

THE MODERATING EFFECT OF GOVERNMENT SUPPORT IN THE
RELATIONSHIP BETWEEN OPEN INNOVATION AND FIRM'S INNOVATION
PERFORMANCE OF SMALL AND MEDIUM ENTERPRISES IN MALAYSIA
FURNITURE MANUFACTURING SECTOR

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DEDICATION

I whole heartedly dedicate this thesis to

My beloved Parents

Ramliy Yaacob & Siti Fatimah Mamat

Whose endless love, care and training helped me stay positive and persistent through thick n' thin and whose prayers I will always need to succeed in both of the worlds

My Dear Wife

Hasrina Hassan

Whose love, trust, encouragement and support has boosted up my spirit throughout this journey and has helped me in achieving my goals

and

My lovely Kids

Nur Arissa Irdina & Nur Aafiya Irdina

Whose innocent smiles, love and prayers always bring life into my life

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ABSTRACT

Open innovation is a viable source to leverage economic viability and success of firms amidst contemporarily global, highly competitive, and transformative post-industrial society. To date, most open innovation research focused exclusively on large companies, while neglecting the specific competitive challenges and strategies of small and medium-sized enterprises (SMEs), in particular of developing countries. This study aimed to fill this gap by investigating open innovation landscape of furniture manufacturing SMEs (FMSMEs) due to their significant roles in Malaysia's economic development. Based on open innovation model and resource-based view theory, this study investigated the influence of open innovation activities and government support in determining firms' innovative performances. Data were collected based on random sampling surveys of 880 FMSMEs in Johor Bahru, Malaysia. Data analysis of useable 210 questionnaires were done using hierarchical multiple regression analyses. Results revealed a statistical significance of open innovation activities in determining FMSMEs firms' innovative performances. Moreover, it is found that government support is a strong moderator of firms' innovative performances. Findings derived from this study contributed to better understanding of the open innovation activities and practices of FMSMEs in Malaysia. Finally, this study suggests more future research to explore open innovation, innovative performance and government support in the service sector as well as in industries of different nature.

ABSTRAK

Inovasi terbuka merupakan satu sumber berdaya maju untuk meningkatkan kemampuan ekonomi dan kejayaan firma dalam zaman kini yang bersifat global, daya saing yang tinggi, dan di dalam masyarakat transformatif pascaindustri. Sehingga kini, kajian berkaitan inovasi terbuka hanya tertumpu secara khusus terhadap syarikat bersaiz besar, sementara kurang pemerhatian diberikan terhadap strategi dan pelaksanaannya dalam kalangan syarikat perusahaan kecil dan sederhana (SMEs), khususnya di negara-negara membangun. Kajian ini bertujuan mengisi jurang ini dengan mengkaji inovasi terbuka di dalam industri pembuatan perabot SMEs (FMSMEs) disebabkan sumbangan mereka yang signifikan terhadap pembangunan ekonomi Malaysia. Berdasarkan model inovasi terbuka dan teori pandangan yang berasaskan sumber, kajian ini menganalisis peranan aktiviti inovasi terbuka dan sokongan kerajaan dalam menentukan keupayaan inovatif firma. Data dikumpul berdasarkan kaji selidik persampelan rawak daripada 880 FMSMEs di Johor Bahru, Malaysia. Data dianalisis terhadap 210 borang soal selidik yang boleh digunapakai melalui kaedah regresi berganda hierarki. Dapatan mendedahkan bahawa inovasi terbuka adalah signifikan terhadap keupayaan inovatif firma-firma FMSMEs. Selain itu, peranan sokongan kerajaan juga adalah signifikan terhadap peningkatan kadar keupayaan inovatif firma. Dapatan daripada kajian ini menyumbang kepada pemahaman yang lebih baik terhadap aktiviti inovasi terbuka dan amalannya dalam FMSMEs di Malaysia. Akhirnya, kajian ini mencadangkan lebih banyak penyelidikan masa hadapan bagi meneroka inovasi terbuka, prestasi inovatif dan sokongan kerajaan dalam sektor perkhidmatan serta dalam industri-industri yang berlainan.

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LIST OF ABBREVIATIONS

| | | |
|---------|---|---|
| 10MP | - | Tenth Malaysia Plan |
| AIM | - | Agensi Inovasi Malaysia |
| CIS | - | Community Innovation Survey |
| CRDF | - | Commercialisation of Research & Development Fund |
| DOSM | - | Department of Statistics Malaysia |
| EFA | - | Exploratory Factor Analysis |
| EIBM | - | Export Import Bank of Malaysia |
| EPU | - | Economic Planning Unit |
| FMSMESs | - | Furniture Manufacturing SMEs |
| GDP | - | Gross Domestic Product |
| GLC | - | Government-Linked Company |
| GNP | - | Gross National Products |
| HLI | - | Higher Learning Institute |
| HMR | - | Hierarchical Multiple Regression |
| MASTIC | - | Malaysian Science and Technology Information Centre |
| MATRADE | - | Malaysian External Trade Development Corporation |
| MDEC | - | Malaysia Digital Economy Corporation |
| MOSTI | - | Ministry of Science, Technology and Innovation |
| MP | - | Malaysia Plan |
| MPIC | - | Ministry of Plantation Industries and Commodities |
| MRM | - | Majlis Rekabentuk Malaysia |
| MSIC | - | Malaysia Standard Industrial Classification |
| MTDC | - | Malaysian Technology Development Corporation |
| NEM | - | New Economic Model |
| NMP | - | National Malaysian Plan |
| NRE | - | Ministry of Natural Resources and Environment |
| NSDC | - | National SME Development Council |

| | | |
|--------|---|--|
| NSI | - | National Survey of Innovation Malaysia |
| OECD | - | The Organisation for Economic Co-operation and Development |
| PCA | - | Principal Component Analysis |
| PSYCAP | - | Positive Psychological Capital |
| QUAN | - | Quantitative |
| R&D | - | Research and Development |
| RBV | - | Resource Based View |
| SMEs | - | Small and Medium Enterprise |
| SPSS | - | Statistical Package for Social Sciences |
| TAF | - | Technology Acquisition Fund |
| WEDP | - | Women Exporters Development Program |

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CHAPTER 1

INTRODUCTION

1.1 Introduction of the Study

Innovation is generally considered as a crucial tool for organisations to achieve better performance or to attain a competitive advantage Lee et al. (2016), (Baker et al., 2016, Greco et al., 2016, Kalay and Lynn, 2015) thus encourage to the studies on innovation in recent times. A great body of literature has also claimed that among its benefits are to ensure firm's long-term endurance and effectiveness (Ritala et al., 2015, Nguyen et al., 2014). Recent researches conducted on innovation have shown a great efforts and dedications towards gaining understanding on how firm's activities can be stimulated through the implementation of technological innovation (Davenport, 2013, Jin and Feng, 2013) by different types of innovations that ranged from organizational innovation (Yang et al., 2014a), internal innovation (Zawislak et al., 2013), institutional innovation (Shu et al., 2015), sustainable growth and eco-innovation (Bhuiyan et al., 2012, Felzensztein et al., 2015) and open innovation (Chesbrough, 2003).

The emerging model of innovation, open innovation introduced by Chesbrough (2003) captures massive attention by scholars (Brem and Schuster, 2012, Dahlander and Gann, 2010, Desouza et al., 2007) as being touted as a superior path for achieving long-term success and becoming important reference in forming our understanding of firm's openness and competitiveness. The historical perspectives on how open innovation evolves, pointing to the development of a systematical process of managing

innovation knowledge with external parties, either through collaboration or outsourcing efforts (Brem and Schuster, 2012, Chesbrough, 2006) to improve firm's innovativeness and performance (West and Bogers, 2014) and to remain competitive and sustainable in the market. The model's effectiveness empirically proven by many studies (Parida et al., 2012, Parrotta et al., 2013, Perkmann and Walsh, 2007, Robertson et al., 2012, Trott and Hartmann, 2009) and as well as effectively being practised by large-sized firms in manufacturing and technological-based sectors. Thus, it increase the interest of comprehensive studies by both academic and practitioners, and making it a subject that is still under-researched for various unexplored sectors (Parida et al., 2012, Berger and Revilla Diez, 2006). Accordingly, an extended research and systematic review revealed that the majority of open innovation related articles focused less attention in the SMEs firm's context (Awang et al., 2014).

Malaysia, with its dynamic and viable business ecosystems, stands among the most attractive transitional economies (World Bank Report, 2013/14). In pursuit of achieving its Vision 2020, the Malaysian government is emphasising to accelerate performance and innovation of SMEs through various programs i.e. the SME Masterplan (10th-MP, 2011) based on public-private partnership, targeting to raise the contribution of SMEs to the economy from the current 32% of GDP to 41% by 2020. However, with the supportive external environment, manufacturing SMEs contribution to country's GDP and major value added exports still needs to be intensified to profit from governments' ongoing supports and compete with its regional as well as international rivals (Govindaraju et al., 2013). Thus, the call of exploration for open innovation studies to increase SMEs performance, and lack of theoretical and empirical research regarding open innovation in Malaysian manufacturing SMEs (FRSA and Reid, 2015, Kaur et al., 2014, Aziz and Samad, 2016), demands in-depth empirical investigation of factors influencing the firm's performance of manufacturing SMEs (Md Noor et al., 2013).

This chapter is a comprehensive representation of the rationale of this study. To help generate the justification of this dissertation, section 1.2 elaborates the background of the study followed by Section 1.3 illustrating the research problem. Purpose, significance and scope of the study are provided in section 1.4, 1.5 and 1.6

respectively. Subsequently, the research questions in section 1.7 and research objectives in section 1.8 are given. Subsequent to scope and delimitations in section 1.9, theoretical framework is explained in section 1.9. Finally, the structure of the study is discussed in section 1.10.

1.2 Background of the Study

The concept of innovation is continually gaining ground and is becoming an essential element for SMEs to be able to compete globally (Md Noor et al., 2013). Malaysian SMEs has continually demonstrated an increase in its total gross domestic product (GDP) based on domestic and international demand. The SMEs' value-added growth in all sectors of the economy were higher than the overall sectoral performance (Mohammed Yusr et al., 2014, DOSM, 2014). However, latest statistics indicated that the long-term growth trend of SMEs in Malaysia since 2014 has endured, with SME GDP increase continuously outperforming the overall economic growth of the country (SME, 2014/15) thus urging the government to take actions through innovative plans. In a detail overview comparing contribution within SMEs - which consist of five sectors (construction, services, mining and quarrying, agriculture and manufacturing), cumulative annual growth rate (CAGR) of each sector shows mixed findings as the services sector contribute the most to its GDP in 2014 (21.1%) (SME, 2014/15). The manufacturing sector denotes 7.8%, and the lowest is mining and quarrying sector (0.1%). According to a 10th-MP (2011) manufacturing plays a major role as one of the key drivers for any countries economic growth, and largely influenced by the development of new or improved products and services. In realising the importance of manufacturing SMEs sector, the National SME Development Council (NSDC) has put a focus to accelerate SMEs growth towards achieving a high-income nation by 2020, from input-driven to productivity-driven in manufacturing sector emphasising innovation as key driver elevating the industry performance.

The quest to develop a robust manufacturing sector in Malaysia by focusing on innovation efforts will further improve the social as well as economic standpoint of

the country, thereby increasing employability (10th-MP, 2011). Manufacturing activities are the centre point of industrialisation in realising a nation's dream of achieving sustained growth by moving from low to middle and high-income status to provide quality employment, wage and to reduce poverty (Govindaraju et al., 2013). Consequently, the impact of globalisation and the advent of technologies in today's 21st century, coupled with new market demands, communications linkages and customers' needs and preferences has also increased the need for more innovative products and services (Lopez-Rodriguez and Martinez, 2014). Thus, firms have become more concerned to acquire external knowledge and technologies for innovation as well as to remain competitive.

However, the competition is no longer just the local market, but globalisation has changed the process of creating innovations as well as the dissemination of new products and services, and the flow of knowledge and capability between different organisations. Therefore, the firm also faces several challenges to initiate innovation activities such as the of complexity in the type of problems encountered and shorter time to innovate (Baker et al., 2016). This can lead to a situation, where organizations need to create, develop and sustain inter-organizational relationships (Navarro et al., 2015) as it is difficult or impossible for one organization to find a solution by themselves, which has led to the innovative efforts to be done openly through partnerships, collaborations or outsourcing to survive in a tougher and tougher business climate. Open innovation model, which is introduced by Chesbrough (2003) has been implemented in the large firms and remarkably improve their business performance and sustainability and aspires micro, small and medium-sized enterprises to apply this concept to their businesses. Nevertheless, the government also responded to this call to adopt open innovation model through triple or quadruple helix concept which involves government, universities, and industries collaboration.

Li et al. (2010) studies on open innovation and implementation among firm's and found that effective knowledge management and technological acquisition aids for improvements in productivity, sales, return on equity, assets, investments and profitability. Similarly Hung and Chou (2013) in his paper shows a significant evidence of technological and knowledge acquisition resulted in higher productivity

and sustainability of the businesses in manufacturing sector in large firms. Thus, organisations are more interested in how open innovation can help them in creating innovative solutions. As highlighted by Vrgovic et al. (2012), open innovation opens up new avenues of collaboration that could lead to innovation which otherwise would be too expensive for the company to initiate internally.

Thus, this study identified the influencing factors of open innovation in determining firm's performance based on extensive literature examination from various studies and research and through critical analysis (Baker et al., 2016, Greco et al., 2016, Felzensztein et al., 2015). Also, applying these factors to developing countries setting will also help in the determination to add and understand whether there are differences so that people and manufacturing firms in developing countries can understand better which factors holds best for them based on their employee perception. As a matter importance, the increase quest for innovation studies among nations today has also led to the development of successful innovations coming out from developing countries' perspectives, even in the midst of challenges inhibiting their accelerated growth on innovation, shows a practical evidences of the success of innovations carried out specifically in Malaysia (SME, 2014/15, Awang et al., 2014). Moreover, Greco et al. (2016) resulted that large organisations implemented open innovation with a positive outcomes. The successful examples of these firms suggest that open innovation may be a tool or model that provides the basis for achieving greater performance.

As stated by DOSM (2014), the manufacturing sector has continued to remain amongst the fastest growing sectors in Malaysia and largest contributions to the country's GDP among the following areas: wood, furniture, paper products and printing (10%), followed by electrical and electronics products (9.1%) and petroleum, chemical, rubber and plastic products (5.0%).

The furniture manufacturing sector of Malaysia was selected as a focused for this research due to a) the industry has contributed to the nation's economic growth with 3.7% towards the total GDP as well as its foreign exchange earnings, b) it is amongst the highest jobs providers compared to other sectors with more than 300,000

people hired (SME, 2014/15, DOSM, 2014) and c) the furniture industries are amongst the innovation driven industries and it is highly correlated with other high impact sectors (towards Malaysia's GDP) such as construction industry (Tasmin et al., 2013) thus, making them as the important element of the Malaysia's economy that should be studied.

In conclusion, innovation and open innovation activities within firms are very important and yet it is still to be understandable and applied in the SMEs context, focusing on manufacturing industries. While the government support for the industrial innovations, it is still questionable whether it will enhance the innovativeness of business entity, although many actions have been taken through 10th Malaysia Plan (10th-MP, 2011). Based on the preceding and the need to understand developing countries experiences, this research study was poised to explore the effects of open innovation activities headed for the firm's innovation performance within the furniture manufacturing SMEs (FMSMEs) sector and to understand the impact of government intervention towards the relationship.

1.3 Furniture Manufacturing SMEs (FMSMEs) Malaysia

Starting in the 1980s, the Malaysian furniture industry has imitated and transformed into a technologically-advanced multi-billion ringgit industry today. From a mere RM32.4 million of exports in 1980, wooden and rattan furniture is today's star performer in Malaysia's wood-based exports, registering RM6.3 billion in 2014. Ranked as the 10th largest exporter of furniture in the world, Malaysia exports around 80% of its furniture production. One of the main reasons for this is the availability of vast natural resources, particularly timbers from forest plantations like rubber wood and acacia. The furniture industry continues to experience a strong global demand despite economic downturns. Malaysia is a respected supplier in the global furniture industry, particularly to the US, Japan and Australian markets.

Currently as in 2016, the manufacturing sector in Malaysia consists of three important sub-sectors that contribute to the Industrial Production Index (IPI) as shown in Figure 1.1 i.e. electrical and electronics (9.1%); petroleum, chemical, rubber and plastic (5.0%); and the highest and most important is wood products, furniture, paper products and printing that denotes 10.1% (DOSM, 2014). Altogether, the manufacturing contributes to the IPI growth of 4.7%. Based on above IPI value, furniture manufacturing sector is important in Malaysia's economic development in the current and future prospects.

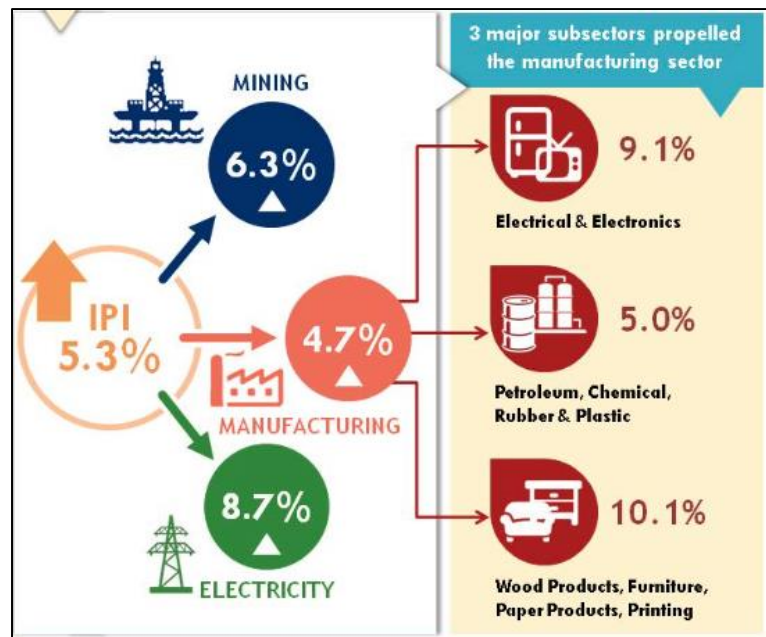


Figure 1.1: Malaysia's Industrial Production Index (IPI)

Source: DOSM (2014)

Zooming into the sub-categorical of furniture manufacturing, Figure 1.2 show the detail parts of its import for the duration of January-April 2016. The majority of the imported products are wooden furniture and seats and its parts which denotes RM280.2 million and RM292.9 million, respectively (DOSM, 2014). Further, based on high importation value, it is showing that the importance of local manufacturers to increase production and quality products to fulfil local market needs.

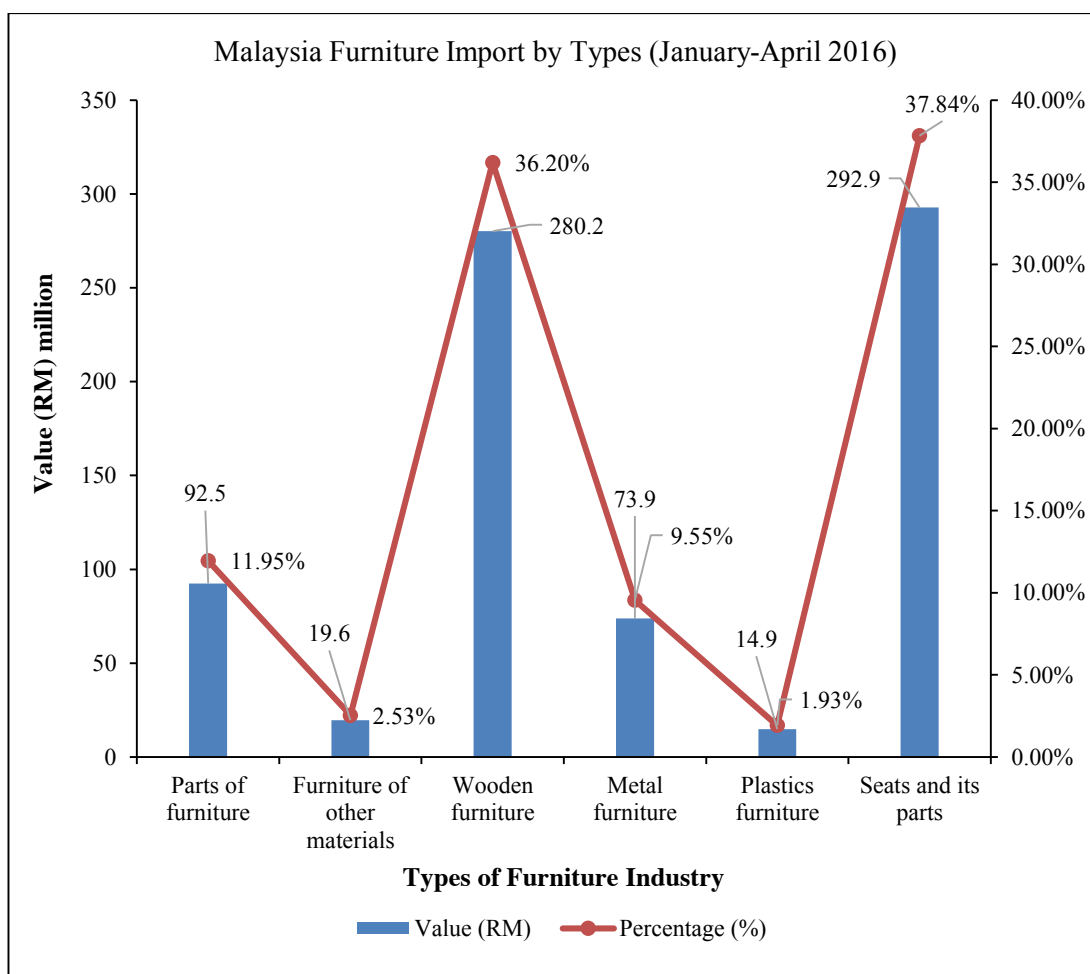


Figure 1.2: Malaysia furniture import by types (January-April 2016)

Source: DOSM (2014)

Furthermore, as shown in Figure 1.3, Malaysia's furniture export shows an incremental trend on yearly basis, with export in 2016 slightly higher than 2015 in overall. The highest export were recorded in January 2016 which valued at RM914.8 million, while the lowest are at February 2015 denotes RM529.3 million (DOSM, 2014). Accordingly, this export trend stimulate the importance of furniture sectors to Malaysia's GDP as well as an effort should be taken to increase its performance and output capabilities.

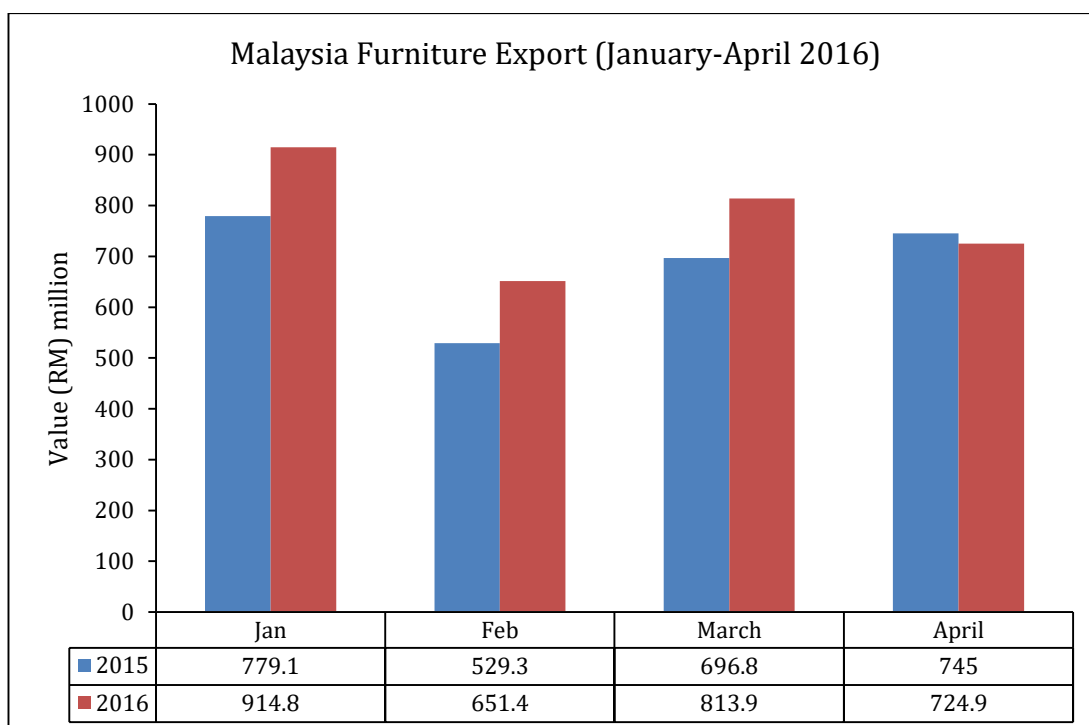


Figure 1.3: Malaysia furniture export (January-April 2016)

Source: DOSM (2014)

Realising the importance of furniture industries for economic development, Malaysian government continues their effort in helping furniture sector growth by providing incentives i.e. pioneer status for tax exemption and investment tax allowance, which facilitated a business-friendly environment (SME, 2014/15). Moreover, according to Malaysian Timber (2016) since 2005, the government has executed a specific forest plantation programme, with the aim of establishing 375,000ha of forest plantation by the year 2020. Once fully implemented, every 25,000ha of forest plantation is capable of supplying an estimated five million of timber. This steady and sustainable source of raw materials has placed the Malaysian furniture industry on a solid footing, reducing pressure on the country's natural forests (Malaysian Timber, 2016) and also enabled the authorities to manage and nurture Malaysia's natural forest resources partly for the supply of high grade timber and partly as conservation parks which are totally protected to be the nation's natural heritage for many generations to come. Efforts are continuously being made to eradicate illegal practices in both natural and plantation forests, and to further enhance the legality of Malaysia's timber-based sources for better industrial output (Malaysian Timber, 2016).

In a technological innovation aspect review of FMSMEs, Ratnasingam et al. (2013) and Harun et al. (2014) explain that the level of technology employed by the Malaysian furniture industry is on par with other countries which manufacture furniture, if not higher. The MTC (1998) has stated that most of the country's furniture manufacturers have invested considerably in machinery and equipment. Such investments may not be impressive by the standard of other high-tech industries such as the electronics sector, but the amount invested nevertheless indicates that the industry has moved beyond the traditional woodworking mills and carpentry shops.

In an aspect of innovation activities in furniture manufacturing, according to Aziz and Samad (2016) the types of innovation that are suitable for furniture firms include product innovation (new/ improvement of products or services); process innovation (new/ improvement of processing technology to increase effectiveness and efficiency); organizational innovation (new/ improvement of management and human capital structure); and market innovation (improvement of marketing approach or promotion). Some researchers suggest that SMEs can get even more benefit if they develop, communicate, embrace and explore the innovation orientation (Saunila and Ukko, 2014). While, as noted by Chaston (2013) the implementation of innovation in small and medium furniture industries is often formed by the informal search process, informal knowledge, and intangible assets. Although they are more flexible in initiating innovation, especially in response to changes in customers' need and the environmental condition (Higón, 2016), they have limited ability to innovate compared to the large firms. The possible reasons are because the large firms have proper facilities, bigger network structure, larger availability and access of resources and capabilities, thus, provide them a better place to develop and exploit new technology as well as possess an ability to benefit from economies of scale (Higón, 2016).

Meanwhile, in respect to local furniture manufacturing SMEs Ratnasingam et al. (2013) stated that the sources of innovation in furniture industry must cover the external factors (such as customer desire and awareness) and internal factors (such as management, human capital, processing and new product development (NDP) and technology) to fulfill the development requirement of innovation in Malaysian wood-

based industry. Malaysian wood-based industry should start with the incremental innovations as the starting phase to build a confident and positive movement and consequently shaping a systematic development progress of innovation process from time to time (Ratnasingam et al., 2013). In this early stage, Malaysia should begin to emphasise more on the aesthetics innovation and innovation of use (SME, 2014/15). The approaches in these two types of sources innovation is believed could minimise the costs, time and compatible with existing manufacturing processes and current technology industry (Dogan and Wong, 2010, Doll and Vonderembse, 1991).

The drivers of innovation in FMSMEs are emerging technologies that leads to technology innovation, acquisition or technology-driven process, competitor actions, which encourage advancement of value creation market-driven, especially community toward green concept (Ratnasingam et al., 2013, SME, 2014/15, Govindaraju et al., 2013). Additionally, new ideas or knowledge from external parties such as customers, strategic partners, and employees, which involve the total workforce; and emerging changes in the external environment also helps the FMSMEs to innovate and perform better.

In a summary, furniture manufacturing sectors in Malaysia plays an important role to increase GDP, import and export value, as well as employment rate. Putting more concisely, by 2020, the Malaysian government aims to achieve an estimated RM53 billion of timber-based exports, of which RM16 billion is expected to be contributed by the furniture industry (SME, 2014/15, DOSM, 2014). Considering this, the researcher will investigate the open innovation factors that could be practised by the furniture manufacturing industries to perform better.

1.4 Problem Statement

Malaysia has been setting and achieving its millennium goals since its independence in order to meet its economic challenges through entrepreneurship development and SMEs have been a major player behind this success (Taghizadeh et al., 2017, Zabri et al., 2014). According to SME Census Report by Department of Statistics Malaysia (DOSM, 2014), SMEs make up approximately 97.3% of the total enterprises in Malaysia, where the majority of them are established in the service sector (86.5%) and 13.5% in the manufacturing sector, while FMSMEs denotes 6.07% (total percent in the manufacturing sector). These SMEs have been accounted for overall 43.5% output and 47.3% value added from all the three sectors of services, manufacturing and agriculture (SME Annual Report, 2010/2011). It had been found that these established SMEs and young SMEs in this region can play an important role in providing linkages with the larger firms in nurturing the economic growth of the country (10th-MP, 2011).

Malaysian government, while recognising the essential role of SMEs as one the important keys of national economic development, has laid greater importance on building the capability and capacity enhancement of the SMEs in the region (SME, 2014/15). Moreover, with the growing significance of manufacturing SMEs at both global and national level, Malaysian government sturdily assist technology-based firms with the financial as well as non-financial support (Kamarudin and Sajilan, 2013). The large-sized manufacturing industries has shown remarkable results in terms of elevating the regional economy, technology transfer, skills development, providing job opportunities and building linkages with educational institutes (Perkmann et al., 2013, Nguyen et al., 2014). Identifying the importance of manufacturing based ventures for technological and economic thrust of the national portfolio, Malaysian government intends to incorporate manufacturing SMEs in the development of its 12 National Key Economic Areas (NKEAs) for making Malaysia a future's hi-income state (10th-MP, 2011). Hence, endeavours to push hard the technology transfer and adoption facilitation programs for SMEs are being emphasised, in order to combine the benefits of both technological developments and capacity building of SMEs thereby making them to compete better in the domestic and global markets (SME,

2014/15). However, even after astounding importance of manufacturing sector in this region and role of SMEs in this regard, little research are found to identify critical success factors related to furniture manufacturing SMEs in economic growth of Malaysia (Fadzline et al., 2014, Abdul Hamid et al., 2015).

On the other hand, literature related to SMEs development clarifies that with all their potential for innovation and GDP growth, these firms are generally characterized by their lack of formal strategic approach, linkages, finance and specific entrepreneurial attribute, are susceptible to less growth of innovation and the short and in the long run (Mokhtar et al., 2014, Zabri et al., 2014, Mustapha et al., 2016). Malaysia with conducive domestic market, advancements in technology and healthy business environment has great potential for manufacturing SMEs to nurture and achieve greater firm's sustainability and performance (Md Noor et al., 2013, BinOthman, 2013, NIS, 2012). On the other hand, Malaysia's successful endeavours to enlist among the innovation-driven economies of the world greatly reside on establishment as well as enhanced competitiveness of knowledge SMEs (10th-MP, 2011, SME, 2014/15).

Therefore, innovation is considered as an economic stimulus and technological process and has been invariably discussed as an integral part of a business entity (Johnson, 2014, Parrotta et al., 2013, Wang and Warn, 2013, Mueller, 2013). Innovative activities that interrelate open innovation are reckoned to be productive activities directed towards any system, process or product transition from a lower level to a higher level (Wang and Warn, 2013). These transformations aim to meet the changing needs of society or consumer, keep up in the competition with other market parties and most importantly, accelerate the countries' economy. Modern countries around the world has proved that through innovation, they manage to drive their economy to the distinct level. Malaysian organisations, in correspondence with the Vision 2020, are not exceptional to continue practising the innovation concept within their firms in order to become more competitive, reliable and successful.

FMSMEs are hence, a potential source of realising the Vision 2020 ascribed in 10th Malaysian Plan regarding expedited value added exports. However FSMEs in context of open innovation literature as well as practice, so far scarce and is in its early stage in Malaysia (Md Noor et al., 2013). Moreover, to the knowledge of the researcher, no research have been done to identify the factors associated with open innovation and its contributions in FMSMEs in this region. Furthermore, regarding manufacturing SME in developing and transitional economies, there is a big theoretical as well as empirical gap in investigation of their performance in effect of open innovation activities (Parida et al., 2012, Mohammed Yusr et al., 2014, Govindaraju et al., 2013, Md Noor et al., 2013) and there are calls for the study in this context (Parida et al., 2012). Thus, this research will focus on the FMSMEs to identify the role of open innovation activities and its consequences on firm's innovation performance.

In addition, to meet the economic challenge as set forth in Vision 2020, Malaysian SMEs are urged to take advantage of government supports to bring more innovation and performance oriented and to contribute effectively in national GDP (SME, 2014/15, 10th-MP, 2011). This support such as innovation grant scheme, technical and service support, and tax reductions channeled through government agencies, however, limited empirical evidence of the effects of government support towards firm's performance, urge the need to investigate its effectiveness of government support in enhancing firm performance (Wei and Liu, 2015, Rocha, 2014) while it is important for the government to understand and to efficiently plan the support distribution in the future. Moreover, facilitation and support from government (i.e. financial aid, tax exemption and technical support) continues being a thoughtful for SMEs, particularly micro-enterprises due to their limitation of resources i.e. financial, facilities and human capital compared to larger firm size (Md Noor et al., 2013, Mohamed, 2013). Thus in addressing aforementioned issues, this study is using government support as a moderator to analyse the intervention effects in enhancing the relationships between open innovation activities and firm performance.

Finally, comparisons of innovation-based study regarding firm's performance, innovativeness, and open innovations across different categories such as SMEs and large firm are highly notable in providing insight to current industries' economic landscape (Hashi and Stojčić, 2013, Parida et al., 2012, Birkinshaw and Fey, 2000). However, scarce analysis in innovation field, mainly on open innovation (Awang et al., 2014, Zanjani et al., 2013, Md Noor et al., 2013) when comparing within the SMEs i.e. across demographic since SMEs consists of three types of companies, namely micro, small and medium enterprises. The importance of having this analysis is to encourage the policymakers to gain a greater view on how different sizes or categories of the firms within them could perform differently in innovation performance. Thus, this study will investigate the relationship between demographic and open innovation activities in FMSMEs.

1.5 Research Questions

In order to achieve the aforesaid research objectives, four research questions are designed for this study as shown below:

1. What is the factors of open innovation activities that influence firm's innovation performance of FMSMEs?
2. What is the relationship between open innovation activities of FMSMEs and their firm's innovation performance?
3. What is the impact of the government support as a moderator on the relationship between open innovation activities of FMSMEs and their firm's innovation performance?
4. What is the relationship between demographic variables (firm's age, total number of staff and annual turnover) of FMSMEs and their innovation performance?

1.6 Research Aims and Objectives

In light of the aforementioned research problem, the aim of this research is to examine the effect of open innovation activities on firm's innovation performance of FMSMEs. This research also highlights the role of government support in moderating the relationships between open innovation activities and firm's innovation performance, and investigate the relationship between firm's demographic variables and open innovation activities. Thus, the researcher focused this study on the FMSMEs firms to answer the following objectives:

1. To identify the factors of open innovation activities that influence firm's innovation performance of FMSMEs.
2. To study the relationship between open innovation activities and firm's innovation performance of FMSMEs.
3. To study the moderating effects of the government support on the relationship between open innovation activities and firm's innovation performance.
4. To ascertain the impact of firm's innovation performance of FMSMEs based on their demographic variables (firm's age, total number of staff and annual turnover).

1.7 Significance of the Study

The present study is specifically an attempt to attend call for the issues related to theoretical complexity and inconclusiveness of open innovation activities and firm performance within FMSMEs, with the moderating role of government support and specifically in emerging countries like Malaysia. The study has both theoretical as well as practical significance for the government agencies entrusted with the task of SMEs development and firm's management.

1.7.1 Theoretical Contributions

The present study would make several contributions to the literature on open innovation and performance of manufacturing firms in Malaysia. The findings of the study will grant empirical evidence on the relationship between variables, which is open innovation activities such as knowledge acquisition, outsourcing and firm's innovation performance. Although these variables were widely studied for decades, they were studied separately in different researches. The strength of the present study is that the researcher investigates these various variables in an integrated model that consists of independent variables (open innovation activities), moderator (government support for innovation), and dependent variables (firm's innovation performance).

This study also investigates the role of government support in moderating the relationship between open innovation of manufacturing SME and firm performance. By including government support as a moderator, this research explores the encouragement aspect in buffering the firm's innovative performance. The research on government support in an open innovation is still new and scarce. Since the introduction of innovation, government support has become a mainstream focus of closed innovation research. With the inclusion of government support, this research explores the gap within context of manufacturing SMEs in open innovation activities by investigating various government supports as an enhancer.

1.7.2 Practical Contributions

Practically, the research findings may have a significant contribution to the industrial and business organisations, generally for manufacturing SMEs, and exclusively for furniture industry. This research aims to provide an empirical evidence regarding effect of open innovation activities' implementation on firm's innovation performance. The findings obtained will further shed light on the underlying processes among the manufacturing SMEs if they implement the open innovation activities in their organisations. In addition, the finding will help to give organisations a picture

regarding the issues that exist in open innovation activities, how it influences the innovation process and capability of manufacturing SMEs, and how it can be utilised efficiently to improve firm performance.

Furthermore, envisaging significant role of government in the research model, findings will generate practical suggestions for the government agencies and policy makers for fostering open innovation among manufacturing SMEs in Malaysia. Moreover, the findings of quantitative investigation will offer the policy makers a wider understanding of the current and prospective level of its contribution or support towards the manufacturing SMEs to foster innovation and performance and finally, contribute to economic growth of Malaysia.

1.8 Scope and Delimitation of the Study

This study is specifically designed to focus on identification and evaluation of open innovation activities affecting firm performance of FMSMEs in Malaysia and role of government support in this regard. In pursuit of carrying out this research, data was collected from the FMSMEs firms located in Johor Bahru region as it is the largest contributor of furniture exporter and major industrial furniture zones of Malaysia (DOSM, 2014).

Random sampling scheme is employed to select a sample size of 880 manufacturing SMEs involved in furniture industry established a year or more from the population of 37,861 from Department of Statistics Malaysia (DOSM) listed manufacturing SMEs. FMSMEs are taken as a unit of observations, and mail survey method is used to contact them for data collection. Data analysis is made by using hierarchical multiple regression and PROCESS macro by Hayes (2012) as the most appropriate tool and for their capacity to deal with the complex models including moderation analyses (Hayes, 2012, Hopwood, 2007).

With all its strengths regarding theoretical novelty and rigorous quantitative research methodology, this study owns some limitations too. First, the mail survey method is used for data collection which is inherently associated with low response rates (Fowler Jr, 2013, Dillman et al., 2014). However, this risk is covered by regular follow-ups as well as personal visits where possible. Second constraint is related to our choice of areas selected for data collection. The sample collection from selected industrial state may offer generalizability challenge, although the choice made is justifiable in terms of their popularity and dense inhabitation of SMEs.

1.9 Operational Definition Key Terms

For the purpose of understanding comprehension of this study, this section describes some of the innovation terms of the study as Table 1.1 below:

Table 1.1: Operational Definition

| No | Term | Description |
|----|-----------------------|---|
| 1 | Innovation Activities | Innovation activities are all scientific, technological, organisational, financial and commercial steps which actually, or are intended to, lead to the implementation of innovations. Some innovation activities are themselves innovative; others are not novel activities but are necessary for the implementation of innovations. |
| 2 | Product Innovations | The introduction of goods or services that is new or significantly improved with respect to its characteristics or intended uses. This includes significant improvements in technical specifications, components and materials, incorporated software, user friendliness or other functional characteristics. Product innovations can utilise new knowledge or technologies, or can be based on new uses or combinations of existing knowledge or technologies. |

| No | Term | Description |
|----|--------------------------------------|--|
| 3 | Process Innovations | The implementation of a new or significantly improved production or delivery method. This includes significant changes in techniques, equipment and/or software. Process innovations can be intended to decrease unit costs of production or delivery, to increase quality, or to produce or deliver new or significantly improved products. |
| 4 | Organisational Innovations | The implementation of a new organisational method in the firm's business practices, workplace organisation or external relations. Organisational innovations can be intended to increase a firm's performance by reducing administrative costs or transaction costs, improving workplace satisfaction (and thus labour productivity), gaining access to non-tradable assets (such as non-codified external knowledge) or reducing costs of supplies. |
| 5 | Marketing Innovations | The implementation of a new marketing method involving significant changes in product design or packaging, product placement, product promotion or pricing. Marketing innovations are aimed at better addressing customer needs, opening up new markets, or newly positioning a firm's product on the market, with the objective of increasing the firm's sales. |
| 6 | Research and Development Innovations | R&D are research and development activities that comprise creative work undertaken on a systematic basis in order to increase the stock of knowledge, which could then be used to devise new applications. |
| 7 | Significant Improvements | This is where existing products go through changes either in materials, components and other characteristics that will enhance the product or service performance. |
| 8 | Closed Innovation | Innovations developed internally by the company itself or company's group. |
| 9 | Open Innovation | Innovations developed jointly (with other companies or institutions) or mainly by other companies or institutions. |

| No | Term | Description |
|----|--|---|
| 10 | Breakthrough/ Radical Technology Innovation | Results in a product that is so superior that existing products are rendered non-competitive. |
| 11 | Knowledge Acquisition | The process of knowledge searching and obtaining from outside of the firms for product, process, marketing or organisational innovation activities. |
| 12 | Outsourcing | The process of appointing third party to conduct product, process, marketing or organisational innovation activities on behalf of the firms. |
| 13 | Collaboration | The activities conducted through a joint effort by two or more firms to conduct product, process, marketing or organisational innovation together based on mutual agreement. |
| 14 | Firm's Innovation Performance | The measurement of the firm's performance based on innovation criteria such as speed of innovation such as a new or significantly improved product to the market, R&D expenditure, and rate of breakthrough or radical technologies produced by the firm. |
| 15 | Government Support | Technical supports or financial incentives given by the government to nurture and encourage innovation activities in the firms. |

Source: Oslo (2005), Lee et al. (2016), Chesbrough (2006)

1.10 Structure of the Study

In-depth review of the extant literature on the major constructs of the study (open innovation activities, government support and firm's innovation performance) has been provided in the Literature Review Chapter 2. The review of the general studies related to all these constructs are especially delineated regarding focus on Malaysian furniture manufacturing SMEs. Moreover, the proposed research framework has also been illustrated in detail with the developed hypotheses.

The theoretical framework and related hypotheses have been derived after expansive assessment of the innovation literature and succeeding identification of research gaps. The methodological stance of the study is explained in chapter three, where a comprehensive elaboration of the chosen methodology includes details regarding tools and techniques used to carry out this research (See Figure 1.4).

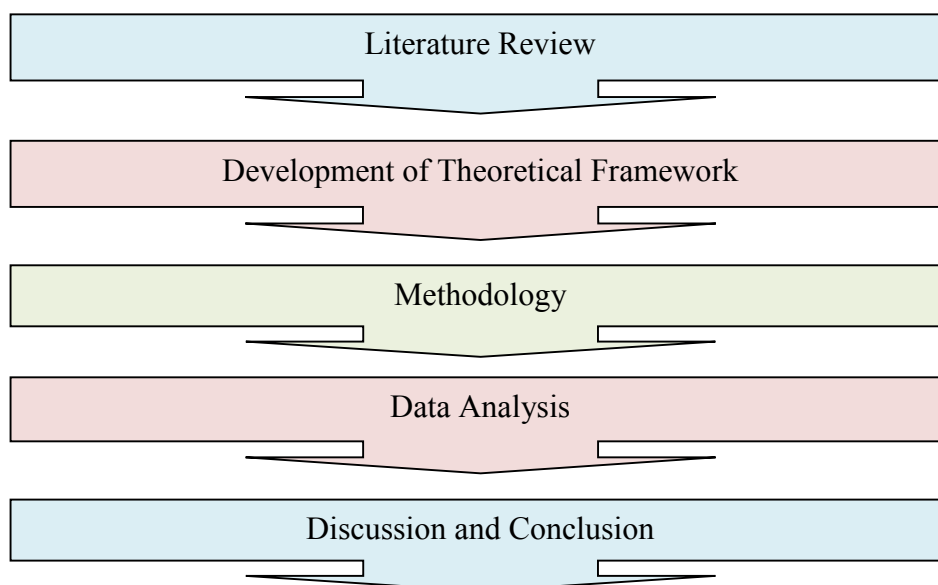


Figure 1.4: Structure of the Study

1.11 Summary of Chapter

In recent years, increased competitiveness has resulted in adoption of open innovation by many firms across the world. Open innovation has been found to have the ability to speed up and help the innovation process, in turn for growth and higher productivity of the firms. The current chapter provided details regarding the background of the study, which was used for formulation of the problem statement. In addition, the chapter provided the details regarding research objectives and questions, significance and scope of the study.

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