significantly has positive relationship with organizational performance [9–12].

2.3 Literature Review

A. Market Orientation (MO)

MO is defined by Narver and Slater [10] as obtained information regarding customers, competitors, other market factors, inter-functional assessment, shared diagnosis, as well as coordinated action. These lead to core capabilities, competitive advantage, and business performance of an organization. In line with that statement, Buchanan and Vanberg [13] agree that it is important to be familiar with the market and to study the information about competition, customers, demand, and production possibilities because it will be useful in developing creative ideas. Therefore, more researchers have begun to understand about market knowledge as they are able to gather relevant information and transform the knowledge into market-oriented product development.

According to Kamisah et al. [7], market orientation is important to the commercialization of university research products because customers' needs are changing.

Thus, if university researchers are continuously determining what customers' needs and wants are, they will be able to identify new forms of products that are missing in current lines. It will lead to creating new products to the market; hence, university commercialization activities will be successful. Furthermore, the researchers are required to foresee the needs of the consumer in the future. From then on, only the technology or research products developed today by researchers are relevant and not be obsolete. Thus, the understanding and knowledge of future needs is important in market orientation, in order to achieve commercialization. In terms of MO concept, there are different perceptions from various researchers in the literature. According to Jaworski and Kohli [14], MO is an organizational process that involves market intelligence generation, dissemination, and responsiveness to such intelligence across department.

Meanwhile, Narver and Slater [10] provide a different concept where they define MO "as an organizational culture that most effectively and efficiently creates the necessary behaviors for the creation of superior value for buyers and thus continuous superior performance for business." They conceive such culture as focusing on customer orientation, competitor orientation, and inter-functional coordination. Therefore, this research will adapt the market orientation conceptualization. On the other hand, Narver and Slater [10] state that MO is positively related to business performance in all types of markets. This is agreed upon by the majority of the authors such as Affendy et al. [15] as well as Asikhia [16]. Conceptually, there is a strong consensus among the researchers about the fact that the final result of MO will improve an organization performance. Hence, the following proposition is established to show the possible relationship between MO toward commercialization of university research products.

B. Customer Orientation

Narver and Slater [10] state that the heart of market orientation is customer orientation. Customer orientation will continuously help understand the needs of not only the current customers but also potential target customers. They will use that knowledge for creating customer value. Besides focusing on customer value, customer orientation can also lead to superior financial performance when the organization can satisfy their customers' needs and wants. From that, it would motivate the group of satisfied customers and potentially loyal ones who would continually do business with the organization. Thus, it shows that customer orientation has a positive influence on firm innovation and performance [17]. Based on the previous research, the next proposition predicts the relationship between customer orientation and commercialization of university research products.

C. Competitor Orientation

Competitor orientation is the constant understanding of the capabilities and strategies of the principal current and future competitors that use the knowledge in creating superior customer value [16]. In line with that statement, however, there are some different opinions by authors. Competitor orientation is not only to understand the ability and strategies of the organizations' competitors, but also the organization must measure themselves compared to the target competitor by recognizing their own strengths and weaknesses. By identifying their own strengths and weaknesses, it can be the organization's competitive advantage, and it will lead to serving customer better than the competitor. This is very important in a competitive environment, with multiple firms competing for market share [17, 18]. From the previous researches, it shows that competitor orientation is very important toward commercialization of university research products since competitor orientation may create a competitive advantage for a new firm created by university commercialization activity. Perhaps, understanding ability of current and future competitor and identifying its own strengths and weaknesses will be the best strategies for university researcher to enhance the commercialization rate of university research products. Thus, the proposition below expects the relationship between competitor orientation and commercialization of university research products.

D. Inter-functional Coordination

According to Narver and Slater [10], inter-functional coordination is the coordination of all functions in the business that utilizes customer and other market information to create superior value for customers. Organizations with better inter-functional coordination would have better ability to create, retain, and transfer knowledge within the firm. Thus, better inter-functional coordination allows the firm to use knowledge about the customers and competitors more effectively [17]. This study sees that inter-functional coordination plays an important factor in successful commercializing of university research products because researchers can share expertise, knowledge, and experience via inter- or intrafaculty within the university. For example, researchers from the engineering faculty may seek advice from the business faculty on marketing strategies and vice versa. Hence, it may create a competitive advantage for the new product that will be commercialized. Thus, the following proposition predicts the relationship between inter-functional coordination and commercialization of university research products.

E. Commercialization of University Research Products

Nowadays, commercialization of university research products has been receiving much attention due to the ability to help in the growth of the nation's economy. This has resulted in significant policy initiatives such as the Bayh-Dole Act of 1980 in the United States to promote the commercial exploitation of invention that has resulted from government-funded research and similar initiatives in European countries. The US Bayh-Dole Act of 1980 is the most well-known government policy stimulating commercialization. The growth in patenting and licensing activities, observed in US universities in the 1980s and 1990s, is often attributed to the passage of the Bayh-Dole Act in 1980 [19]. In terms of definition, commercialization is a term that bounds up with the word "commerce." This shows that commercialization activities and the products produce from those activities are being the subject of commerce. Commercialization involves the basic assumption that an entity which is the product exists and that it is possible to design and manufacture that particular entity. This entity then needs to be made tradable, for example, subject to buying and selling. The activities that make it happen are called commercialization [20, 21].

F. MO Toward Commercialization of University Research Products

MO has been mostly studied toward business performance. The outcome of MO on business performance has been widely investigated by previous studies in different business contexts, and the result frequently shows positive and significant relationship with the organization performance [10, 14]. Inappropriately, nevertheless, there has been a strong agreement among the previous studies regarding the relationship between MO and business performance. However, there is limited study that has tested the relationship between MO and performance of commercialization university research products. Thus, in this study, the researcher intends to test the relationship between MO and commercialization of university research products.

G. Moderating Effect of Organizational Culture

This study intends to test organizational culture as the moderating factor because according to Ismail et al. [22] "university researcher are facing problem to commercialize their research because they are having much responsibility such as teaching various subject at various levels (undergraduate students, postgraduate students) researching, consulting, supervision of postgraduate research students,

writing research article for publication, holding administrative position, working in government committees and as well trying to innovate and manage spin off venture.” From this statement, it shows that Malaysian university’s culture still does not support the commercialization and innovation activities with burden on the researchers (who are also at the same time teaching) with bundles of work and responsibility. With having much responsibility, time to focus in commercialization is also being reduced. Even though researchers have high MO, it cannot increase the commercialization due to the unsupported organizational culture.

Organizational culture is very important in determining the organizational performance. According to Lucky et al. [23], organizational culture is a crucial factor to determine the success or failure of entrepreneurial development and business activities. It is because according to Kuratko and Welsch [24] and Abdullah Kaid and Rosli [25], organization that has an effective culture will understand that the competitive advantage does not last forever. Thus, they encourage constant changes and establish never-ending innovation environment. Hence, with organizational culture, it will create uniqueness and inimitability to an organization. In terms of definition, organizational culture can be defined as the values, beliefs, and hidden assumptions that organizational members have in common [26].

In agreement with that statement, Spacapan and Bastic [27] define organizational culture as “the way we do things around here.” It reflects the norms and deeply rooted values and beliefs that are shared by people in an organization. Meanwhile, Henrie and Sousa-Poza June [28] come out with different view of organizational culture. It has not been comprehensively studied, due to the reasons that determining organizational culture is not an easy job, and, therefore, there is confusion over the definition of culture. However, in this study, the researchers believe that organizational culture can be a very important factor that will moderate the relationship between MO and commercialization of university researcher products. This is because according to Spacapan and Bastic [27], organizational culture can affect level of entrepreneurship and innovation in an organization through socialization processes. These, in turn, influence individual’s behavior, through structures, policies, and procedures that are shaped by the basic values and beliefs of the organizations.

2.4 Proposed Conceptual Framework and Hypothesis Development

From the discussion and extensive literature review, the researchers proposed a conceptual framework to organize and direct the research. The diagram in Fig. 2.1 shows that independent variable is market orientation (MO) components which consist of customer orientation, competitor orientation, and inter-functional coordination. Meanwhile, the dependent variable is commercialization of university research products, and the moderating variable is the organizational culture. Based

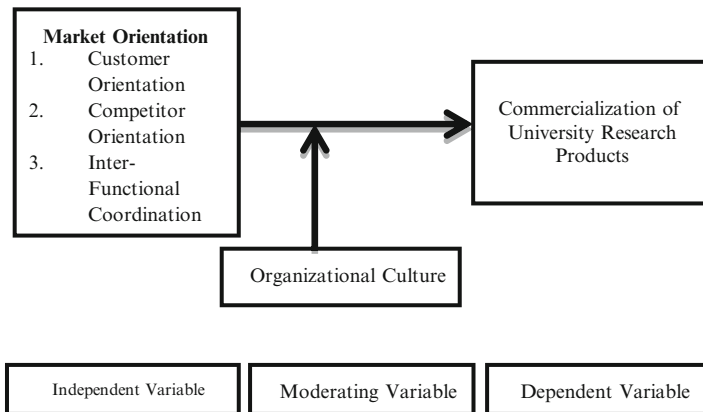


Fig. 2.1 The proposed conceptual framework

on this conceptual framework, the researchers develop the research hypotheses for the study. Thus, from the above discussion, the following hypotheses are being postulated:

Hypothesis 1 There is a positive relationship between market orientation and commercialization of university research products.

Hypothesis 1a There is a positive relationship between customer orientation and commercialization of university research products.

Hypothesis 1b There is a positive relationship between competitor orientation and commercialization of university research products.

Hypothesis 1c There is a positive relationship between inter-functional coordination and commercialization of university research products.

Hypothesis 2 Organizational culture will moderate the relationship between market orientation and commercialization of university research products.

Hypothesis 2a Organizational culture will moderate the customer orientation and commercialization of university research products.

Hypothesis 2b Organizational culture will moderate the competitor orientation and commercialization of university research products.

Hypothesis 2c Organizational culture will moderate the inter-functional coordination and commercialization of university research products.

2.5 Methodology

This research will focus only on universities having the research university (RU) status in Malaysia, namely, Universiti Malaya (UM), Universiti Sains Malaysia (USM), Universiti Kebangsaan Malaysia (UKM), Universiti Putra Malaysia (UPM), and Universiti Teknologi Malaysia (UTM). This is due to the nature of the research university that focuses on research and commercialization activities compared to other universities that focus on teaching and learning. The research will be focusing on science and technology-based faculties. This is due to the data provided by MOHE in the report that indicates the majority of the research having potential to be commercialized is science and technology-based product. Social sciences research has limited potential to be commercialized [8]. Respondents in this research include professors, associate professors, senior lecturers, and lecturers who are actively involved in research and commercialization activities. Based on the universities and MOHE directory, the total number of RU researchers in the science and technology discipline is 4,044 persons. According to Krejcie and Morgan [29] as cited in Sekaran [30], the minimum sample size is 354 respondents of population. Furthermore, Saunders et al. [31] have highlighted that with the number population of 10,000 the sample size of 354 will provide 5 % margin of error. The greater the proportion of the total population sampled, the smaller the margin of error.

In this study, the researcher uses cross-sectional studies where the data will be collected at one time, perhaps over a period of months in order to get the answer from the respondents. Directory of each faculty university's website will be the main source which the researcher attempts to reach the respondents. From the directory, the researcher retrieves the e-mail and telephone number of each respondent, and the questionnaire will be disseminated through personally administered questionnaire. The advantages of using this technique in collecting data are that the researcher is able to establish rapport and also to motivate the respondents to answer the questionnaires. Any doubts that respondents face can be solved immediately by the researcher. Sekaran [30] also states that almost 100 % response rate is ensured when using this technique. The unit of analysis is individual person.

All primary data will be processed and analyzed using statistical package for social sciences (SPSS). The results will be tabulated in the form of descriptive statistic, reliability testing, Pearson's correlation analysis, and multiple regression analysis. Frequency distribution is used to gather the frequencies from all the respondent personal data or classification variables such as age, gender, level of income, position, level of education, and other related information. Meanwhile, reliability testing purpose is to obtain consistency and stability of each variable. Pearson's correlation analysis and multiple regression analysis will be used to test the hypotheses and identify the most contributing factors of independent variables toward commercialization.

2.6 Conclusion

This study will explore the market orientation (MO) among the researchers of research university status in Malaysia. This study will investigate the relationship of MO and commercialization of university research product. It is hoped that this research will contribute to the body of knowledge in terms of theoretical framework and methodology used, and the most important thing is the factors identified that contribute to commercialization of university research products. The result will provide a strong foundation for Malaysian Government and universities to revise and strengthen current policies and strategies to propel the number of research products to be commercialized. It will help the nation attain prosperity and subsequently will be moving forward to achieve the status of high-income nation by 2020.

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