THE EFFECT OF FIRM STRATEGIC ORIENTATION AND CAPABILITY ON NEW PRODUCT PERFORMANCE IN THE MALAYSIAN MANUFACTURING INDUSTRY

A thesis submitted in fulfilment of the requirement for the degree of Doctor of Philosophy

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DECLARATION

I certify that except where due acknowledgement has been made, the work is that of the author alone; the work has not been submitted previously, in whole or in part, to qualify for any other academic award; the content of the thesis is the result of work which has been carried out since the official commencement date of the approved research program; any editorial work, paid or unpaid, carried out by a third party is acknowledged; and ethics procedures and guidelines have been followed.

Noor Afzainiza Afendi

31 March 2020

DEDICATION

This thesis is dedicated to:

My beloved parents,

Haji Afendi Yazid

Hajjah Jeleha Abdullah

AND

My loving husband,

Rosfairin Rosdi

AND

My beautiful daughters,

Tsu Faye Nursarah

Tsu Faye Nursophia

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LIST OF ABBREVIATIONS

AMOS	Analysis of Moments Structures
BNM	Bank Negara Malaysia
CEO	Chie Executive Officer
CFA	Confirmatory Factor Analysis
CIS	Community Innovation Survey
EFA	Exploratory Factor Analysis
ETP	Economic Transformation Programme
GDP	Gross Domestic Product
GOF	Goodness-of-Fit
IDR	Indonesian Rupiah
KMO	Keiser-Meyer-Olkin Measure of Sampling Adequacy
MIDA	Malaysian Investment Development Authority
MIDF	Malaysian Industrial Development Finance Berhad
MIMOS	Malaysia's National Applied Research and Development Centre
MOSTI	Ministry of Science, Technology and Innovation, Malaysia
NDP	National Development Policy
NEM	New Economic Model
NEP	New Economic Policy
NPD	New Product Development
NPP	New Product Performance
NSDC	National SME Development Council
NSI	National Survey of Innovation Malaysia
OECD	Organisation for Economic Co-operation and Development
PDMA	Product Development Management Association
PICF	Participation Information Consent Form
PMO	Proactive Market Orientation
RBV	Resource-based View
RMO	Responsive Market Orientation
SEM	Structural Equation Modelling
SGD	Singapore Dollar
SIRIM	Standard and Industrial Research Institute of Malaysia
SME	Small-medium Enterprises
SPSS	Statistical Package for the Social Sciences

PUBLICATIONS AND CONFERENCE PRESENTATIONS

Afendi, NA, Huang, X & De Waal, GA 2019, 'The Impact of Strategic Orientation and Firm Capabilities on New Product Performance in SMEs', paper presented to ISPIM Innovation Conference: Celebrating Innovation: 500 Years since Da Vinci, Florence, Italy, 16 – 19 June 2019.

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ABSTRACT

Small and medium enterprises (SMEs) have played a very important role in fostering growth, employment and income in the national economy of Malaysia. SMEs in Malaysia are critical to the economic transformation as they form the key domestic source of growth and the bedrock of private sector activity. Moreover, SMEs are also important in stimulating innovation and act as stabilizers of growth during the economic slowdown. In order to accelerate the growth of SMEs, it is important to understand the forces that drive the performance of these firms. It is widely reported that only through innovation can SMEs become competitive in the global market and among their competitors.

This thesis examines the relationship between the firm's strategic orientations (*market orientation, entrepreneur orientation and technology orientation*) and their new product performance in the Malaysian manufacturing industry and how such a relationship is mediated by a firm's capabilities (*marketing capabilities and technological capabilities*). This thesis also investigates how the relationships between a firm's capabilities and its new product performance are moderated by the exploitation and exploration (or ambidexterity) of such capabilities (marketing and technological capabilities). This thesis aims to identify the differences in new product performance and their influencing factors between *Bumiputera* and non-*Bumiputera* firms.

Based on the literature review and embedded in the Resource-based View (RBV) of the firm, a theoretical framework of new product performance was developed. A quantitative approach achieved the objectives and a survey technique was used to collect data from CEOs, Directors, Project Managers, Process Managers and Team Leaders of manufacturing SMEs in Malaysia. A total of 209 usable responses was received from a survey of 900 firms, and the proposed theoretical model was tested using analytical procedures, including confirmatory factor analysis and structural equation modelling (SEM). The effects, including direct, indirect, and total effects, among the factors, were calculated simultaneously, together with relationships between the observed variables and proposed factors. Hierarchical multiple regression was used to assess the effect of the moderating variable. A series of t-tests was used to examine the differences in product innovation between *Bumiputera* and non-*Bumiputera* firms.

The empirical results demonstrate that a firm's market orientation and technology orientation have a positive impact on new product performance. This research confirms that marketing capabilities do have a direct impact on new product performance. However, the effect of technological capabilities on new product performance is not significant, although positive.

The findings presented in this thesis also highlight that marketing capabilities serve as an indirect-only mediator (full mediation) for the relationship between market orientation and new product performance. Apart from this, technology orientation is also mediated by marketing capabilities in a complementary mediating effect (partial mediation) on the relationship between technology orientation and new product performance.

Another important finding of this research was that a moderation effect of the firm's technological capabilities exploration was found in the relationships between a firm's technological capabilities and its new product performance. There is also a moderation effect of marketing exploitation on the relationship between marketing capabilities and its new product performance in a significant, but negative way. One unanticipated finding was that the effect of entrepreneur orientation on new product performance was negative.

In term of differences in product innovation between *Bumiputera* and non-*Bumiputera* firms, the t-test results revealed that only new product performance differs significantly between these two groups of firms.

The findings presented here have implications for both theory and practice. Theoretically, this research extended a model of new product performance, on which can be beneficial to policymakers, managers and owners as a reference to the innovation policy and new product development. Practically, the results from this research can benefit SMEs in Malaysia, particularly, *Bumiputera* and non-*Bumiputera* manufacturing firms. A clear message for managers and owners is that they should focus on developing strong firm capabilities in order to achieve superior new product performance. The evidence from this research suggests that the level of firm capabilities is influenced by the three key resources of market orientation, entrepreneur orientation and technology orientation.

Key Words: innovation, SMEs, strategic orientation, firm capabilities, ambidexterity, new product performance

CHAPTER 1

INTRODUCTION

1.1 Introduction

This research examines the impact of strategic orientations and firm capabilities on new product performance in the Malaysian manufacturing industry. This research also identifies how the relationship between a firm's capabilities and new product performance is moderated by the exploitation and exploration (or ambidexterity) of a firm's capabilities. This chapter presents an overview of the thesis. The first section provides a background to the research, followed by the research questions, derived from the literature review in Chapter 3. The next section justifies the research, and is followed by two sections that describe the overview of the research methodology and research contributions. The last section provides an overall summary of the research.

1.2 Background to the Research

Small and medium enterprises (SMEs) have played an important role in fostering growth, employment and income in the national economy of Malaysia. This phenomenon is not an exception to Malaysia alone; SMEs are seen as the main actors in both national and regional development in many countries (Keskģn et al. 2010; Wang, Y 2016). In moving towards achieving sustainable economic growth, Malaysia has developed an important group of diverse and competitive SMEs that play an important role and are vital to the economic growth and overall production network. Ninety-seven per cent of business establishments in Malaysia are SMEs. These businesses are responsible for nearly 36 per cent of the country's Gross Domestic Product (GDP), 65 per cent of the country's employment, and nearly 18 per cent of Malaysia's exports (The World Bank, 2016).

SMEs also provide steady support for the growth of new industries (Malaysia SME Info, 2016). SMEs in Malaysia are critical to the economic transformation as they form the key domestic source of growth and the bedrock of private sector activity. They are

also important in stimulating innovation and act as stabilizers of growth during an economic slowdown. An example of this if the Gross Domestic Product (GDP) of Malaysian SMEs that expanded at an average annual growth rate of 6.8 per cent in the period 2004-2010, far above the average overall GDP growth of 4.9 per cent per annum (SME Masterplan, 2012-2020).

Although Malaysian SME growth has outpaced that of the overall economy, the country's target of 8 per cent SME growth through to 2020 will be difficult to maintain, given that the overall economy is growing only at about 5 per cent annually, according to Hafsah, Chief Executive of SME Corp Malaysia (The World Bank 2016). Productivity growth of Malaysian SMEs has slowed significantly after the Asian crisis which caused a decline in private investment, a shortage of skilled workers, and a lack of innovative activity (SME Master Plan, 2012-2020).

In order to accelerate the growth of SMEs, it is important to understand the forces that drive the performance of these companies. The SME Masterplan has highlighted six factors that influence the performance of SMEs (SME Corp Malaysia), namely: 1) innovation and technology adoption, 2) human capital development, 3) access to financing, 4) market access, 5) legal and regulatory environment; and, 6) infrastructure. Innovation has been considered the number one factor in the SME Masterplan. Currently, SMEs are not achieving high performance due to challenges faced in each of these areas (Ahmad, Noor Hazlina & Seet, Pi-Shen 2009; Rahman, Yaacob & Radzi 2016a). The Masterplan aims to address these challenges to unleash the growth potential of SMEs to achieve Vision 2020 (SME Corp Malaysia)[1].

Although all six performance levers in the Masterplan should be enhanced simultaneously, as shortcomings in any one of these levers can prevent SMEs from reaching their full potential, the Malaysian Government considers innovation and technology adoption the uppermost priority (SME Corp Malaysia). Only through

[1] SME Corp Malaysia is a specialized agency established to spur the development of SMEs by providing infrastructure facilities, financial assistance, advisory services, market access and other support programs.

innovation SMEs can become competitive in the global market and among their competitors.

The Ministry of Science, Technology and Innovation, Malaysia (MOSTI) surveyed manufacturing firms in 2015, to identify and categorise the innovative status of the companies. Details of the survey conduct March 2015 – March 2016 are provided by the National Survey of Innovation, Malaysia (NSI). Table 1.1 illustrates the innovative and non-innovative manufacturing firms. Criteria for innovative and non-innovative firms are:

i) Innovative – any firm that has conducted any of the innovation activities such as:

   a) Product innovation;

   b) Process innovation;

   c) Marketing innovation; and

   d) Organisational innovation.

ii) Non-innovative – any firm that has not undertaken any of the four (4) innovation activities during the period.

Table 1.1: Innovative and Non-Innovative Manufacturing Firms

Types of firms	Total	Percentage (%)
Innovative	469	68.87
Non-Innovative	212	31.13
Total	681	100

Source: National Survey of Innovation (2015)

Table 1.1 shows the Malaysian manufacturing firms' response to innovative and non-innovative activities. Overall, more firms are innovative and carry out innovation activities. The main concern is that a third of the two-thirds of manufacturing firms are not innovating. This issue needs to be addressed because innovation can contribute to the positive performance of the company, as is measured by their economic development (Camisón & Villar-López 2014; Guan & Yam 2015; Wang, Z & Wang 2012). Recent evidence suggests that to accomplish Vision 2020 and to transform Malaysia into a high-income nation through innovation and knowledge-based economy, SMEs, as the engine of growth and innovation, must be innovative and competitive at the global level.

In line with the Malaysian government's objective to maintain economic growth at 6 per cent annually and achieve a high-income and developed status in 2020, several initiatives have been taken including: developing an ecosystem that would create opportunities, enablers and funding for innovations; rationalising the role of government in business to balance between government and private sectors; developing SMEs; and, creating research universities to assist in creating innovative companies.

With regards to the size of the firms in the manufacturing sector under the NSI survey, 366 (78%) are small firms and, 69 (15%) are medium firms. The study addressed whether firms are innovative or non-innovative and reported on the level or degree of novelty of product innovation (Table 1.2).

The table depicts firms of all sizes, except large firms, and the new or significantly improved products introduced to the market, globally or locally by the manufacturing sector from 2012 to 2014. According to the type of novelty of innovation, 292 firms introduced their products as new to the company, followed by 187 firms who introduced their products as new to the market and four firms who introduced their new products as new to the world. The concern derived from the figures presented in Table 1.1 and Table 1.2 is that one-third of the manufacturing firms who do not

innovate at all, and among those that do, there are not many firms that introduced their new products as new to the world.

Table 1.2: Novelty of New Product of the Manufacturing Firms

The novelty of Product Innovation	**Number of Product Innovation**	
	Yes	**%**
New to the world	4	0.85
New to the market	187	39.87
Only new to the company	292	62.26
Total	483	

Source: National Survey of Innovation (2015)

The survey conducted by the NSI, indicates that small-sized firms (50.43%) introduced more, new or significantly improved products, than medium-sized firms (10.86%).

Apart from reporting on the novelty of the new product, the number of abandoned innovation activities before completion, for the period 2012 to 2014 are also reported. The findings indicate that the number of innovations abandoned within the period in manufacturing firms, had medium-sized firms recorded the highest percentage of 32.84 per cent compared to small-sized firms that recorded 27.92 per cent.

The importance of innovation to the national economy and business performance has been highlighted in business literature, reports and government policy (Rosli & Sidek

2013). Ample practitioner-oriented literature also suggests that to survive and thrive in hyper-competitive markets, innovation is the only key solution (Kim, WC 2005). Entrepreneurs or small business owners need to have an edge to compete against larger, well-established competitors through innovation, including product, service and process innovation and innovation in business models (Rosenbusch, Brinckmann & Bausch 2009), as well as open innovation (Vanhaverbeke 2017).

Ensuring an organization's sustainability means companies must continue to innovate within a context of global competitive pressure, shortened product life cycles and ease the threat of imitation. Innovation is a major factor that contributes to an organization's survival and sustainability. Nevertheless, innovation research in the Malaysian context is still under-researched. An inadequate effort has been devoted to research on SME innovation (Aziati et al. 2014).

It is evident that in an increasingly borderless world economy, which offers both opportunities and risks, only innovative firms, capable of meeting new challenges, can survive. Besides the problem of the under-researched innovation in Malaysian SMEs in general, the poor innovation performance in the Bumiputra (or indigenous Malay) firms has also been a severe concern for the Malaysian Government (Hashim, M 2000; Zain et al. 2012; Zainol & Daud 2011). The following section discusses the ethnic groups that operate in the Malaysian manufacturing industry.

1.2.1 Bumiputera and Non-Bumiputera Groups in the Manufacturing Industry

Malaysia's population comprises many ethnic groups, predominantly the Malay. In 2008, Malaysia had a multi-racial population of around 27.9 million, and by the end of 2017, the population was estimated at 32.0 million people (Mahidin 2017). The three major ethnic groups in Peninsular Malaysia are Malay, Chinese, and Indian. The Malays together with other indigenous groups of Malaysia are recognized by Malaysia's constitution as the 'sons of the soil' or the Bumiputera (Federal Constitution, 2010). Statistics on the Malaysian population by ethnic groups in 2010

were: Malay 50.1 per cent, followed by Chinese 22.6 per cent, Indigenous[2] comprising 11.8 per cent, Indian 6.7 per cent, and others 8.2 per cent (Swidi A et al. 2010).

The Malaysian government has launched several socioeconomic initiatives promoting the indigenous or Bumiputera in trade and industry since the 1970s, and through schemes such as the New Economic Policy (NEP) and National Development Policy (NDP). Although these initiatives, aimed to increase the participation of indigenous people in business ventures, Bumiputera economic development is still lagging in areas such as limited skilled workers, lack of creativity and knowledge, lack of strategic orientation of firms and innovativeness (Hanifah et al. 2017). Multiple ethnic groups operate in the Malaysian business arena and behave in unique ways, with certain ethnic groups dominating and operating in certain types of businesses.

Consequently, the share capital for non-indigenous (mainly Chinese) ownership has increased from 32.3 per cent in 1970 to 46.2 per cent in 1995. However, Indigenous or Bumiputra equity ownership has increased from 2.4 per cent to only 20.6 per cent over the same period (Zainol & Daud 2011). Overall, the participation of Bumiputra entrepreneurs in the economy is still low. Only 27.6 per cent or 283,200 of the total 1,026,100 registered companies in Malaysia in 2012 were Bumiputera (Malaysia 2012). Among them, 90.7 per cent or 218,930 of Bumiputera SMEs were micro-enterprises.

Recognizing the importance of innovation to the development of Bumiputera SMEs, the Malaysian government has implemented policies for promoting research and development (R&D) activities to facilitate Bumiputera entrepreneurs to improve product quality and standards. For example, a scheme comprising soft loans by the Malaysian Industrial Development Finance Berhad (MIDF)[3] for a minimum value of

[2] Under Article 153 of the Constitution of Malaysia, this category encompasses the natives of any of the states of Sabah and Sarawak and the legitimate interest of other communities in accordance with the provisions of the Constitution.

[3] Malaysian Industrial Development Finance Berhad (MIDF) is a statutory body under the Ministry of International Trade and Industry, Malaysia to promote the development of the nation's industrial sector through the provision of financing for manufacturing-based SMEs.

RM50, 000 and up to RM 5 million with interest of 4 per cent per annum for R&D has been granted to Bumiputera SMEs (Eleventh Malaysia Plan 2016-2020). These efforts are aimed at supporting Bumiputera SMEs in developing smart partnerships with R&D centres for their product and service innovation, and to comply with international standards and certifications.

Above all, prominent scholars suggest that variables such as market orientation and resources can influence new product performance (Day, George S 1994; Kohli, Ajay K. & Jaworski 1990; Montoya-Weiss & Calantone 1994; Narver & Slater 1990), though relatively little is known about the relative impact of a firm's orientation type on new product performance (Jeong, Pae & Zhou 2006; Yang, Y et al. 2012a). Understanding a firm's resources that are best used for business practices in the context of Malaysian SMEs, especially the manufacturing industry is critical if development is to accelerate.

The role of a firm's capabilities in terms of its performance outcome, such as firm performance generally and new product development performance more specifically is well established (Calantone, Roger J., Harmancioglu & Droge 2010; Morgan, NA, Vorhies & Mason 2009; Mu 2015; Vorhies, Douglas W., Orr & Bush 2011). It is the findings by Su, Xie, et al. (2013), Helfat (2000) and Ireland, Hitt and Sirmon (2003), that identify how the integration of technological capabilities and marketing capabilities is the best way to leverage these capabilities in the context of the Malaysian manufacturing industry. What is clear is that a deeper understanding of the importance of the firm's resources and capabilities in deriving excellent new product performance, especially in the Malaysian manufacturing industry is critical.

Besides, looking at the Malaysian context, the Bumiputera firms underperforming than non-Bumiputera firms. Could it be a problem of the Bumiputera does not have the economic structures required for business? All these points to the fact that all of the issues are the relevant and under-researched topic.

1.3 Research Objectives

This research investigates the significance of the relationship between strategic orientations (market orientation, entrepreneur orientation and technology orientation) and firm capabilities (marketing capabilities and technological capabilities) with new product performance in Malaysian manufacturing SMEs. In order to address the main objective, the research questions are formulated in the following section.

1.4 Research Questions

This research focuses on the important factors of, strategic orientations, firm capabilities, and firm ambidexterity that contribute to new product performance in the Malaysian SME manufacturing firms. These concepts are detailed in Chapter 3.

The primary research question is: What factors influence new product performance in Malaysian manufacturing SMEs? Specifically, this research attempts to address the following sub-questions:

RQ1: How do the strategic orientations of firms impact new product performance in Malaysian manufacturing SMEs?

RQ2: How do the marketing and technological capabilities of SMEs impact new product performance?

RQ3: Do firms' capabilities mediate the relationship between strategic orientations and new product performance?

RQ4: Does firm ambidexterity moderate the relationship between firm capabilities and new product performance?

RQ5: What are the similarities and differences in factors influencing new product performance between the Bumiputera (Malay) and non-Bumiputera firms in Malaysia?

1.5 Contribution to the Research

This research contributes to the existing literature both theoretically and practically. From a theoretical perspective, this thesis enhances our understanding of how a firm's

strategic orientation influences its new product performance by investigating the effects of a combination of strategic orientation dimensions and firm capabilities on such a performance. Furthermore, by exploring the moderating role of the exploitation and exploration of a firm's key strategic capabilities (marketing and technology), this research identifies the important mechanisms influencing the effects of a firm's ambidexterity and its strategic orientations and capabilities, on its new product performance.

This research demonstrates the direct relationships of a firm's capabilities on new product performance and indirect relationships of strategic orientations and new product performance through the mediation of firm capabilities, and their combined effects among the variables studied.

This research is also of practical significance to the managers/owners of SMEs and the policy implications in relation to the government in Malaysia. By investigating the impact of strategic orientations and firm capabilities on new product performance, this research assists SME managers/owners to develop a better strategy and, develop and deploy their firm's resources and capabilities in their new product development for better performance of these products.

Another potential contribution of this research is that it identifies the similarities and differences in innovation performance and the influencing factors between Bumiputera and non-Bumiputera SMEs. Undoubtedly, such findings can serve as a starting point in building evidence to inform managers/owners in the Bumiputera firms to understand the areas requiring more attention if they are to create a competitive advantage for their firms.

With regard to the Malaysian government, the findings of this research provide guidelines that will assist policymakers in formulating appropriate and better-targeted policies for future programs, and assistance to both Bumiputera and non-Bumiputera SMEs. These initiatives can enhance new product performance in Malaysian SMEs,

specifically in the manufacturing industries that have been the bedrock of the country's economy.

Importantly this thesis provides relevant information and recommendations to assist managers/owners in developing and improving their strategic orientations and firm capabilities involved in the new product performance not only in Malaysia, and also to SMEs elsewhere in the world provided more research is needed that include study samples that represent some populations of interest from the larger population in the correct proportions.

1.6 Overview of the Research Methodology

This research predominantly applies a deductive research design through a quantitative survey for its primary data collection as it seeks to develop and validate a theoretical model consisting of testable hypotheses. This methodology is also consistent with research operationalization based on positivist assumptions and considered appropriate for verifying hypotheses (Amaratunga et al. 2002).

A theoretical framework for new product performance is developed here based on the resource-based view (RBV) (Barney, Jay B. 1996; Barney, Jay B, Ketchen & Wright 2011; Wernerfelt 1984) (refer to 4.2). Specific testable hypotheses were then developed based on the literature review through logical arguments, consistent with the premise of a deductive approach (Edmondson & McManus 2007).

The theoretical framework consists of 11 testable hypotheses. This research examines several mediating and moderating effects on new product performance, thereby providing new evidence in support of or contradicting previous work, and generating new knowledge (Edmondson & McManus 2007).

The primary survey was carried out between July and December 2017, during which both postal and online self-administered questionnaires were distributed. A purposive sampling method was chosen because the choice of research participants was determined by the focus of this research. The sample of 900 firms included in the

survey represented manufacturing firms in Malaysia based on the currently available list provided by the Malaysian Investment Development Authority (MIDA). A total of 209 firms responded to the survey, a response rate of 23.2 per cent.

The data collected from the survey was analyzed using IBM SPSS Statistics version 24 for the descriptive analysis and t-test. Furthermore, structural equation modelling (SEM) using AMOS 24 was applied in testing the 11 hypotheses based on the framework of new product development adopted for SEM.

1.7 Outline of the Thesis

This thesis is organized into eight chapters (**Error! Reference source not found.**).

Chapter 1 introduces the background of the study and addresses the justification of this research. This chapter briefly outlines the research questions, provides a brief description of the research methods used and an overview of the thesis structure.

Chapter 2 examines the structure and contributions of SMEs and the manufacturing sector in Malaysia's national economy as the research context for this research. The definition of SMEs within the Malaysian context and its neighbouring countries is also discussed, as well as the importance of SMEs and the issues and challenges they face.

Chapter 3 is a review of the literature, focusing on product innovation, new product development and the influencing factors, particularly for SMEs. Based on an extensive literature review and integration, key knowledge gaps in new product development have also been identified.

Chapter 4 is the development of a theoretical framework for new product performance in the context of SMEs according to the resource-based view and the integration of the literature review. This theoretical framework is used as a guide to develop 11 hypotheses and study the findings of existing empirical research on new product development in SMEs.

Chapter 5 describes the research philosophies and research methodology employed in this research. A quantitative survey method was used to collect primary data from Malaysian manufacturing SMEs. The considerations for using quantitative techniques in developing and distributing the questionnaires are described and discussed here, including the development of research instruments, data collection procedures, and data screening. This chapter also presents the statistical results of descriptive data analyses and the reliability of the key variables. Participant characteristics, data screening and a preliminary evaluation are presented and explained.

Chapter 6 serves two objectives. Firstly, the chapter discusses the analytical method and procedures used and presents the empirical findings on the effects of strategic orientations and firm capabilities on new product performance, as specified in the theoretical framework developed in Chapter 4. With regard to hypotheses testing, AMOS 24 was used to evaluate both the measurement and structural models. The validity and reliability of the survey instrument are presented and discussed. Secondly, the chapter presents and discusses the results of the hypotheses testing for the mediating effect of firm capabilities on the relationship between strategic orientations and new product performance.

Error! Reference source not found. analyzes, presents and discusses the moderating effects of firms' ambidexterity (exploitation and exploration) on the relationships between firms' marketing and technological capabilities on new product performance. Using a series of multiple regression analyses, the results of these moderating effects are reported and discussed, with further testing of the hypotheses developed in Chapter 4. This chapter also describes the similarities and differences between the Bumiputera and non-Bumiputera firms in their new product development and performance.

Chapter 8 provides the conclusions, implications and contributions of the research findings. The research questions identified in Chapter 1 are revisited based on the results obtained. The contributions are discussed from both theoretical and managerial

perspectives. Finally, limitations of the study are identified, and recommendations for future research are proposed.

1.8 Summary

This chapter provides a general introduction and background of the research undertaken in this research, highlighting the issues Malaysian manufacturing firms are facing. This section established the context of SMEs in Malaysia, the multiple ethnicities that operate businesses and the reasons for product innovation being a critical area to understand. The next chapter (Chapter 2) will go into much greater detail on the manufacturing SMEs in Malaysia. The research questions are stated, and the research is justified. Finally, a brief discussion of the methodology used, and the research contributions of this research are presented.

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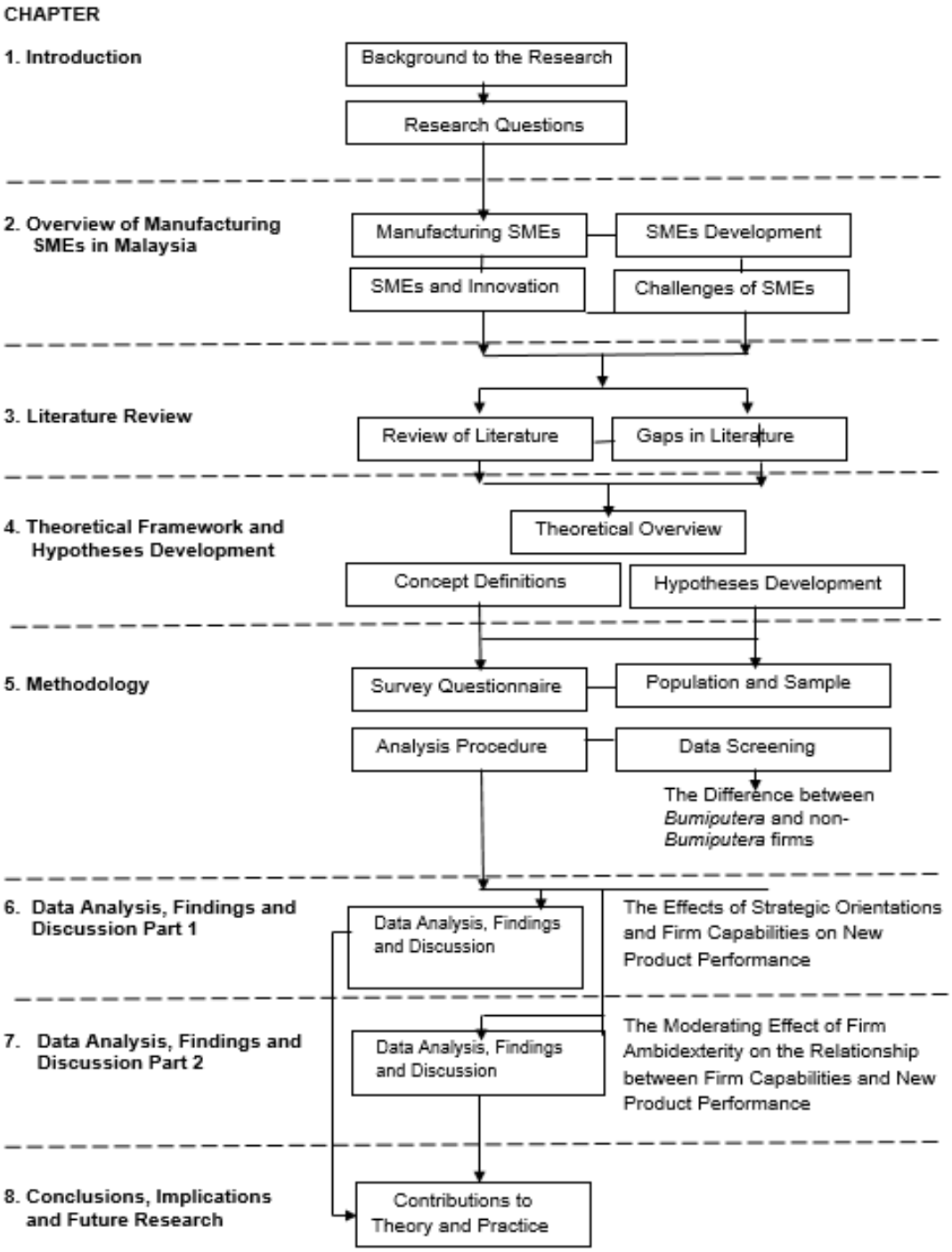


CHAPTER 2 OVERVIEW OF MANUFACTURING SMEs IN MALAYSIA

2.1 Introduction

This chapter begins with an overview of SMEs in the Malaysian manufacturing industry to provide the context of this research, as discussed in Chapter 1. The significance of the manufacturing industry such as the structure of the industry and its contributions to the Malaysian economy is discussed, followed by an analysis of Malaysian SMEs, innovation in the sector along with the challenges they face.

2.2 SME Contributions to the Manufacturing Industry

In Malaysia, SMEs operating in the manufacturing sector are mainly involved in activities such as processing and production of raw materials, for instance, textiles, food, beverages, wood, rubber, petroleum and the assembling and manufacturing of electrical and electronic appliances (Hilmi et al. 2010).

Malaysian SMEs, particularly in the manufacturing sector, play a very important role in the development of the economy. In 2016, manufacturing SMEs comprised 47,698 (5.3%) of the 907,065 SMEs and their contribution was 8.0 per cent to the overall GDP in 2017[4]. The role of SMEs operating in the manufacturing sector is crucial to the Malaysian economy, and job creation, contributing 31.2 per cent to total employment and is anticipated to increase considerably in the future (Kassim & Sulaiman 2011).

In terms of sectoral contribution to the national GDP by SMEs in 2017, the manufacturing sector was the second-largest contributor (21.5%) after the services sector (59.7%) to total SME GDP, followed by agriculture, construction and mining and quarrying. In 2017, the SME value-added in the manufacturing sector increased 6.8 per cent (2016: 4.8%).

Meanwhile, exports of SMEs in the manufacturing sector in 2017 contributed 47.2 per cent to total SME. This was supported by growth expansion in mineral fuel, inedible

[4] SME Annual Report 2017/18, source is from Department of Statistics, Malaysia

crude materials, animal, vegetable oil and fats products and lubricants and related materials. The major export destinations for SMEs in the manufacturing sector were Singapore which accounted for 18.3 per cent, followed by PR China (9.2%) and United States (US) (7.6%)[5]. Table 2.1 presents the profile of SMEs by sectors in Malaysia.

Table 2.1: Profile of SMEs by Sectors

Sector	Total SMEs	Percentage (%) of SMEs
Services	809,126	89.2%
Manufacturing	47,698	5.3%
Construction	39,158	4.3%
Agriculture	10,218	1.1%
Mining & Quarrying	865	0.1%

Source: SME Corp. Malaysia (2018)

Table 2.1 presents how the manufacturing sector adds more value per capita in terms of GDP output than the service sector. This data shows that the manufacturing sector has greater potential to be investigated as it has a larger contribution to the country's GDP.

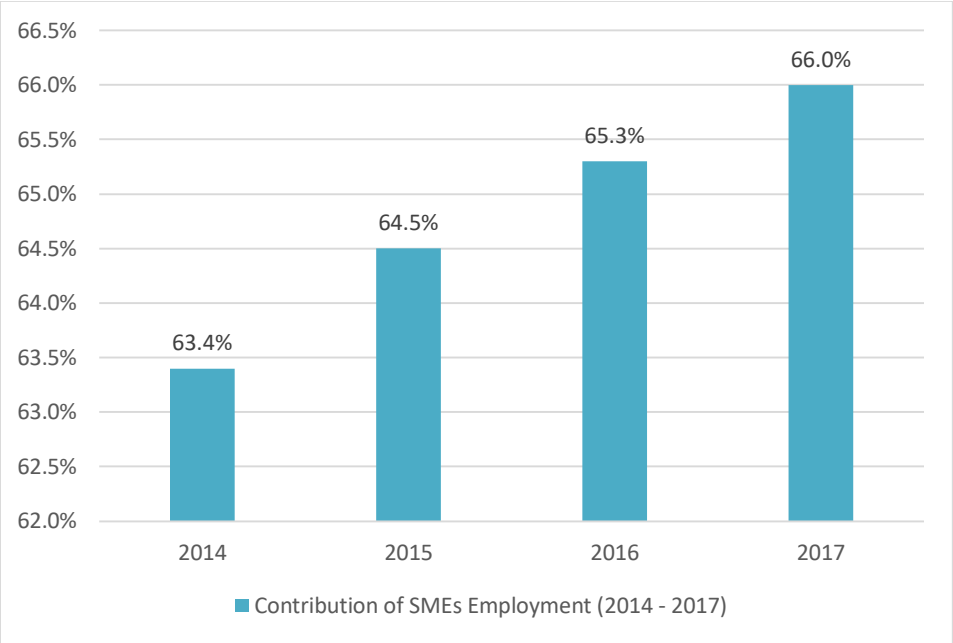
The influence of SMEs on the economy is evident in various aspects. In line with the trend in GDP growth of Malaysian SMEs, SMEs accounted for 66.0 per cent of total employment (2016: 65.3%) in 2017 as the employment of SMEs continued to increase with a growth of 3.4 per cent (2016: 2.1%). Due to a shift in employment from large firms to SMEs, the growth of SME employment was higher compared to large firms which remained flat at -0.01 per cent in 2017 (SME Corporation Malaysia 2018).

The expansion was propelled by the higher performance of SME employment which outpaced the momentum of national employment. The contribution of SMEs to total

[5] SME Annual Report 2017/18, source are from Department of Statistics, Malaysia

employment increased from 63.5 per cent in 2016 to 66.0 per cent in 2017. Figure 2.1 presents the contribution of SME employment for 2014 – 2017.

Figure 2.1: Contribution of SMEs to Employment (2014 – 2017)



Source: Department of Statistics Malaysia (2018)

The contributions of the manufacturing industry in Malaysia, asserts that it is worth investigating to provide a better understanding of how to help transform Malaysia into a high-income nation by 2020. This can also better help recognize the importance of SMEs to economic growth and their ability to provide job opportunities to the society.

The following two sections discuss the definition of SMEs in Malaysia and neighbouring countries followed by an overview of SMEs in the context of the Malaysian culture, economics and politics.

2.3 SMEs and how they are defined

Generally, there is no standardized definition of SMEs from a global perspective due to different criteria being employed in different parts of the world (Arokiasamy & Ismail 2009; Hooi 2006). The Malaysian government has adopted a common definition of

SMEs in various economic sectors or subsectors to facilitate efficient growth strategies, aid and support programs to the SMEs.

SMEs in Malaysia are generally defined based on fixed quantitative criteria such as the number of employees, amount of capital, amount of assets and sales turnover (Hashim, M 2000) and was endorsed at the 14th National SME Development Council (NSDC) Meeting in July 2013 to cover all sectors, namely services, manufacturing, agriculture, construction and, mining and quarrying (SME Corporation Malaysia 2019; SME Info 2019).

In 2014, the definition of SME was reviewed in order to define the target groups for support. This revision took into account variables such as price inflation; structural shifts; changes in employment and business trends; the simplicity of understanding and implementation; comprehensiveness of the definition in terms of coverage; and the significance of the definition until 2020 (Chin & Lim 2018; SMEMasterplan 2012)

The Malaysian SMEs' definition has been adopted for two sectors: manufacturing and services and other sectors. The qualifying threshold for the size of the operation of the establishment has been extended. According to the new definition provided by the SME Corporation Malaysia (SME Corp. Malaysia)[6], an establishment in the manufacturing sector is categorized as an SME if its sales turnover is less than RM50 million (≈ USD 12.3 million) or employs less than 200 full-time employees. Similarly, if the sales turnover of an establishment in the services and other sector is less than RM20 million (≈ USD 4.8 million) or if it employs less than seventy-five full-time employees, it is characterized as an SME (Arokiasamy & Ismail 2009; SME Corporation Malaysia 2019). Malaysian SMEs can also be categorized as: micro, small and medium. These categories are based on either the number of employees or the

[6] SME Corporation Malaysia (SME Corp. Malaysia) is the central coordination agency (CCA) under the Ministry of Entrepreneur Development Malaysia (MED) that coordinates the implementation of small and medium enterprises (SMEs) development programmes across all related Ministries and agencies.

total sales or revenue generated by a firm in a year. Table 2.2 provides definitions for the categories micro-, small- and medium-sized enterprises.

Table 2.2: Number of Full-time Employees and Sales Turnover of Malaysian SMEs

Size	**Micro**		**Small**		**Medium**	
	Sales Turnover	**Employees**	**Sales Turnover**	**Employees**	**Sales Turnover**	**Employees**
Manufacturing	< RM300,000	< 5 employees	RM300,000 < RM15 million	From 5 to < 75 employees	RM15 million ≤ RM 50 million	From 75 to ≤ 200 employees
Services & Others			RM300,00 < RM3 million	From 5 to < 30 employees	RM3 million ≤ RM20 million	From 30 to ≤ 75 employees

Source: SME Corp. Malaysia (2019)

This research uses the definition provided by SME Corp. Malaysia as it is currently used across all government agencies and other organizations related to SME development in formulating more effective policies and strategies.

2.3.1 SMEs and how they are defined in Neighbouring Malaysia Countries

A variety of measures have been developed to define SMEs in each nation. What constitutes an SME varies widely between countries. Some definitions take into

account the number of employees, annual revenue, or value of invested capital as criteria. In Malaysia, for instance, no standard definition of enterprises was in use before the formation of the National SME Development Council (NSDC) in June 2004.

Specifically, there is no common agreement on the difference between macro and small and medium-sized enterprises. The only common characteristic of SMEs is that they are “not large” and most SMEs are very small, and between 70 to 80 per cent of them hire less than five employees. Only a very limited number of firms, usually ranging from around one to four per cent, have more than 100 employees (Tambunan 2009).

Comparisons between countries is difficult because in different countries economic sectors define SMEs differently, based variously on number of employees, value of fixed or productive assets (excluding land and building), or annual revenue (i.e., Thailand) (Chittithaworn et al. 2011); in another country (i.e., Indonesia) definitions differ among departments or agencies (Setyorini, Pinasti & Rokhayati 2013). Malaysia defines SMEs differently in different sectors (i.e., manufacturing and services). Table 2.3 presents definitions of SME in Malaysia’s neighbouring countries such as Singapore, Thailand, Brunei, Indonesia and Vietnam.

Table 2.3: Number of Full-time Employees and Sales Turnover of SMEs in Malaysia's Neighbouring Countries

Country	Employees	Sales Turnover
Singapore	≤ 200 employees	≤ $ 100 million
Thailand		
Small	< 50 employees	< 50 million baht
Medium	51 to 200 employees	≥ 50 million baht to 200 million baht
Brunei		
Micro	1 to 5 employees	< SGD 1 million
Small	6 to 50 employees	> SGD 1 million to ≤ SGD 10 million
Medium	51 to 100 employees	> SGD 10 million to ≤ SGD 100 million
Indonesia		
Micro	< 5 employees	≤ IDR 300 million
Small	5 to 19 employees	

Medium	20 to 100 employees	IDR 300 million to < IDR 2.5 billion IDR 2.5 billion to < IDR 50 billion

Table 2.3 applies to all ministries of their own countries, yet, it is unclear whether definitions have been used consistently since. Malaysia does have a uniform definition that has been agreed and used across all government agencies.

2.4 An Overview of SMEs in the Context of the Malaysian Culture, Economics and Politics

In order to understand the current context of entrepreneurship in Malaysia, the historical practice of segregating economic activity along racial lines has to be established as this influenced Malaysia's economic history.

The British colonized a group of states in Malaya from the 18th and 19th century until the 20th century. The British implemented a practice under Malaya's foreign rule before independence in 1957 by segregating economic activity among the ethnic groups. The 'divide and rule' policy was introduced (Omar, A 2003; Simpson 2005; Sundaram 1989). During that period, tin mines and rubber plantations were major economic resources, and the British imported Indian workers for the Rubber Industry and Chinese workers for the Tin Mines Industry due to insufficient labour numbers. The wholesale and retail operations that supported the Rubber and Tin Industries were designed to favour the Indian and Chinese groups.

The Malays dominated the agricultural sector, and the only ethnic group permitted into the bureaucracy and few members of the upper class and the Royal Family were permitted to contribute to the government, and the majority of Malays (Bumiputera)[7]

[7] Bumiputera literally means "sons of the soil". This demographic group includes ethnic-Malays and indigenous people of Peninsular Malaysia, Sabah, and Sarawak under Article 153 of the Malaysian Constitution

were restricted to the low-income agricultural sector. The economic conditions for most Malays worsened due to the segregated economic situation among ethnic groups. The majority of Malays lived as farmers and thus earned a modest income (Ariff & Mohamad 1998).

As a consequence of this 'divide and rule' policy it became evident when the interethnic economic disparity between the predominantly Malays (Bumiputera) and predominantly Chinese non-Bumiputera triggered serious 'race riots' in the period May to July 1969. It was a spontaneous outbreak between Malays and Chinese – Malaysia's two largest ethnic groups (Gomez 2012; Soong 2008).

Representatives of the three main ethnic groups agreed that, upon independence, Malays would be granted certain "special rights" in the realm of religion, economics and politics. The main reason for this "positive discrimination" was to raise the status of the economically disenfranchised Malays and thus establish a more equitable society (Ariff & Abubakar 2003).

Then the Malaysian government developed the New Economic Policy (NEP) in 1971, which was binding between 1971 and 1990. This prominent policy reacted to the economic inequalities that occurred between the Malays and other races (particularly Chinese non-Bumiputera) who dominated the country's economic wealth (Ariff & Abubakar 2003; Gomez 2012). Concurrently, the policy also called for a fairer distribution of opportunities for Malays to participate in the widening range of economic activities.

Since then, the government has focused on the significance and growth of SMEs in Malaysia under the NEP, and further comprehensive commitments have been made. In 1992, the NEP was substituted with the National Development Policy (NDP) in order to compensate for the apparent ethnic differences through multiple enterprises including the development of entrepreneurship, managerial expertise and skills in the Bumiputera community (Athukorala & Menon 1999).

After this, the Malaysian government's commitment strengthened and so the Malaysian Industrial Plans were introduced in two phases, Simply Industrial Master Plan 2 (IMP2) for the period 2000 to 2005 and Industrial Master Plan 3 (IMP3) for the period 2006 to 2020 (Jamak et al. 2012). These plans provided a new approach to the growth of the industrial base and new opportunities for the development of SMEs.

Similarly, the government further strengthened its dedication to SMEs in 2004 by establishing the National SME Development Council (NSDC). The establishment of NSDC was intended to strengthen the government's promise to support the growth of SMEs in Malaysia and was managed by the Prime Minister with Ministers and Heads of Key Government agencies involved in SME development (Aris 2007). Numerous creative plans were introduced by NSDC through the SME Development Framework for 2015 – 2020 (NSDC 2015). The key creative plans are to:

- Approve a standard nationwide definition of SMEs;
- Outline an annual plan named the National SME Development Blueprint, later retitled the SME Integrated Plan Action (SMEIPA);
- Track the progress of SMEs and develop a comprehensive database;
- Forecast macro performance targets of SMEs for 2015; and
- Establish a devoted agency for SMEs, realized through the transformation of the Small and Medium Industries Development Corporation (SMIDEC) into the SME Corporation Malaysia (SME Corp. Malaysia) as the central organizing agency to modernize, organize, monitor and assess all SME development creativities.

In March 2010, the Malaysian government presented a New Economic Model (NEM) to make Malaysia a high-income advanced nation that is self-sustainable by 2020. To achieve this goal, domestic SMEs were an important factor (Unit 2015). One primary focus of the NEM was monitoring the unexploited potential of SMEs and converting them to be more competitive and stronger in the challenging business environment (NSDC 2015).

Malaysian SMEs are an important area in which the government is transforming the country from a middle-income economy to a high-income economy as stipulated in NEM, specifically through an Economic Transformation Programme (ETP) launched in September 2010.

A total of RM10.5 billion was spent in 2017 on 168 SME development programs benefiting around 600,000 SMEs across all sectors (Department of Statistics 2018). However, more is required to ensure Malaysian SMEs are on par with those in developed countries. To begin with, the new government in 2018 re-established the Ministry of Entrepreneur Development to stimulate the development of SMEs[8]. Figure 2.2 presents the development of SMEs in Malaysia starting from the year before independence in 1957.

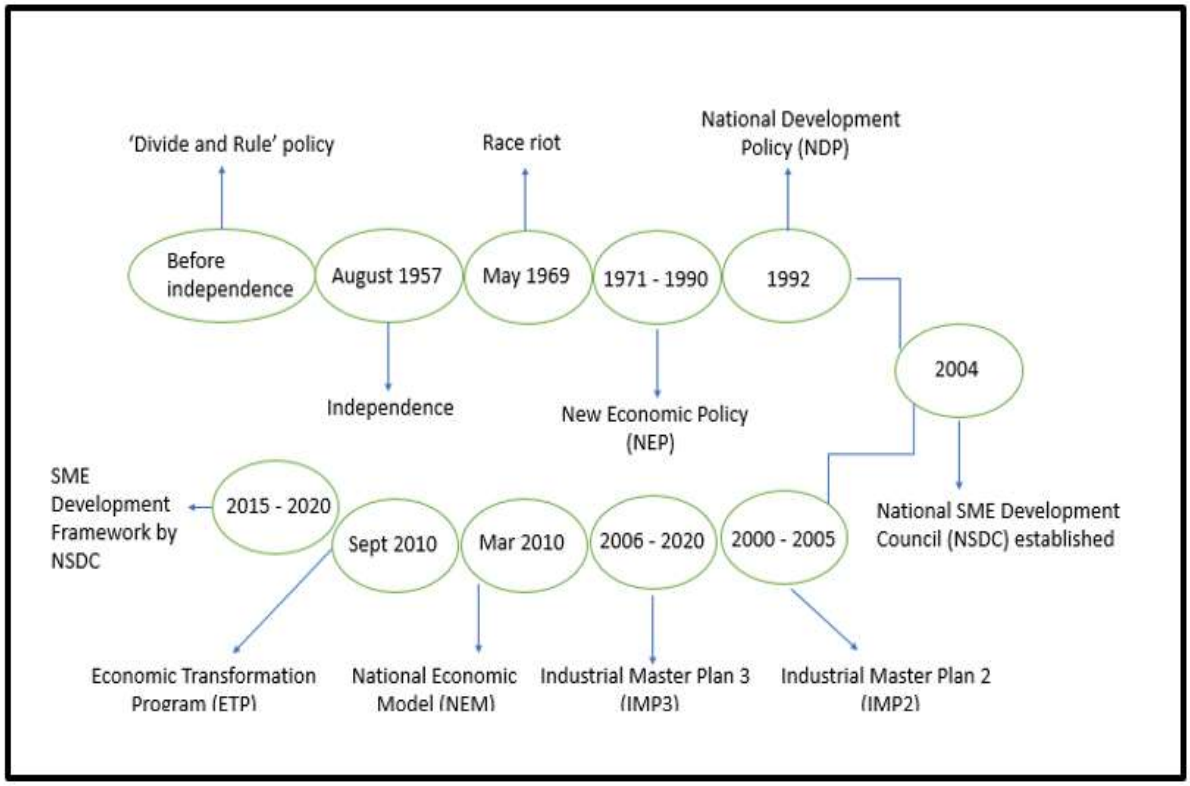


Figure 2.2: Chronology of SME Policy Development in Malaysia

[8] Message from YAB Prime Minister in the SME Annual Report 2017/18

Source: Author

Figure 2.2 presents a string of policies introduced by the government to assist the Bumiputera firms to be more competitive than the non-Bumiputera firms. Those policies increased Bumiputera progress in the modern economic sector. Eliminating the identification of ethnicity with economic function was important. Nevertheless, to establish equitable income as an economic foundation for sustainable development and national unity is still a challenging task for the government as the policies introduced for non-Bumiputera are more advanced than those for the Bumiputera (Lazim & Aman 2018).

SMEs are the 'backbone' of the economy in most countries. It is no different for Malaysia where SMEs play an important role in developing the country's economy in the long term (Shamsuddin et al. 2017)

The Malaysian economy has experienced a major shift over the last few decades, from agricultural to industrial. In the Malaysian economy, the role of SMEs is seen as supporting the economy, especially the manufacturing sector, which plays a very significant part in the growth of the economy (Khalique et al. 2011).

The importance of SMEs in Malaysia's economy is certain as the Economic Census 2018 indicated that 98.5 per cent of businesses established in Malaysia are SMEs, making their contribution to the Malaysian economy crucial (Abdullah, MA 2019). SMEs have a crucial role to play in developing a country's economy to create jobs for rural and urban labour, poverty reduction, and are a significant source of technological innovation and new products (Fida 2008; Muriithi 2017).

Given that, SME employment increased from 65.3 per cent in 2016 to 66.0 per cent in 2017 (refer to Figure 2.1). The SME GDP also increased to 38.3 per cent compared to 37.1 per cent in 2017 (Department of Statistics 2018). Despite recording an increase in export value from RM155.1 billion in 2016 to RM167.4 billion n 2017, SME contribution to total exports was lower at 17.3 per cent (2016: 18.6%) due to higher

export growth by large firms (Jaafar 2018). Value-added SME exports increased by RM12.3 billion to RM167.4 billion in 2017, compared with RM155.1 billion in 2016.

According to SME Corp. Malaysia, the encouraging performance was due to a more streamlined and coordinated approach to SME development and the effective execution of SME Masterplan projects. The target is for SME contribution to GDP to reach 41 per cent by 2020, with the contribution to the country's export reaching 23 per cent, and the employment of SMEs reaching 65 per cent of the total employment. SMEs can provide a powerful basis for the growth of new industries and strengthen current ones, for Malaysia's future development.

2.5 Innovation in SMEs

Small firms make a significant contribution to technological innovation and economic growth (Ackermann 2012; Andries & Czarnitzki 2014). Companies focusing on innovation achieve not only an increased competitive advantage but also can sustain them for a longer period. Innovation has been regarded as being the most crucial for today's globalized and competitive environment. Pursuing innovation is needed to succeed in today's increasingly competitive environment (Pisano & Teece 2007).

It has been suggested by researchers that SMEs have limited innovation capacity/potential as compared to larger firms (Oke, Burke & Myers 2007; Woschke, Haase & Kratzer 2017) due to limited resources – investment or knowledge, for R&D. (Ortega-Argilés, Vivarelli & Voigt 2009) and therefore is one of the reasons why many innovation SME projects are either abandoned or delayed (Radas & Bozic 2012).

Conversely, Kaufmann and Tödtling (2002) contended that SMEs are more innovative due to their heterogeneous character but are restricted in innovation capacity due to their limited resources. Likewise, Rosenbusch, Brinckmann and Bausch (2011) viewed that new SMEs benefit more from innovation than the mature organizations primarily due to their flexibility to accept change in their environment or industry.

In line with this, Bommer and Jalajas (2004) suggested that small firms are able to react more quickly to a changing business environment, have greater internal flexibility, and greater entrepreneurial spirit that their large counterparts. They are also more willing to take risks, more efficient, have advantage with informal communication and less bureaucracy. Nevertheless, they are lack human and financial resources for R&D, are unable to attain economies of scale, and have narrower market niches and little bargaining power with suppliers and customers (Van de Vrande et al. 2009; Yap & Souder 1994). These characteristics create challenges for the process of product innovation in SMEs.

Compared with small firms, the advantages of large firms include: the financial and personnel resources required to conduct R&D; economies of scale in research; established manufacturing and marketing products and services; greater bargaining power with suppliers; large and global markets; and superior networking information contacts with markets and technology sources (Bommer & Jalajas 2004; Terziovski 2010). Apart from this, the drawbacks of the larger firms include: lack of internal flexibility; less readily prepared to adapt to changes in the business environment; more formal communication and bureaucracy; less willingness to take risks; and less entrepreneurial dynamism (Goss 2015; Nieto & Santamaría 2010).

Despite the importance of innovation in SMEs, there is relatively little empirical research on the subject, particularly in developing countries, like Malaysia (Lee, C & Lee 2007). Developed economies have fostered innovation in SME manufacturing, although comparable attempts have been less apparent among developing countries (Narayanan & Yew-Wah 2014). Furthermore, it is reported that for SMEs to initiate and to sustain their progress and also to compete in the global markets with their large competitors (Adams, Bessant & Phelps 2006; Imhemad 2011); it is, therefore, important that research on SME is conducted in developing countries.

The Schumpeterian debate over which firms – large or small – are more likely to be most innovative is one of the oldest in political economic and is still a source of

controversy today. Awareness of this debate is also visible in academic circles and has sparked growing concern between managers and policy makers. The importance of innovation in SMEs should be clearly acknowledged and understand, particularly in terms of how product innovation unfolds in SMEs in the context of a developing country, such as Malaysia.

Keeping in view the importance of innovation in SMEs, this research focuses on the Malaysian SMEs because the importance of SME growth and their sustainability cannot be ignored for Malaysian economic growth and development, especially in this competitive global environment.

2.5.1 Innovation within Malaysia's Manufacturing SMEs

Innovation has been traditionally considered a generator of competitiveness, leading to superior performance and heralding something new. The contribution of the dynamics of SMEs has risen in latest decades, as income growth, enhanced market demand and evolving technologies have made it possible for SMEs to enhance their comparative advantages and reduce the structural disadvantages stemming from resource constraints and restricted capability to reap economies of scale.

Despite the early emergence of manufacturing, the focus on innovation has been comparatively recent. The first significant incentive for firm-level R&D came only in 1986 in the form of a tax deduction for eligible research expenditure (Narayanan & Wah 2000). While not all SMEs are innovative, SMEs are often the driving force behind radical technologies. Specifically in Malaysia, technology and innovation has started to be of interest for researchers of SMEs with the SME Masterplan 2012-2020 (Rahman, Yaacob & Radzi 2016b). This plan is in line with the launch of NEM in March 2010 when the Malaysian manufacturing SMEs gained new momentum in innovation.

The role of innovation in influencing the performance of SMEs in Malaysia has been acknowledged as critical (NSDC 2015). Given the manufacturing sector's importance, scholars and policy-makers have attempted to determine the state of technological

development in this sector (Rosli & Sidek 2013). Technology plays a vital role in innovation success but technology can only succeed in innovation when combined with clear leadership and strategy (Linton & Solomon 2017).

The issues of innovation in the manufacturing industry are best examined through the six focus areas, known as performance levers of the Malaysian SMEs Masterplan 2012 – 2020, which serves to promote the development of SMEs. The six performance levers are (SMEMasterplan 2012):

- Innovation and technology adoption;
- Human capital development;
- Access to financing;
- Market access;
- Legal and regulatory environment; and
- Infrastructure.

The Masterplan suggests that the most important performance lever is innovation and technology adoption as it appears to drive real innovation and it is necessary to start with small steps. Consequently, results are produced results quickly and then SMEs can move on to higher goals after building credibility, generating better results and sustaining market position. Mustafa and Yaakub (2018) also suggest that innovation is the solution for firms to remain and succeed in increasingly hypercompetitive markets.

2.6 Government Aid on SME Innovation

Government policies such as promotion schemes (i.e. government export promotion programme, enterprise allowance scheme, networking between SMEs and institutions) have a positive impact on SME sales growth rates (Haddoud, Jones & Newbery 2017; Storey, DJ 2016). SME volatility means government policy should target these firms so as to give them extra opportunities to improve their performance (Motohashi 2002). Similarly, Romijn and Albu (2001) suggest government policy

should focus on promoting linkages between SMEs and scientific institutions because their study found that external factors such as scientific institutions can foster and nurture the technology required for SMEs.

However, the Rolfo and Calabrese (2003) study found the Italian aid programs aimed at fostering technological innovation in SMEs appeared to be negative. This result is due to the lack of technical structure such as a technical office, design department, R&D laboratory, and staff capable of interacting with research bodies. In short, it shows contradictory findings with regard to government policy aids.

Although studies about Malaysia's government policies indicate that government support, such as financing and provision of credit, training and development, outsourcing and consulting services, marketing and business incentives, as well as infrastructure support, help improve the performance of Malaysian entrepreneurs, especially the Bumiputera (Hambali 2011; Omar, C & Azmi 2015). Yusof (2011) identified that support for entrepreneurship and government policies to the "angel investors"[9] and the availability of risk capital, financial resources, government support for entrepreneurship are correlated with the success of entrepreneurship in Malaysia. These findings are mixed and could indicate that the success of business performance depends on the type of supports-provided and how this support is utilised in their environment.

Malaysian government encourages SMEs to focus on making innovation which is the key driver for sustainable competitive advantage due to rapid technology changes, globalization, and shorter product and technology lifecycles. As local SMEs having limited resources, the government has established few agencies such as Standard and Industrial Research Institute Malaysia (SIRIM) and Malaysia's National Applied Research and Development Centre (MIMOS). These two agencies have been trusted by the government to support local SMEs in terms of technology, industrial research,

[9] Angel investors are defined as investors who provide financial backing, industry knowledge, as well as industry or business experience to early stage of start-ups or entrepreneurs

and consultancy services. Thus, it is shows that government has taken progressive actions to enhance the creation of prosperity and social well-being of the country by encouraging the development of innovative, resilient and competitive SMEs.

2.7 Challenges Facing Malaysian SMEs

SMEs face common problems concerning their survival or to create a competitive advantage with more than 50 per cent of SMEs collapsing within the first five years of operation (Chong 2012; Khalique et al. 2011). Despite various government assistance and programs targeting SMEs, the rate of Malaysian SMEs failure is rising (Chong 2012). According to Rahman, Yaacob and Radzi (2016a), the main reason for the closure of SMEs is because SME owners are not aware of company problems, probably because they lack financial and management skills. The lack of access to various forms of support, such as financial and training support, is also a significant obstacle to success among SMEs (Ahmad, N.H. & Seet, P-S. 2009).

Rahman, Yaacob and Radzi (2016a) have identified that countless studies have been conducted regarding SME challenges, including inefficiency of SMEs in strategic management, limited access to credit, short survival rates, and limited banking service. Specifically, SMEs in Malaysia are facing serious issues and many obstacles to stay competitive in the market since the failure rate is at 60 per cent (Chong 2012; Husin & Ibrahim 2014; Nordin, Hamid & Woon 2011) which demand absolute attention from the authority.

Hashim, MK and Wafa (2002) identified that the main problems faced by Malaysian SMEs are the lack of knowledge regarding marketing techniques and opportunities at both local and international levels. This situation suggests the need to discover more effective management processes so that SMEs in Malaysia can apply strategies that will enable them to attain better new product performance. The strategic orientation of the firm can be considered a key element with important implications for the management and efficiency of SMEs (Jansson et al. 2017; Taneja, Pryor & Hayek 2016).

Firms may identify aspects as technological position, innovation, organizational design, and personnel management; depending on the strategic orientations adopted (Hsu, C-C, Tan & Mohamad Zailani 2016). It is these aspects of management that can largely determine firm performance and business efficiency (Al-Henzab, Tarhini & Obeidat 2018)[10]. Identifying the relevant strategic orientations and firm capabilities for SME competitiveness can provide them with advantages to compete with large firms and becoming aware of these factors is the only way for both firms and government to take them into consideration and promote them in the future.

A case study conducted by BNM (2003) also recognized the common issues for Malaysian SMEs as including strategic orientations of the firms. These factors have also been acknowledged as key elements to generate global competitiveness among SMEs in Malaysia.

Apart from strategic orientations of the firms, it is also important to explore how these resources and capabilities determine the firm's strategic process. In other words, how a firm's resources and capabilities are managed is affected by the firm's strategic orientation (Conant, Mokwa & Varadarajan 1990; Narver & Slater 1990), and whether such a bond is comparable to that which exists between large firms is also critical to understand.

In Malaysia, despite the important contribution made by SMEs to the economy, adequate attention has not been paid to them as numerous researchers have been biased towards larger and listed enterprises (Moorthy et al. 2012). Strategic orientations and firm capabilities are also very crucial for Malaysian SMEs with the challenges faced by Malaysian SMEs summarised in Table 2.4.

Table 2.4: Summary of Malaysian SME Challenges

[10] Strategic orientation dimensions, firm capabilities, innovation, firm performance: all these constructs are discussed in detail in Chapter 4 of this thesis.

Problems	Author/s (Year)
Lack of access to various supports (i.e., financial and training)	Ahmad, N.H. and Seet, P-S. (2009) Rahman, Yaacob and Radzi (2016a)
Failure to create and sustain competitive level in the industry	Nordin, Hamid and Woon (2011) Chong (2012) Husin and Ibrahim (2014)
Owners are unaware of firms' problems due to lack of financial and management skills	Rahman, Yaacob and Radzi (2016a) Dato' Hafsah Hashim, the SME Corp. Malaysia CEO
Lack of knowledge on firm strategic orientations and capabilities	Hashim, MK and Wafa (2002) Awang, A et al. (2009) BNM (2003)

There are remedial actions to overcome the challenges Malaysian SMEs are facing. According to Dato' Hafsah Hashim, the CEO of SME Corp., Malaysia, Malaysian SMEs need to restructure their financial systems to improve their management skills and to emphasise high-quality products/services to ensure their survival. These are very important for SMEs to continue growing and improving their performance in the dynamic Malaysian market.

Evidence shows that the performance of Malaysian SMEs is important to owners, managers, policymakers and society. However, there is a lack of knowledge as to which strategic orientations affect the performance of SMEs and how they impact their performance (Awang, A et al. 2009).

2.8 Summary

Malaysian SMEs have more flexible structures compared to large business and are considered the backbone of the national economy and very significant for political

stability, and social value. Creating and nurturing viable, resilient and forward-looking SMEs is the challenge for Malaysia. This chapter has described and analyzed the Malaysian manufacturing industry, particularly the firms operating as SMEs, including their contributions to job creation, the definition of SMEs in Malaysia and its neighbouring countries were presented. Additionally, the government aids in SMEs innovation is highlighted. Further, the challenges facing such firms were also discussed. The next chapter reviews literature and discusses it in detail.

CHAPTER 3

LITERATURE REVIEW

3.1 Introduction

Chapter 2 provided an overview of manufacturing SMEs in Malaysia and established the significance of the manufacturing industry to the Malaysian economy. This chapter reviews the literature on innovation management and begins with examining literature relevant to SMEs and their capacity to be innovative, as well as establishing the scope of knowledge in the area of new product performance. This chapter identifies the key dimensions and constructs impacting new product performance given the objectives of this thesis (refer to Section 1.3). The theoretical framework that arises from this literature analysis will be developed in the following chapter.

3.2 Innovation and New Product Performance

Research consistently links innovation with business performance where being the first to market an innovative product allow a firm to gain a competitive advantage (Danneels, Erwin 2002; Huarng & Hui-Kuang Yu 2011; Lieberman & Montgomery 1998). Innovation is shown to be: a major contributor to a firm's growth (Eiriz, Faria & Barbosa 2013; Roper 1997; Sok, O'Cass & Sok 2013); the fastest growing product groups or 'clusters' (Audretsch, Coad & Segarra 2014; Johne 1999); better business performance associated with higher levels of innovation (Neely et al. 2001; Prajogo et al. 2013); and the rise and dominance of large corporations using new technology (Christensen, Raynor & McDonald 2015; Hill & Rothaermel 2003; Spithoven, A, Vanhaverbeke, W & Roijakkers, NJSBE 2013).

Studies on innovation found that firms using innovation to distinguish their products from competitors have a variety of benefits. For example, they can be twice as profitable than their non-innovative counterparts (Casadesus-Masanell & Zhu 2013; Kumar, V et al. 2011); innovation is a key element of business success (O'Cass, Heirati & Liem Viet 2014); the level of competitiveness is linked with the levels of

innovativeness (Volberda, Van Den Bosch & Heij 2013); innovative firms can grow more than non-innovative firms (D'Este et al. 2012), and innovative firms have a lower likelihood of decline in employment compared to non-innovative firms (Giovannini 2008).

3.3 The Concept of Innovation

Innovation literature originates from the social sciences, economics, psychology, and management and applies to a wide range of industry sectors and markets. Such literature claims that innovation is the most fundamental source for the firm's success and survival (Abbing 2010) and is widely acknowledged as a key economic driver and an important competitive element for every industry (Huizingh 2011) and includes a broad set of innovation definitions. However, scholars disagree in terms of defining innovation with some taking a range of ontology and epistemological perspectives to study, examine and report on a dynamic and multidimensional phenomenon (Mele et al. 2017).

Peter Schumpeter, arguably the most influential early author on entrepreneurship and innovation and its key role in the economic change process, proposed the earliest definitions of innovation. His interpretation includes five manifestations of innovation which consist of any of the following phenomena (Schumpeter 1934):

- Introduction of a new product or technological improvements to existing products;
- Introduction of a new method of production;
- Opening of a new market;
- Conquest of a new form of supply of raw materials or half-manufactured goods; and
- Implementation of a new form of organization

Although Schumpeter established a definitive concept of innovation, a range of concepts is completely accepted by organizations and some that refer to their needs.

For instance, the Malaysian Ministry of Science, Technology and Innovation (MOSTI) adopted the definition of innovation used by the Organisation for Economic Co-operation and Development (OECD that defined innovation as "*the implementation of new or improved characteristics of the product, process organization and methods of marketing in a business firm, workplace organization and external relations*" (Malaysia Science and Technology Information Centre 2015). The Malaysian government aims to foster an environment where research and innovation will flourish and is of key importance in spurring economic growth.

Others, like The European Commission's Green Paper, defined innovation as "…*renewal and enlargement of a range of products and services and the associated markets, the establishment of new methods of production, supply and distribution, the introduction of changes in management, work organisations and the working conditions and skills of the workforce*" (Arundel & Kabla 1998). Similarly, Chaminade, Edquist and Handbook (2006) define innovation as new creations of economic importance that are usually carried out by firms (or individual at times).

The OECDs more limited view of innovation restricted it to new product and/or process development efforts, although it has a broader vision of the product to cover social services (Caspers 1984). It defines innovation as "*the transformation of an idea into a new or improved saleable product or operational process in industry and commerce or a new approach to social service."* Therefore, the view of innovation consists of the:

- full scope of technical, scientific, financial and commercial activities necessary to create and market new or improved products
- industrial use of new or improved methods of production and machinery
- new ways of delivering a social service

The Baregheh, Rowley and Sambrook (2009) study focused on an explicit definition of innovation when they conducted a content analysis of extant definitions of "innovation" as a basis for proposing an integrative definition of organizational "innovation". They proposed a diagrammatic definition in words by means of

interpretation (refer to Figure 3.1). This diversity of heterogeneity of sources and outcomes makes it difficult to define and analyze (Damanpour & Wischnevsky 2006). Damanpour and Wischnevsky (2006) also noted that different definitions of innovation tend to overlap with each other and depend on the environment of an organization. Also, to deal with key areas of innovation, the literature on product development, process development, service development and business development could all be considered.

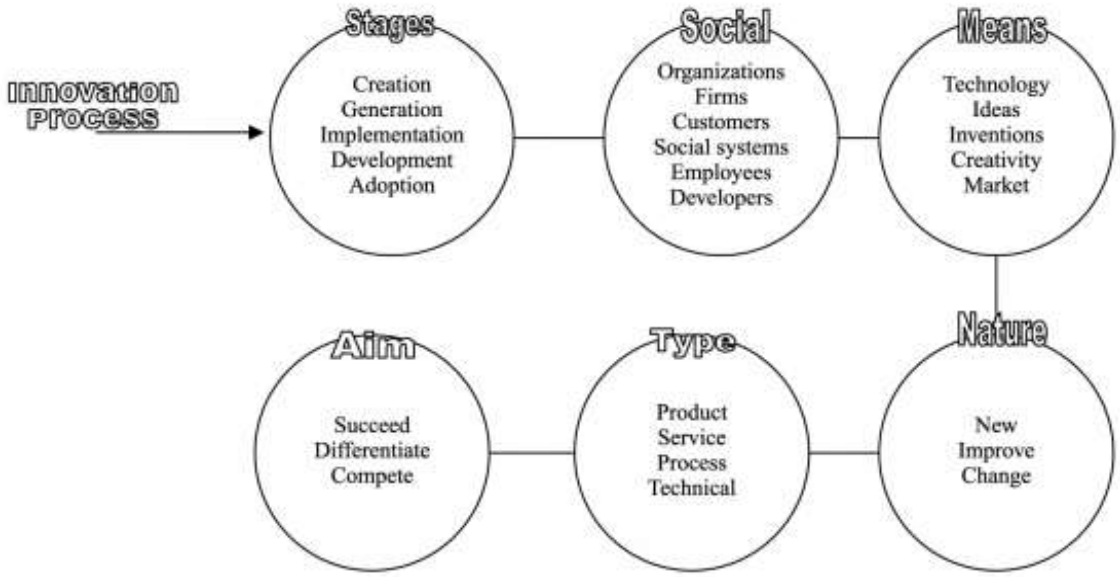


Figure 3.1: A diagrammatic definition of innovation

Source: (Baregheh, Rowley & Sambrook 2009)

However, innovation is regarded as a nebulous concept which Godin (2002) believes is due to:

- It is characterized as an outcome or an action depending on the analyst's research focus and convenience of data availability;
- Conducting R&D and the acquisition of advanced technologies and the employment of highly skilled workers are all perceived as innovative;

- In terms of process innovation, an organization can be innovative by inventing new production processes and by using new technologies developed by others; and
- There is no established view as to whether innovation should be new to the world, to the country, to the market and or the firm.

3.3.1 Innovation Definition in the Management Context

The phenomenon of innovation continues to attract interest among management scholars who describe innovation as “any idea practice or object that is perceived to be new by an individual or other units of adoption” (Rogers, E 1995, p. 11). It consists of some technical knowledge about how things can be done better than the existing state of the art (Rogers, EM 2010). In other terms, Tyler (2001) indicated that innovation is related to the adoption of new products and/or processes to improve competitiveness and overall profitability.

Likewise, Menrad (2004) views innovation as a complex phenomenon, involving the production, diffusion and translation of scientific or technical knowledge into new or modified products and services as well as new production or processing techniques. Additionally, Therrien, Doloreux and Chamberlin (2011) propose that the complex process of innovation is related to changes in production functions and processes whereby firms seek to acquire and build upon their distinctive technological competence, understood as the set of resources a firm possesses and how innovative capabilities transform these.

A study by Francis and Bessant (2005) meanwhile identified an additional dimension to the defining innovation. Innovation is not just about the changes or new things based on individual perception, but it is also linked to a better position in the market, a new way of introducing a product into a new context, or a business model or a new method for finding new challenges and opportunities which are related to market exploitation. In the same vein, Porter (1990), Paradkar, Knight and Hansen (2015) and Tidd and Bessant (2018) view innovation as a new approach to doing things commercially.

Other authors also interpret innovation as an on-going process which occurs with four different outcomes: new products, new techniques or different strategies, new forms of organization and new markets (Johnson, B, Edquist & Lundvall 2004). The innovation study, in general, was built from value creation, distinguishing firms as manufacturers (e.g., innovators) and customers as consumers (e.g., adopters) of market offerings (Vargo & Lusch 2011).

Authors such as Leifer et al. (2000), Danneels, Erwin and Kleinschmidt (2001), Avlonitis and Salavou (2007) and Laforet (2011) all defined product innovation as an activity leading to any product, service or idea recognized as new, based on individual perception. Meanwhile, Schmidt and Rammer (2007) and Camisón and Villar-López (2014), both indicate the implementation of new production technology is a result of process innovation which could be adapted to an existing system of production and achieved either steadily or radically. At the same time, organizational innovation is when organizations exhibit innovative behaviour consistently over time (Gumusluoglu & Ilsev 2009; McLean 2005), and involves changes in the organization of the workplace such as marketing, purchasing, sales administration, management and personnel policies (Rogers, EM 2010).

Management studies identify innovation as something new for an individual and is mostly defined in the form of products or processes, leading to an increase in the competitiveness of firms. Though these definitions of innovation vary, innovation can be basically recognized as the main factor in improving both companies' productivity and economic growth. Therefore, this research adopts the definition of innovation include: any idea practice or object that is new to the individual or organization: consists of some technical knowledge on how things can be done better than the existing state of the art; and is linked to a better position in the market – that is market exploitation and exploration.

3.3.2 Innovation at Micro and Macro Firm Levels

Despite a large number of innovation-related studies over the past several decades, there is still no specific prerequisite for successful innovation (Rothwell 1992), though. Biemans (2018) discovered that the integration of marketing and product development is a prerequisite for success. Innovation studies' have expanded to include observations and comprehension of the dynamics and impacts of innovations across the whole economy (Therrien, Doloreux & Chamberlin 2011). According to Smith, K (2005) and Carree and Thurik (2010), innovation has been identified as a cause of economic wealth at the macro level and is considered a continuum for the development of new or incremental product and/or process changes leading to higher competitiveness at micro or firm-level (González-Pernía, Peña-Legazkue & Vendrell-Herrero 2012; Gopalakrishnan 2000). This definition includes inter and intra-firm relationships across organizational boundaries to improve performance, build competitive advantages, and allow flexibility in the market (Akamavi 2005).

In several cases, firms have implemented new strategies to speed their product development, noting that product life cycles are diminishing (Chen, J, Reilly & Lynn 2012; Dumaine 1989) due to innovation, which is also instrumental in shortening the life cycles of products for firms and taking advantage of new opportunities (Kam-Sing Wong 2014). Additionally, the range of innovation can also differ from incremental to radical. A previous study by Porter (1985) reported the former only occurs at the micro-level such as is the size of SMEs, and result in either minor marketing or technological discontinuity. The latter, though, has major effects on marketing and technological discontinuity at both macro and micro levels (Garcia, Calantone & Association 2002; Gunday et al. 2011).

3.4 Types of Innovation

Innovation is widely viewed as a critical component of competitiveness incorporated within the organizational structures, processes, products and services. It is widely accepted that innovation is central to the growth of output and productivity of a firm

and the most important factors contributing to a firm's performance. The innovation activities of firms can be divided into two groups: technological innovation and non-technological innovation. Firms must then deal with the different types of innovation that they have chosen. According to the OECD (2005), the definition of technological innovation includes product innovation and process innovation that is stimulated primarily by new technologies: " A product innovation is the introduction of a good or service that is new or significantly improved with respect to its characteristics or intended uses" (OECD 2005, p. 156). Since, "a process innovation is the implementation of a new or significantly improved production or delivery method" (OECD 2005, p. 163) product and process innovations are closely related to technological development.

According to the study reported in the Oslo Manual (2005), product innovation is the introduction of good or services that are new or significantly improved. The term product includes products as well as services. Significant improvements in components and materials, technical specifications, incorporated software, user-friendliness or other functional features are the characteristics or intended uses of the product (Gunday et al. 2011). Product innovation can be based on new knowledge or technologies, or new methods or adaptation of existing knowledge or technologies. Product innovation is a complicated process guided by technological advancement, rising customer needs, increasing global rivalry and shortening product life cycles (Gunday et al. 2011; Utterback & Abernathy 1975).

Process innovation is the introduction of new or significantly improved production or delivery methods, involving significant changes in techniques, equipment and/or software. It is designed to reduce unit output or distribution costs, improve quality, or to manufacture or deliver new or substantially improved products (Oslo Manual 2005). Additionally, to gain a competitive advantage, as in the case of product innovation, manufacturing organizations should place greater emphasis on process innovation as their distinctive primary competence (Camison & Villar López 2010). This finding is in

line with a study by Rosli and Sidek (2013), who found that process innovation influenced firm performance significantly in manufacturing enterprises.

Classifying the process of innovation has expanded to include two types of non-technological innovation: marketing innovation and organizational innovation (Figure 3.2).

Marketing innovation is a new marketing strategy requiring substantial changes to product design or labelling, product placement, product promotion or pricing (Oslo Manual 2005). Han, Kim and Srivastava (1998) draw on the work of Barich and Kotler (1991) suggesting that marketing innovation is targeted at efficiently meeting customer needs. Opening new markets or putting the firm's product on the market can increase the firm's sales. Marketing innovation is strongly linked to the marketing mix of product design properties, pricing strategies, product placement and promotion activities (4Ps). A study conducted by Ernst et al. (2015) offered clear evidence that tapping successfully into low-income segments in emerging markets involves the development of new products that meet low price demands, yet also offering value.

Since organizational innovation is the implementation of new business practices in the company's business processes, workplace organization or external organizational innovation tends to increase performance by lowering administrative and transaction costs and increase job satisfaction and labour productivity. Gaining access to non-tradable resources such as non-codified external knowledge or minimising supply costs (Oslo Manual 2005) or setting up databases for best practices, lesson learnt and other knowledge would make it easier for others to access knowledge. Organizational innovations are therefore strongly linked to all administrative efforts to update the organizational routines, procedures, mechanisms, as well as systems to facilitate teamwork, share information, communication, collaboration, training and innovativeness.

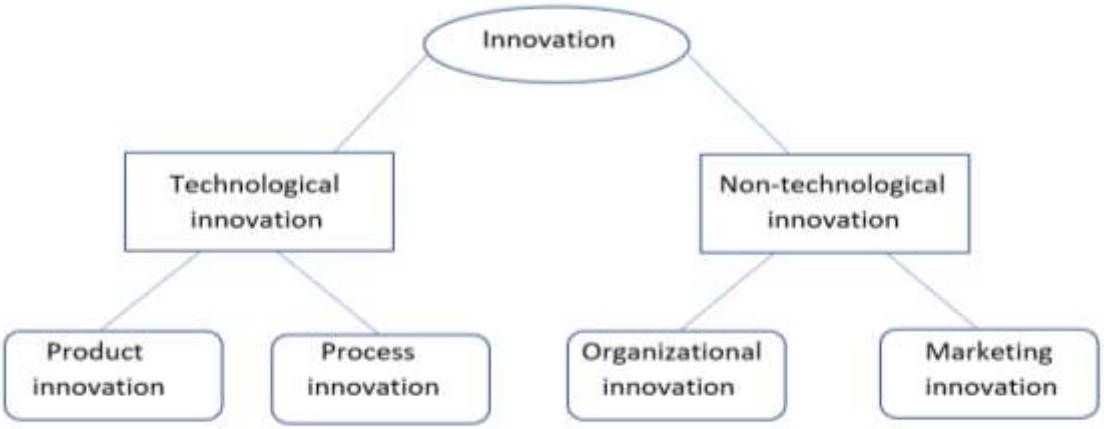


Figure 3.2: Types of innovation

Source: Author

Tether (2005) suggests however that firms need to align their organizational and marketing strategies to facilitate technological innovation making the introduction of non-technological innovation useful in this regard. This view is supported by Schmidt and Rammer (2007) who regard non-technological innovation is an important element of a firm's innovation activities that both supplement and complement technological innovation, thereby improving performance (i.e. the introduction of new products and new processes).

In a world of increasingly intensive competition, the traditional emphasis on product innovation is no longer sufficient (Cimento & Knister 1994) and firms which undertake product or process innovation are more likely to engage in organizational innovation (Mol & Birkinshaw 2009). New services or instance, are also essential (Fisk 2002) and yet process innovation is often a significant source of competitive advantage, as it is difficult to copy (Chen, Y-S, Lai & Wen 2006; Francis & Bessant 2005). Much of the focus of new product development used to be on product features (Wind & Mahajan 1988) which means successful new product development should not only

focus on product features but on the entire product/service/financial offering and customer empowerment (Fuchs & Schreier 2011). New technologies and new products are a key part of new services too with a combination of both services and new technologies leading to a competitive advantage (Fisk 2002).

Several studies reported the importance of non-technological innovation (Armbruster et al. 2008; Geldes, Felzensztein & Palacios-Fenech 2017; Mothe & Uyen Nguyen Thi 2010), showing that organizational innovation serves as an antecedent that promotes product development and process innovation. Organizational innovation also acts as an important source of competitive advantage and has a significant impact on the firm's performance concerning productivity and lead time.

Studies on technological and non-technological innovation indicate that both are important but vary across industries (Geldes, Felzensztein & Palacios-Fenech 2017). For example, evidence from the service industry indicates that non-technological innovations have a more important role while the reverse happens for manufacturing where technological innovations are more relevant for productivity (Aboal & Garda 2016).

3.5 Product Innovation

Product innovation is central to business and national prosperity where management that can improve efficiency and speed of new products will be the ultimate winner. This success occurs when management overcomes the evolving conditions of rapidly developing technology, increasingly fierce competition, and radically shifting marketplaces during industry and company restructuring and "re-strategizing" (Cooper, Robert G 1994).

Management often faces a dilemma in product innovation. On the one hand, there is an increasing demand for developing and launching more new products with firms expecting new products to grow from 33% to 40% and that number of new products introduced expected to grow to 52% over the next five years (Booz & Hamilton 1982). In contrast, Cooper, Robert G (1984) and Cooper, Robert Gravlin (1986) show that

new product failure rates remain high (estimated to be about 33% at launch) and range around 50% (Castellion & Markham 2013) due to factors such as ineffective investment that cannot generate future revenues (Hirschman 1980), consumer innovation resistance or the adoption behaviour of individuals (Talke & Heidenreich 2014), and insufficient knowledge or resources to understand and predict consumer behaviour (Dijksterhuis 2016).

Bringing a new product to the market successfully is the lifeblood for most organizations, although it is also a complex and challenging task (Barringer 2015). Firms who deliver higher quality products faster and cheaper than their competitors are in a superior position which often stems from valuable knowledge and technological skills and experience in new product development (Alegre, Sengupta & Lapiedra 2013; Calantone, Roger J, Chan & Cui 2006; Campbell, Coff & Kryscynski 2012; Hatch & Dyer 2004; Porter 2011).

New product development entails several innovation activities (OECD, E 1997) and includes very close coordination between different units and functions or an organization such as R&D, engineering, logistics and marketing (Bendoly et al. 2012; Gerwin 2004). Product innovation is defined as the process of adopting new technology into use (Lukas & Ferrell 2000).

Previous product innovation studies addressed factors that help firms to accomplish successful product innovation. The antecedents of product innovation can be classified into categories such as organization-related, project-related, process-related, product-related and market-related (Cheng, C-F, Chang & Li 2013). Table 3.1 illustrates how some antecedents of product innovation in an organization can play a very important role in innovation activity.

Table 3.1: Antecedents of Product Innovation

Category	Antecedents
Organization-related	Vision
	Innovation culture

	Market orientation
	Entrepreneur orientation
	Organizational competence
	Slack resource
Project-related	Discretion
	Cross-functional team
	Fit with technological and market competence
Process-related	Process formality
	Process concurrency
Product-related	Product definition
	Product superiority
Market-related	Formal launch process
	Market attraction

Source: Cheng, C-F, Chang and Li (2013)

Although all types of innovation are important for companies, numerous studies have identified product innovation as the most important (McKee 1992; Utterback & Abernathy 1975; Yalcinkaya, Calantone & Griffith 2007). Indeed, product innovation was reported to be among the top three strategic priorities for 71% of companies (Andrew et al. 2010), a view supported by Sandberg (1992), who argues that Schumpeter's view of innovation is consistent with the current focus on product innovation. Similarly, product innovation is a critical element of product policy (Lay 1999) and product innovation is one of the most significant profit sources (Sabisch & Pleschak 1996). There has been increased interest in product innovation in Malaysia (Bakar & Ahmad 2010) and included Malaysian government policy (Rosli & Sidek 2013) confirms the critically of this product innovation trend.

3.6 Product Innovation and Firm Size

There is an ongoing debate on whether or not small firms are inherently more innovative than their larger counterparts (Rosenbusch, Brinckmann & Bausch 2011).

Rothwell (1983) found large size firms have monopoly power with technological change that is a prerequisite for economic progress but also suggested that small firms are better adapted to the development of major innovations due to certain behavioural and organizational factors. Small firms can have greater flexibility, limited resources and skills, but lack the organizational and marketing capabilities of large firms (Berends et al. 2014).

Innovation in small firms is attributed to the ability to serve as the initiator, catalyst and medium for more significant technological change. Roper (1997) examined the relationship between product innovation and growth in European countries (German, Irish and U.K) and found that the output of innovative small firms grew significantly faster than non-innovators.

Cohen and Klepper (1996a), Cohen and Klepper (1996b) and Andries and Czarnitzki (2014) found that in smaller firms, the number of new products created continues to be higher than in larger firms. They argue that larger firms are more concentrated on process innovation where there is a likelihood of achieving high-cost reductions in a short time of process innovation. A study also found that innovation has a stronger impact on small firms than in more prominent firms (Rosenbusch, Brinckmann & Bausch 2011) while Geroski (1995), concludes that small firms are significant innovators.

Another research by Acs, Audretsch and Feldman (1994) explored the relationship between the size of the company and the percentage of product innovation per employee. The study details that the mean innovation rate for small firms was 332 per million employees, compared with 225 per million employees in large corporations in 1982, claiming that large firms are more innovative than small firms in terms of innovation per employees.

In contrast to the findings above, the theory that large firms with market powers better pursue modern industrial R&D (i.e., Schumpeter, 1942) has been strongly disputed. Levin et al. (2002) draw on the work of Frisch (1993), to suggest that the impact on

product innovation of company size and age is not apparent. Different researchers have found contradictory results concerning this relationship, and since most small firms do not participate in formal R&D practices (CIS 2012), they often seek alternative ways to innovate.

Researchers observed that R&D investment rises almost in proportion to the size of the company (Bound et al. 1982; García-Manjón & Romero-Merino 2012; Klette, Moen & Griliches 1999). This finding was also confirmed by Hansen, JA (1992), who studied the innovation output to assess the degree to which the level of innovation in manufacturing firms is influenced by firm size and firm age. He stated that both firm size and firm age are significant determinants of the number of new products produced per dollar of sales. Furthermore, he found that the higher the proportion of R&D resources dedicated to the product, instead of R&D processes, the more new products produced. Wakasugi and Koyata (1997) explored whether the hypothesized economies of scale apply to the innovation inputs and outputs of the Japanese electrical machinery firms and found that R&D expenditure and the number of patents in large firms were higher than in smaller firms. A recent study by Matzler et al. (2015) showed that family business participation has a negative impact on innovation input and a positive influence on innovation output.

These findings indicate that the issue with small firms producing most new products is focused on a limited financial context for R&D activities. Chandy and Tellis (2000) and Czarnitzki and Hottenrott (2011) found that it is difficult for small business to secure financial support for product innovation concluding that small companies have more difficulties in developing new products than larger companies. The majority of the earlier empirical literature finds innovative activity increasing with firm size. This evidence is further qualified by Spithoven, A, Vanhaverbeke, W and Roijakkers, N (2013) who found that large firms prove to be more innovative in several industries and noted that the level of research activities initially increases with a company's growth, then decreases when the companies hit mid-size.

However, it is not either small firms or large firms that are the best innovators. In the process of technical advancement, small and large firms are likely to play complementary roles in the sense that they are better at different types of innovation with no difference between small and big companies (Audretsch & Vivarelli 1996; Laforet 2013). They also found that higher R&D investment in large companies can be balanced toward highly innovative workers in small firms. A study done by Zucker, Darby and Torero (2002) stresses that a large incumbent firm hiring highly skilled scientific expertise plays a critical role in the firm's organizational, strategic and technological transformation. Small companies also hire new research scientists and as a result, small companies also have a high capacity to develop new products, as do large companies. The evidence presented in this section suggests that the relationship between the number of product innovations and company size is not clear.

While various theories have attempted to disentangle the factors and drivers that may advance product innovation, the combination of innovation types (i.e., the combination of product and process innovation, a combination of innovation behaviour, strategic capability, and internal technological process) or new product performance (Rajapathirana & Hui 2018) it is a firm's strategy of choosing its new product program that is a critical element of the corporate strategy.

Little research has investigated the performance of a firm's new product programs, or the link between strategy and performance (Audretsch & Vivarelli 1996), and so is the focus of this research.

3.7 Measuring New Product Performance

The effort to define the variables associated with new product performance (NPP) has been one of the most important themes of innovation studies (Huang, X, Soutar & Brown 2004). From a managerial perspective, the description of NPP is essential when it comes to the revision of new product development strategy decisions (Millson & Wilemon 2006), the launch of strategy decisions (Chiu et al. 2006) and the analysis of

the contribution of NPP to the value of a firm (Pauwels et al. 2004). As such, understanding new product performance is an important issue for managers and researchers alike.

Accordingly, a substantial number of studies have tried to identify the best way to define NPP from a theoretical (Cordero 1990; Katsikeas et al. 2016) as well as an empirical viewpoint (Griffin 1993; Griffin & Page 1996; Storey, C et al. 2016). Traditionally, NPP has been measured in financial terms (e.g., relative return on investment, relative profitability). The use of financial criteria alone, however, takes a very narrow view of the extent to which a company benefits from developing new products. Huang, X, Soutar and Brown (2004) found that four factors were commonly used as success measurement, namely: financial performance, objective market acceptance, subjective market acceptance, and product-level measures. Their study also highlighted that customer acceptance, customer satisfaction, product performance and quality are the most commonly used specific measures in Australian SMEs.

Multiple measuring scales have been identified as assessing NPP. Griffin and Page (1996) and Im and Workman Jr (2004) say that measurements regularly used are customer acceptance (e.g. meeting sales goal), financial performance (e.g. profitability), and firm-level measures (e.g. firm sales volume), Griffin (1993) and Carbonell and Rodriguez (2006) used the three main indicators of profits, sales and market share to evaluate NPP. In the same vein, Cooper, Robert Gravlin and Kleinschmidt (1993) and Moorman and Miner (1997) defined NPP as the revenue (e.g. sales), market share and profitability of a new product during the first 12 months of its commercial existence (e.g. life in the marketplace). Similarly, variables such as sales growth, return on investment, profit level, and market share of the new product compared to the products of major competitors for performance evaluation are included as indicators of NPP (Gatignon & Xuereb 1997; Li, T & Calantone 1998).

Zhang, Di Benedetto and Hoenig (2009) introduced subjective NPP measures to those presented in the study by Im, Workman Jr and John (2004) using scales to determine management's perception of a new product's market performance and assessing its contribution to sales volume, profitability and customer satisfaction in comparison with key competitors (Zhang, Di Benedetto & Hoenig 2009). Using innovative sales productivity, Tsai, Kuen-Hung (2009) measured NPP and operationalizes as the revenue generated by new products per employee (i.e., the ratio of sales attributed to new products derived by the total number of employees). Such sales include: (1) technologically new or technologically improved products introduced to the market within the past three years, and (2) marginally changed products within the same time period.

Although several important factors are considered as measures of NPP, numerous studies considered NPP with only one dimension (Atuahene-Gima, Slater & Olson 2005; Narver, Slater & MacLachlan 2004; Tsai, Kuen-Hung 2009; Zhang, Jing & Duan 2010) which is captured in more than 90% studies by financial and market measures (Im et al. 2003). More recently, Narver, Slater and MacLachlan (2004) measured NPP by merely using a single item "New-product success compared to the firm's major competitor is good" while Atuahene-Gima, Slater and Olson (2005) considered NPP as a single financial dimension with five sub-items.

It has been suggested that measuring NPP include both financial and non-financial outcomes of the company's innovation performance (Cooper, Robert G & Kleinschmidt 1987; Hollenstein 1996), where process efficiency and product innovativeness (Verona 1999) are widely considered as measures of the company's performance. The efficiency of processes includes elements such as speed, productivity and flexibility (Clark & Fujimoto 1991; Verona 1999).

The importance of new products to demonstrate innovation or success has increasingly been emphasized, given the extent companies focus their effort for survival, growth and success. The development of a new product is an important

ingredient of long-term business success in competitive, resource-demanding and globalized market environment conditions (Langerak, Hultink & Robben 2004). Henard and Szymanski (2001), Zahra, Wright and Abdelgawad (2014) and De Jong and Vermeulen (2006) confirm that new products, specifically those that are radically innovative, offer small companies the ability to gain early market share, increase cash flows, increase their external visibility and legitimacy, and increase the likelihood of survival. Henard and Szymanski (2001) also stressed that research shows stronger financial performance is associated with innovative products that offer a relative advantage over competitive offerings and significantly reduce perceived risks to consumers. A meta-analytic study by Sivasubramaniam, Liebowitz and Lackman (2012) used the three measures of NPP, as effectiveness (market success), efficiency (meeting budgets and schedules) and speed-to-market. Figure 3.3 and Table 3.2 illustrate types of NPP measures based on empirical studies.

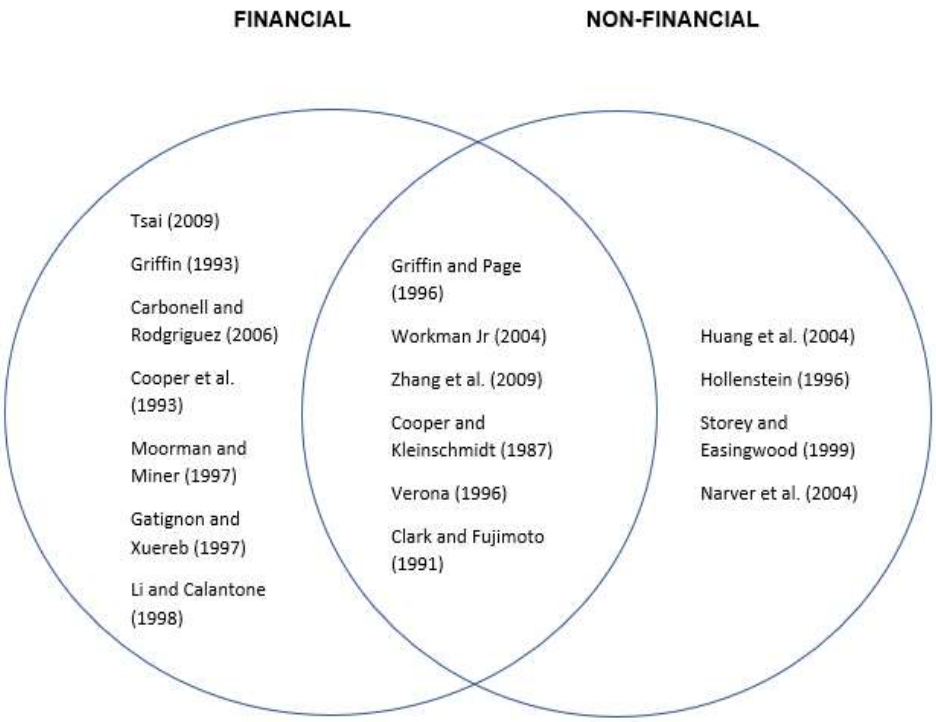


Figure 3.3: Financial and non-financial NPP measurements

Table 3.2: Types of New Product Performance Measures

Authors	Financial	Non-financial	Types
Huang, Soutar & Brown (2004)		✓	Customer acceptance Customer satisfaction Product performance Product quality
Hollenstein (1996)	✓	✓	
Storey, C and Easingwood (1999)	✓	✓	Company image New markets
Griffin and Page (1996) Im, Workman Jr and John (2004)	✓	✓	Customer acceptance Financial performance Firm sales volume
Carbonell and Rodriguez (2006)	✓		Profits Sales Market share
Cooper, Robert Gravlin and Kleinschmidt (1993) Moorman and Miner (1997)	✓		Revenue, Market share, Profitability of a new product during the first 12 months
Gatignon and Xuereb (1997) Li, T and Calantone (1998)	✓		Sales growth, Return on investment, Profit level, Market share of new product compare to competitors
Zhang, Junfeng, Di Benedetto and Hoenig (2009)	✓	✓	Sales volume, Profitability, Customer satisfaction in comparison with key competitors
Tsai, Kuen-Hung (2009)	✓		Revenue by new products per employee
Narver, Slater and MacLachlan (2004)		✓	The success of a new product
Verona (1999) Clark and Fujimoto (1991)	✓	✓	Product speed Product productivity Product flexibility Profitability Market share
Henard and Szymanski (2001)	✓	✓	Product revenue Early market share Increase cash flows

Zahra, Wright and Abdelgawad (2014) De Jong and Vermeulen (2006)	Increase external visibility and legitimacy Increase likelihood to survive

Findings from studies above proposed that NPP can be measured either through financial or non-financial or a combination of the two. This research aims to examine the NPP, using measures proposed by the Product Development Management Association (PDMA). There are 16 common measures considered to be core success measures are grouped into the four dimensions (Griffin 1993) of "customer acceptance measures", "financial performance measures", " product or technical measures", and "organizational-level measures". For example, customer satisfaction and customer acceptance were among the most useful customer-based measures of NPP (Griffin & Page 1996).

Studies of the importance of new product performance (NPP) have provided substantial evidence that a wide variety of antecedent influences can determine the effects of new product development activities. The key question is what factors determine the innovation success of SMEs, in the context of Malaysia?

3.8 Factors Affecting New Product Performance

The quest to understand new product performance has resulted in several important research studies. The success of the new product developed is significant as a key to performance in the fast-paced and competitive world. Since this research seeks to examine SMEs in Malaysia and particularly those in the manufacturing sector, it is vital to examine the factors that affect NPP.

Table 3.3 shows the factors that impacting NPP and investigated in this research. Cooper, Robert G (1990) and Evanschitzky et al. (2012) showed the critically important for firms to assess factors that influence new product performance, as research shows that regardless of the level of investment in new products, success rates are mainly below 25%. Empirical work on the determinants of NPP, the strategic, process,

organizational, and/or market environment factors, indicated there are a wide variety of antecedent factors (Montoya-Weiss & Calantone 1994).

Table 3.3: Factors Impacting New Product Performance

Factor	Dimension	Reference
Strategic orientation	Market orientation Entrepreneur orientation Technology orientation	Kohli, Ajay K. and Jaworski (1990) Narver and Slater (1990) Cheng, CCJ and Huizingh (2014) Lonial and Carter (2015) Theodosiou, M, Kehagias, J and Katsikea, EK (2012)
Firm capabilities	Marketing capabilities Technological capabilities	Vorhies, Douglas W., Orr and Bush (2011) Theodosiou, M, Kehagias, J and Katsikea, EK (2012) Morgan, NA, Katsikeas and Vorhies (2012)

And the three sets of factors considered most relevant to SMEs from a resource-based view (RBV) are strategic orientation, marketing and technological capabilities and their ambidexterity (exploitation and exploration).

Researchers have sought to identify, categorize and examine their impacts on performance, mainly because of their practical relevance. Innovations provide a strategic orientation for firms to solve their challenges while aiming to gain a sustainable competitive advantage (Drucker 1985; Hitt et al. 2001; Kuratko 2005). A study by Day, George S (1990) provides evidence that the strategic orientation of an organization as a market-driven company is a significant indicator of its performance. Other studies support this view that various kinds of strategic orientations (i.e., market orientation, entrepreneur orientation, resource orientation, learning orientation, technology orientation) can enhance NPP (Cheng, CCJ & Huizingh 2014; Lonial & Carter 2015) and the impact on NPP is different across different levels of environmental hostility and market growth (Shirokova et al. 2016). The following sections examine the three sets of factors.

3.8.1 Strategic Orientation: Market, Entrepreneur and Technology Orientations

The strategic orientation of firms has drawn widespread attention from management, marketing and entrepreneurship scholars, yet there is no universally accepted definition of the strategic orientation of the firm. The term “orientation” refers to ‘ a usually general or lasting direction of thought, inclination or interest’ (Merriam-Webster 2009). From an RBV perspective, strategic orientation can be regarded as part of an organizational culture, which is valuable, rare, inimitable and non-substitutable. This research adopts strategic orientations as those directing and influencing the firm’s activities and creating the behaviours intended to ensure the firm’s profitability and performance (Gatignon & Xuereb 1997; Hakala 2011; Tarhini & Obeidat 2016).

Strategic orientation consists of the strategic directions by which a firm appropriates the behaviours required for superior performance (Gatignon & Xuereb 1997; Theodosiou, M, Kehagias, J & Katsikea, EK 2012). The market, entrepreneur, technology and learning orientations are seen as principles that drive and influence a company’s activities and create behaviours to ensure its profitability and efficiency (Hakala 2011). Hakala (2011) also suggested that firms should develop and use multiple orientations, though the relationship between strategic orientations and NPP is unclear.

Previous studies explicitly promoted the use of behaviours relevant to the generation, dissemination and use of business intelligence as key ingredients of strategic orientation (Kohli, Ajay K. & Jaworski 1990; Narver & Slater 1990). Current studies promote the implementation of multiple strategic orientations, such as entrepreneur orientation, technology orientation, innovation orientation, quality orientation, and productivity orientation (Kalmuk & Acar 2015; Theodosiou, M, Kehagias, J & Katsikea, E 2012; Van Doorn et al. 2013; Voss & Voss 2000; Zhou, Yim & Tse 2005).

This research examines the three types of strategic orientation: market orientation, entrepreneur orientation, and technology orientation in terms of their relationship with

innovation (Yang, Y et al. 2012b) and new product performance (Mu et al. 2017; Najafi-Tavani, Sharifi & Najafi-Tavani 2016).

3.8.1.1 Market Orientation

The concept of market orientation has become important due to highly competitive global markets. The seminal work of two groups of researchers, Narver and Slater (1990) and Kohli, Ajay K. and Jaworski (1990) have advanced our understanding of the market orientation concept. According to Narver and Slater (1990, p. 21), market orientation is defined as “the organisation culture that most effectively and efficiently creates the necessary behaviours for the creation of superior value for buyers and, thus, continuous superior performance for the business”.

Market orientation has been strongly linked to the success of the firm’s innovative efforts (Atuahene-Gima 1995; Kohli, Ajay K. & Jaworski 1990; Liu et al. 2013; Mavondo & Farrell 2003; Slater & Narver 1994). Understanding market orientation and its relationship with new product performance could provide useful insights into how organizations should pursue their market orientation strategy so as to promote new product performance output under different environmental conditions. It also directs firms to efficiently and effectively build superior value in conducting business and is recognized by the resource-based view (RBV) as a valuable resource (Kam Sing Wong & Tong 2012).

Market orientation is often claimed to improve organizational performance on the grounds that market-oriented organizations are better able to track and respond to customer needs and preferences, thereby better satisfying customers and achieving a higher level of performance (Kolar 2006; Reijonen et al. 2012; Tay, Morgan & Economics 2002). Accordingly, market orientation allows businesses to track changing customer needs, assess the effect of these changes on customer satisfaction, improve the rate of product innovation, and help adopt strategies that develop the competitive advantage for the organization (Evanschitzky et al. 2012; Narver & Slater 1990; Zhang, Jing & Zhu 2016).

In response to criticism of the role of market orientation in innovation and new product performance, Narver, Slater and MacLachlan (2004) introduced a proactive market orientation concept that addresses customers' latent needs, those that regular people do not realise or find difficult to express. Atuahene-Gima, Slater and Olson (2005) postulate that there have been positive outcomes for organizations that understand these needs.

One of the main issues for an organization is the development of market orientation (Harris 2001; Morgan, T et al. 2015). There are two major market orientation conceptualizations: from a behavioural and a cultural point of view. Kohli, Ajay K. and Jaworski (1990) describe a market orientation as the organization-wide generation related to current and future customer needs, and the organization-wide information and responsiveness. Meanwhile, Narver and Slater (1990) described and affirmed market orientation as an essential element of the business culture, creating the behaviours needed for effectively and efficiently creating superior value for buyers (customers) and continuous excellent business performance. Researchers claim the three behavioural components of market orientation are: customer orientation, competitor orientation and inter-functional coordination.

In response to changes in market orientation Narver, Slater and MacLachlan (2004) argue that an excessively narrow market orientation perspective may one reason for criticising the performance impact of market orientation. They divide the market orientation into two complementary approaches, responsive and proactive. In the case of responsive market orientation (RMO), the firm aims to identify and understand its customers' current and expressed needs. On the other hand, proactive market orientation (PMO) focuses on the latent needs for customers, which may not yet be known to them (Narver, Slater & MacLachlan 2004; Slater & Mohr 2006). Other studies by Lamore, Berkowitz and Farrington (2013), Tan and Liu (2014) and Herhausen (2016) also embedded the same suggestion and described the same phenomenon using market-driven (current needs) and market-marketing (future needs) concepts.

Recent empirical PMO and RMO studies have investigated the different roles in new product performance. Hence, Narver, Slater and MacLachlan (2004) established measurement scales to show that this model should be responsive and proactive. Their study indicates that only PMO is linked favourably to new product success. In line with this, Li, C-R, Lin and Chu (2008) investigated high-technology firms in Taiwan using a survey, noting that PMO has more influence on radical innovation than RMO. On the other hand, RMO has a stronger effect on incremental innovation than being proactive market oriented. They added that such results would also be moderated by external and organizational factors such as rigidity of the strategic mission, strategic consensus and assessment of market opportunities. A more recent study by Lamore, Berkowitz and Farrington (2013) also identified that PMO has a positive relationship with market performance, whereas RMO does not.

In comparison, the survey conducted by Atuahene-Gima, Slater and Olson (2005) in US companies reveals that while RMO has a U-shaped relationship with new product program performance, PMO has an inverted U-shaped relationship. They also found the relationship of both orientations has a negative relationship with new product program performance, a relationship confirmed by Tsai, Kuen-Hung, Chou and Kuo (2008) in high-technology industries in Taiwan. They conclude that RMO is detrimental to NPP beyond a certain level under a high level of technology turbulence. The PMO – NPP relationship is an inverted U-shaped relationship during low technological turbulence or competitive intensity. Also, RMO and PMO are significant NPP determinants.

The positive impact of market orientation is not yet understood. Researchers found a negative effect of market orientation on NPP if companies listen to their customers too carefully, and lose their industry leadership position (Berthon, Hulbert & Pitt 1999; Christensen & Bower 1996). Berthon, Hulbert and Pitt (1999) endorsed this view concerning the net benefits of market orientation and pointed out that market orientation may deviate from innovation. Also, managers can only view the term through the eyes of current customers (Hamel & Prahalad 1994) possibly leading to

myopic R&D (Akman & Yilmaz 2008; Frosch 1996), and may hamper innovation and R&D activities and damage a firm's ability to introduce innovative products in the market (Zhou, Yim & Tse 2005).

A meta-analysis study conducted in 28 countries by Ellis (2006) shows that market orientation is a common determinant of firm performance and that more significant results have been found in large, mature markets and conducted in single countries cultures than in developing countries. The meta-analysis also revealed that the market orientation value decreases in proportion to the cultural distance between the home market and the USA. Market orientation fails to provide a competitive advantage and also becomes a cost of doing business or a failure preventer when a firm's rivals are also customer-oriented (Kumar, V et al. 2011). Table 3.4 illustrates studies conducted on market orientation in single country cultures by Lafferty and Tomas M. Hult (2001).

Table 3.4: Studies on Market Orientation based on a single country culture

Settings	Authors
Single country cultures (Eastern European Countries) Bulgaria, Hungary, Poland and Slovenia	Hooley, G et al. (2000), Marinov et al. (1993)
Developing economies Nigeria, Scandinavia,	Gray et al. (1998), Mitchell & Angenmonmen (1984), Selnes, Jaworski & Kohli (1996)
Developed economies The UK, Taiwan, Australia, the USA, Singapore	Caruana, Ramaseshan & Ewing (1999), Greenley, Gordon E (1995a), Greenley, Gordon E (1995b), Horng & Chen (1998), Kohli & Jaworski (1990), Narver & Slater (1990), Ramaseshan, Caruana & Soon Pang (2002)

Source: Lafferty and Tomas M. Hult (2001)

While many market orientations studies have been conducted in single countries or cultures, more have been undertaken in developed than in developing economies. This issue further received attention from Deshpandé and Farley (2004), Ellis (2006), Gruber-Muecke and Hofer (2015) and Kumar, K et al. (2012). Consequently, market orientation needs to be investigated in a country with diverse cultural settings, such as Malaysia.

To add, Malaysia government has launched a 'Buy Malaysian Products' campaign way back in the late 90's. However, given the current scenario with the internet, exposure has opened a broad access to international products that can be easily reached. To encourage Malaysians to buy local products and to ensure the Malaysian economy remained competitive, the Malaysians SMEs need to innovate in order to compete and be sustainable in the long run. Thus, improved capabilities would also create job opportunities and generate more revenues for companies.

Although the importance of market orientation is to acknowledge, the other dimensions of strategic orientation should also be stressed in a given environmental context, such as Malaysian SMEs. Other dimensions of strategic orientation discussed in the pertinent literature found that entrepreneur orientation and technology orientation also played a significant role in leading to new product performance. The following sections discuss the concepts of entrepreneur and technology orientations and their impact on NPP.

3.8.1.2 Entrepreneur Orientation

According to prominent scholars, entrepreneur orientation (EO) is part of strategic orientation that encompasses the specific aspects of organizational strategies (Covin & Slevin 1989; Lumpkin & Dess 1996; Rauch et al. 2009; Wiklund & Shepherd 2005) and is concerned with the entrepreneurial aspects of a firm's strategy (Hakala 2011). A general trend in the business environment today is to reduce the life cycles of the product and business model (Hamel & Prahalad 1994; Stark 2015), making the existing operations' and future profit streams uncertain and with businesses needing

to search for new opportunities constantly (Polat & Mutlu 2012). They can, therefore, benefit from an entrepreneur orientation.

The concept of an EO was introduced by Covin and Slevin (1991) who proposed that entrepreneur orientation implies a willingness to innovate to rejuvenate market offerings. Entrepreneurs are taking risks in trying out new and uncertain products, services, and markets and to be more proactive towards new market opportunities than competitors (Chen, HL & Hsu 2013). Research has shown that businesses with more entrepreneurial strategic orientation are doing better (Anderson, BS & Eshima 2013; Dess, Pinkham & Yang 2011; Edmond & Wiklund 2010; Zahra, Sapienza & Davidsson 2006).

Schumpeter (1934) first emphasised the value creation function of entrepreneurs, and others also recognized the role of value creation (Carland et al. 2007; Vesper 1980) which can be a natural bond between marketing and entrepreneurship (Davis, Morris & Allen 1991). Schumpeter (1934) suggested five behaviour categories that would identify an entrepreneurial venture (refer to Section 3.3), and Bird (1989) proposed a sixth to the list, the introduction of new services.

The entrepreneurial tendencies toward risk-taking, innovativeness and proactiveness are considered central to entrepreneurial orientation (Covin and Slevin 1989; Miller 1983) with these actions strongly supported by top management (Engelen et al. 2015). Lumpkin and Dess's (1996) conceptualization of entrepreneurial orientation added competitive aggressiveness and a tendency towards independent and autonomous action as important. The main proposition of entrepreneurial orientation is that organizations acting entrepreneurially are better able to adjust their operations in dynamic competitive environments (Covin and Slevin 1989).

Organizations that are entrepreneurially oriented may change and shape the environment and be willing to commit resources to exploit unpredictable opportunities (Watson 2013). The anticipation of future demand enables companies to pursue new and creative ideas that can lead to changes in the industry and do so proactively ahead

of the competition. This method of better environmental change and shaping should have positive effects on firm performance (e.g. Hult et al. 2004; Keh et al. 2007; Wiklund and Shepherd 2005; Tang and Tang 2012). Other studies have found that entrepreneurial orientation also indirectly affects performance through information utilization (Moorthy et al. 2012), learning orientation (Real, Roldán & Leal 2014) or in conjunction with market-oriented behaviours (Polat & Mutlu 2012; Zahra, Wright & Abdelgawad 2014).

The literature on entrepreneur orientation and performance relationships are long-standing and empirical studies have shown that entrepreneur-oriented firms perform better (Wiklund & Shepherd 2005; Zahra 1993; Zahra & Covin 1995). With regard to the individual dimensions of entrepreneur orientation, earlier research suggests that each can have a universally positive impact on performance. According to Schumpeter (1934), Brown et al. (1998) and Hausman and Johnston (2014), innovative firms can create extraordinary economic performance by developing and introducing new products and technologies and have even been seen as the drivers for economic growth. Meanwhile, proactive firms will build the first-mover advantage (Clausen & Korneliussen 2012), enter premium market segments (Dhliwayo 2014), charge a high price, and "skim" the market ahead of rivals (Soininen et al. 2012; Zahra & Covin 1995). The advantage here is that by managing the distribution channels and creating brand recognition, they will control the market. Nevertheless, the relationship between risk-taking and performance is less noticeable. March (1991) and McGrath (2001) suggest that while tried-and-true strategies can lead to high mean performance, risky strategies lead to variation in performance because some projects fail while others succeed and are maybe more profitable in the long run though results may be unknown and or where the cost of failure may be high (Etemad 2015).

Entrepreneur orientation can have universally positive effects on performance as an overarching construct (Hamel 2000; Wales, William John 2016) because the future profit flows of current projects remain unpredictable and companies need to search for new opportunities actively. In such a process, an entrepreneur orientation will assist

companies. Several empirical studies confirm the positive performance effects of entrepreneur orientation (Mahmood & Hanafi 2013; Rauch et al. 2009) with Hamel (2000) and Shan, Song and Ju (2016) also asserting there is plenty of empirical evidence that supports entrepreneur orientation.

The notion that entrepreneur orientation is universally beneficial, though, maybe too simple. Empirical studies by Covin and Slevin (1989) and Lumpkin and Dess (1996) for instance, showed that entrepreneur orientation correlated with performance in small firms operating in hostile environments but not in benign environments. They stress that the performance effects of entrepreneur orientation are context-specific so that the interaction between entrepreneur orientation and performance relies on external environment characteristics as well as on internal organizational characteristics. Empirical research also supports the suggestion that the performance effect of entrepreneur orientation varies across various types of external environments (Covin & Slevin 1989; Wales, William J, Gupta & Mousa 2013; Zahra & Covin 1995; Zahra, Newey & Li 2014).

Miller (1983) and Baker, Grinstein and Harmancioglu (2016), for instance, claims that, unlike conservative firms, entrepreneurial firms innovate confidently and consistently while taking significant changes with their product-market strategies. Some studies propose similarly that major product innovation requires greater risk-taking and pro-active behaviour by companies (De Massis et al. 2015; Kreiser et al. 2013). There is still no explicit research evidence to verify or otherwise the views of industry experts. De Massis et al. (2015) and Kreiser et al. (2013) claimed that new products with a lower degree of innovativeness – most of which are me-too products (i.e., products already introduced by competitors). These products were launched by SMEs in old-fashioned cultures and vice versa. Industry experts have claimed that lower product innovation comes from weaker entrepreneur orientation, while higher product innovation comes from stronger entrepreneur orientation. They conclude that less innovative products are less successful, while more innovative products are the

opposite (Avlonitis & Salavou 2007; Holahan, Sullivan & Markham 2014; Oly Ndubisi & Iftikhar 2012).

While the literature on strategy and entrepreneurship indicates an entrepreneur orientation improves firm performance, empirical results are mixed. Most studies found better performance among firms with a more entrepreneurial orientation, while other scholars do not confirm this positive relationship. It raises the question of whether entrepreneur orientation is always an appropriate strategic orientation or whether its relationship with performance is more complex (Wiklund & Shepherd 2005).

A study conducted by Smart and Conant (1994) confirmed there was no significant relationship between entrepreneur orientation and performance. Another study by Lechner and Gudmundsson (2014) showed the different impacts of individual entrepreneurial orientation dimensions on competitive advantage, which may, under certain conditions, even be related to poor performance (Hart 1992; Rosenbusch, Rauch & Bausch 2013). Conceptualizing the entrepreneur – performance relationship, Lumpkin and Dess (1996) highlighted the ambiguity of this relationship, indicating that entrepreneur orientation's performance implications are context-specific if the strength of the entrepreneur orientation and performance relationship depends on the external environment characteristics as well as on the internal organizational characteristics. Consequently, the relationship between entrepreneur orientation and performance may seem more complicated than a straightforward relationship of main-effects only (Wales, W, Monsen & McKelvie 2011).

Furthermore, in the Malaysian context the concept of 'entrepreneur orientation' is significant as many higher education institutions began to introduce courses related to entrepreneurship or majors in entrepreneurship since the mid-1990s. The Malaysian government is aiming to foster entrepreneurs from among the university's graduates. Malaysia seems to be mindful of the challenges of accelerating entrepreneurship education if the goal is to become a developed nation as outlined in the government's "Vision 2020" through restructuring the Malaysian educational system. For that reason,

entrepreneurship courses are now made compulsory in the public universities. It is evident that Entrepreneurship education has become a topic of considerable interest in Malaysia in recent years.

To the best of our knowledge; there are few studies that specifically addresses the issue of how various entrepreneurial roles and other strategic orientation dimensions of SMEs can contribute to NPP, especially in the Malaysian context. This research, therefore, aims to narrow this gap, at least partially, by extending the research question to include this investigation.

3.8.1.3 Technology Orientation

Technology orientation reflects the philosophy of the "technological push" (Zhou, Yim & Tse 2005) which suggests that consumers prefer products and services that are technologically superior (Gatignon & Xuereb 1997; Zhou & Li 2007). Technology orientation refers to the ability and strong determination of firms to utilize sophisticated technologies in developing new products, rapidly integrating the new technologies in business operations and proactively developing new technologies as well as committing to creating new product ideas (Gatignon & Xuereb 1997).

Technology-oriented firms are usually distinguished by high investment in R&D, which enhances their technological base (Ju et al. 2013; Lee, J & Jungbae Roh 2012; Schoenecker & Swanson 2002). Firms need to excel not only at generating new innovations but also at commercializing these innovations (Visnjic, Wiengarten & Neely 2016; Yang, H, Zheng & Zhao 2014). The potential area of interest linking technology orientation and new product performance may further advance marketing knowledge in a different environmental context.

Technology orientation has received significant attention in new product development studies. A technology-oriented firm is one that seeks a substantial technological background and uses it in the development of new products (Gao, Zhou & Yim 2007; Gatignon & Xuereb 1997; Slater & Mohr 2006). Gatignon and Xuereb (1997, p. 82) suggested that several important features define a firm's technology orientation such

as the use of sophisticated technologies in new product development, the rapidity of integration of new technologies, and the proactive development of new technologies and product ideas. The philosophy underpinning technology orientation posits that consumers favour products with a technological advantage (Gao et al., 2007). This demand indirectly encourages firms in the industrial market to pay more attention to new technology which means technology-oriented firms increase R&D, actively acquire new technologies, and use sophisticated production technologies (Lee, J & Jungbae Roh 2012; Voss & Voss 2000; Zhou, Yim & Tse 2005). A strong technology focus may, therefore, enable a firm to build unique and inimitable technological capabilities, providing a competitive niche based on the RBV view (Barney, 1991) and therefore, influence the meaningfulness and novelty dimensions of the new products (Kim, N, Im & Slater 2013).

Technology orientation suggests that the technology focus of a firm would lead to the development of more innovative, technologically superior products compared to those offered by rivals (Tsou, Chen & Liao 2014). It also suggests that customer value and the long-term success of the firm is best created through innovations, technological solutions, products, services or production processes (Euchner & Ganguly 2014; Gatignon & Xuereb 1997; Grinstein 2008b). Through developing and adapting new technologies, product differentiation from competitors or cost advantages in the production can be accomplished (Dangelico, Pontrandolfo & Pujari 2013; Gatignon & Xuereb 1997; Reguia 2014). Investment in new technologies, rather than the development of products on the basis of current customer needs, is seen as securing the viability of firms in times of disruptive changes in their markets (Christensen 2013).

A technology orientation is said to improve business or new product performance (Day, George S 1999; Gatignon & Xuereb 1997; Hakala 2011; Salojärvi et al. 2015). Yet, studies have not always identified positive effects and have, on occasion, found detrimental effects (Gao et al. 2007). In essence, the interest in new solutions that create superior customer value, which is at the heart of technology orientation, are incorporated in the studies by Hunt and Morgan (1995) and Hakala and KohtamÄKi

(2010). They argued that although market orientation includes the firm's interest shown towards potential customers, the commonly used scales for measuring market orientation do not incorporate any new technology, product or innovation dimensions. Thus, technology orientation is viewed separately from market orientation.

Grinstein (2008b) and Hortinha, Lages and Lages (2011) argue that market orientation is a strategic orientation that should be considered in conjunction with other dimensions of strategic orientation (e.g. technology orientation). This point of view discusses how a firm obtains more successful market intelligence. This view indicates that the comprehensive strategic orientation of a firm, including market orientation and technological orientation will have the most significant impact on the new products developed. Therefore, it will be investigated in this research.

Although the relationship between strategic orientation and NPP has been explored, existing empirical evidence suggests it is necessary to explore the effects of the internal factors of a firm on this relationship. In their study, Hsu, TT et al. (2014) indicated how a firm's capability moderates the strategic orientation – NPP relationship.

In helping industries to cope with the growing global competition, technology development in Malaysia still has some way to go. Considering the importance of technology in the Malaysian SMEs, a few agencies are heavily involved in research and development (R&D), such as National Applied R&D Centre (MIMOS) and Standard and Industrial Research Institute of Malaysia (SIRIM), to help SMEs. MIMOS is a strategic agency under the Ministry of Science, helping to transform Malaysia's industry through patentable technology platforms, products and solutions. Also, create a culture of innovation and nurture the relationships between the internal and external stakeholders.

Meanwhile, SIRIM is a premier industrial research and technology organization in Malaysia, a wholly owned company of the Malaysian Government under the Ministry of International Trade and Industry (MITI). They focus on developing new technologies

and improvements in the manufacturing, technology and services sectors. As well as to nurture SMEs growth with solutions for technology penetration and upgrading. Thus, making them as an ideal technology partner for SMEs. With the help of these agencies, SMEs in Malaysia will be more advanced.

Moreover, SMEs are encouraged to adopt the latest technologies in the face of Industry 4.0 and one of the key elements is artificial intelligence (AI). Industry 4.0 refers to the rapid technological change that is disrupting businesses across all industries. Namely, advances in communication technologies, devices connected to the internet and data analytics are occurring at a much quicker pace than at any other time in history (Xu, Xu & Li 2018).

However, due to financial constraints SMEs could not do so as cost is quite high and moreover, there are not many capable AI technology companies in Malaysia. MIMOS will therefore build the infrastructure using Microsoft technology to enable SMEs and young entrepreneurs to adopt AI into their firms. MIMOS has expertise in this field and would like to see more technology and innovation used in the local industry.

Meanwhile, SIRIM also has an initiative to transform Malaysian SMEs towards Industry 4.0 through its Centre of Excellence (CoE). SMEs are recommended to use lean methods and tools to reduce organizational uncertainty and improve productivity. SIRIM provides services to assist SMEs in making decisions what would be its end goal before finding out the technological options available for use. To conclude, the evidence is lacking in terms of the impacts of a firm's resources on product innovation success, so this research will investigate the role of a firm's strategic orientation in shaping its resources and capabilities, and their effects on its NPP in the context of the Malaysian manufacturing industries. The following subsection describes and discusses the role of a firm's resource and capability, particularly marketing and technology resource and capabilities, in the new product development process and their impact on NPP.

3.8.2 Capabilities: Marketing Capabilities and Technological Capabilities

The resource-based view (RBV) considers a firm as a bundle of resources and capabilities. In the endowment of these resources and capabilities, firms are also considered heterogenous (Barney, J 1991; Penrose, Edith & Penrose 2009; Wernerfelt 1984). RBV scholars argue that resources that are of value, rarity, imitability, and sustainability are at the root of competitive advantage (Barney, J 1991; Barney, Jay B, Ketchen & Wright 2011). To help researchers articulate the drivers of competitive advantage, Hunt and Morgan (1995), Capron and Hulland (1999), Yarbrough, Morgan and Vorhies (2011) and Kamboj, Goyal and Rahman (2015) agreed that RBV has influenced the marketing strategy literature dialogue and strategic management concepts. The capabilities viewpoint indicates that it is the ability, more than resources, which allows resource deployment and leveraging that causes some organizations to perform better than others (Grant 1996; Kozlenkova, Samaha & Palmatier 2014; Teece, Pisano & Shuen 1997).

Ultimately, capabilities are characterized as complex bundles of skills and accumulated knowledge implemented across organizational processes. They enable firms to organize activities and utilise their resources more effectively and efficiently (Day, George S 1994; Helfat 2000). Capabilities are identified as the 'firm's ability to deploy resources, typically in combination, using organizational processes, achieving the desired goal'. Different functional areas of the organizations are characterized as capabilities (Amit & Paul 1993) and whose purpose is to improve the efficiency of the other resources acquired by the firm (Makadok 2001). Capabilities allow a firm to execute value-creating tasks successfully and reside in hard-to-replicate processes and routines. In these processes, capabilities are deeply rooted and are therefore embedded in the complex mesh of intertwined actions that over time follow managerial decisions within organizations. In effect, embedded capabilities or its integration into the surrounding context establishes barriers to imitation, allowing firms to enjoy a sustained advantage over their competitors (Grewal & Slotegraaf 2007).

Danneels, Erwin (2002) argued that existing capabilities can serve as leverage points for the development of new skills that help a firm sustain its performance, with Day, George S (1994) suggesting that capabilities are core determinants of the competitive advantage of an organization and its performance. Overall, there seems to be a positive association between a firm's capabilities and its performance.

For example, the R&D capabilities of an organization relate to its ability to convert R&D expenditure into innovation. Alternatively, marketing capabilities define the ability of a firm to take advantage of its marketing expenditure and achieve specific marketing objectives such as revenue or customer satisfaction (Narasimhan, Rajiv & Dutta 2006; Vorhies, Douglas W., Orr & Bush 2011). Taking another example, customer relationship and product leadership are two effective strategies that offer higher customer satisfaction (Hennig-Thurau & Hansen 2013; Treacy & Wiersema 1993). These strategies also correlate to marketing capabilities and R&D capabilities (Krasnikov & Jayachandran 2008) and firms that are responsive to fast-changing customer preferences (Theodosiou, M, Kehagias, J & Katsikea, EK 2012) are more likely to perform well compared to their competitors. An organization that intends to implement an imitative entry strategy requires adequate technological and marketing capabilities to create an attractive product and be capable of marketing the product.

These two capabilities of marketing and technological capabilities, and their impact on NPP have been argued as being the most valuable for firms for their product innovation (Dutta, Narasimhan & Rajiv 1999; Feng, Morgan & Rego 2017; Morgan, NA, Katsikeas & Vorhies 2012) and are major drivers of NPP (Eisend, Evanschitzky & Calantone 2016). Marketing and technological capabilities are the core organizational functions responsible for the formulation and execution of business strategies that result in a sustained advantage (Krasnikov & Jayachandran 2008). The impact of capabilities on performance is driven by two characteristics that drive them: (1) the difficulty they face in copying them (imperfect imitability) and; (2) the difficulties they face in extracting them from the market (imperfect mobility). In terms of the imitability and mobility of the knowledge that supports them, marketing and technological capabilities can vary. It is

for these reasons that marketing and technological capabilities, and their impact on NPP will be the focus of this research. The next sections discuss the impact of marketing and technological capabilities on NPP that may vary. The concept and definition of both capabilities are also discussed in brief and details are further discussed.

3.8.2.1 Marketing Capabilities

Marketing capabilities refer to the resources, knowledge and skills of an organization relevant to its marketing mix practices such as product, price, distribution and marketing communication (Vorhies, Douglas W & Morgan 2005). Marketing is a key organizational function that fulfils the expectations of customer needs. Marketing skills define the ability of the organization to execute marketing routine activities by efficiently integrating marketing outputs and transforming them into useful marketing outputs (Bahadir, Bharadwaj & Srivastava 2008; Vorhies, Douglas W & Morgan 2005).

Marketing capabilities are based on the market knowledge of customer needs and experience in predicting and addressing these needs (Day, George S 1994). They are based on market knowledge typically established and improved by experiential learning and experimentation (Krasnikov & Jayachandran 2008). By practising and experimenting, market knowledge usually develops over time. Due to its socially complex nature, a significant part of market knowledge is difficult to codify, indicating that market knowledge is distributed through multiple groups and people (Simonin 1999). Simonin (1999) added market knowledge theories of experiential learning and social complexity, which indicate that marketing capabilities are focused to a large degree on information that is tacitly retained and difficult for rivals to replicate (imperfect imitability). Even if market knowledge is codified and can be transmitted, as in a measurement system for customer satisfaction, the knowledge is still held close, leading to imperfect mobility (difficulty obtaining this capability through a market system). Overall, marketing capabilities, owing to the distributed, tacit and private

nature of the underlying knowledge, is likely to be resistant to competitive imitation and acquisition.

Moreover, marketing capabilities are the ability of a firm to understand and anticipate customer needs better than its rival and to link its offerings effectively to customers (market sensing and customer-linking capabilities). Marketing capabilities also involve organizational processes that allow customer needs to be projected through acquisition, management, and using market knowledge and processes that promote sustainable customer relationships (Barrales-Molina, Martínez-López & Gázquez-Abad 2014; Day, George S 1994). Marketing capabilities thus create a link between organizations and customers, allow organizations to predict changes in customer preferences and provide a platform for sustainable customer relationship and distribution channels (Bruni & Verona 2009; Day, George S 1994; Moorman & Slotegraaf 1999). Strong relationships between firms and channel partners and distributors can help build barriers to entry (Herrera 2015; Reve, Stern & performance 1986). This relationship, therefore, provides a competitive advantage, especially in a highly uncertain environment (Noordewier, John & Nevin 1990; Sambasivan et al. 2013).

Marketing capabilities allow firms to identify the needs of customers and the factors that influence their attitudes and purchasing decisions (Theodosiou, M, Kehagias, J & Katsikea, EK 2012). Customer knowledge helps firms achieve better targeting and positioning in comparison to competing brands for their products. This knowledge results in a more significant differentiation of the product (Hoyer et al. 2010; Kohli, Ajay K. & Jaworski 1990; Mahr, Lievens & Blazevic 2014; Von Hippel & Katz 2002) and subsequently allows firms to enjoy higher profits and superior financial performance (Cui & Wu 2016).

The heterogeneity of marketing resources (e.g., sales personnel) between firms causes differences between the marketing capabilities of firms (Makadok 2001; Ngo & O'Cass 2012). Resources and capabilities that are not easily acquired, imitated or

substituted are drivers for sustainable stability (Barney, J 1991; Day, George S 2014). Additionally, the marketing capabilities of an organization grows cumulatively within an organization. It is, therefore, dependent on the path, which helps prevent imitation (Kozlenkova, Samaha & Palmatier 2014; Teece, Pisano & Shuen 1997). For instance, the ability of the organization to collect valuable customer input requires skills in environmental monitoring and management of customer relationships. Teece, Pisano and Shuen (1997) also stressed that such factors can contribute to the difficulty for rivals to imitate in diagnosing the causal link between the marketing capabilities of a product and its performance outcome making this capability an important source for sustainable competitive advantage (Davcik & Sharma 2016; Vorhies, Douglas W & Morgan 2005).

3.8.2.2 Technological Capabilities

Technological capabilities refer to the ability of an organization to produce, develop and use different technologies (Afuah 2002) which create impactful innovations (Sears & Hoetker 2014). Meanwhile, product technology capability refers to the technological capacity of a firm to create new products and related processes (Moorman & Slotegraaf 1999). Technology capabilities allow firms to respond to rapid environmental, technological change (Wang, G et al. 2015; Wind & Mahajan 1988). Technical proficiency, research and development and engineering or technical resources and skills are also found to be essential for new developments in products and processes (Bierly & Chakrabarti 1996; Haeussler, Patzelt & Zahra 2012). A meta-analysis of over 40 studies analysing NPP by Montoya-Weiss and Calantone (1994) indicate that technical proficiency is an important factor leading to NPP including success or failure. A recent study by Li, Y-H and Huang (2012), also found a direct and statistically significant effect of technical proficiency on new product performance.

R&D capabilities can be regarded as part of technology capabilities and are of paramount importance in the high-tech industry with short product life cycles, high rates of new product launch and constant innovation (Dutta, Narasimhan & Rajiv 1999;

Lin et al. 2012). Dutta, Narasimhan & Rajiv (1999) and Lin et al. (2012) stress, that it is in fact, the superior R&D of an organization that often contributes to a competitive advantage by process innovation and a favourable cost structure. Firms with superior R&D capabilities enjoy strong consumer loyalty (Givon, Mahajan & Muller 1995; O'cass & Ngo 2012) and are able to charge their products at premium prices.

Compared to marketing capabilities, technological capabilities are also an important source of competitive advantage because of its inimitability and non-transferable nature. There is also a high level of tacitness in R&D which renders this capability inimitable (Dutta, Narasimhan & Rajiv 1999). Competitive advantage from technological capabilities have a high degree of causal uncertainty as firms with similar competencies have difficulty understanding how product and process improvements are created (Coombs & Bierly 2006). Similarly, firms in high-tech industries also gain technological capabilities through learning-by-doing, making it difficult for rivals to imitate or develop technology know-how (Irwin & Klenow 1994; Teece 2015).

The following section describes and discusses the impact of marketing and technological capabilities on firms' performance in general and NPP in specific.

3.8.3 Marketing and Technological Capabilities Analysis

3.8.3.1 The Impact of Marketing and Technological Capabilities on Organizational Performance

The impact of a firm's functional capabilities on its performance has been the focus of much recent research because it is an enduring issue for managers. Since the inception of the RBV framework (Barney, J 1991), the relationship between a firm's capabilities and its performance has been the subject of interest for strategic scholars. Day, George S (1994) claims there is a positive relationship between capabilities and performance; thought capabilities can also contribute to key rigidities and therefore a negative impact (Haas & Hansen 2005; Leonard-Barton 1992). RBV scholars are involved in the interaction of marketing and technological capabilities as well as their impact on performance.

Krasnikov and Jayachandran (2008), in their meta-analysis, found that the firm's capabilities – performance relationship shows that marketing capabilities generally have a more significant impact on firm performance than R&D and operational capabilities. Meanwhile, Dutta, Narasimhan and Rajiv (1999) conducted a study to investigate marketing, R&D and operations capabilities, and their effects on the financial performance of firms. They found that interaction between marketing and R&D capabilities is the most important determinant of firm performance in high-tech markets. This finding suggests that performance is largely based on the ability of firms to develop continuous product innovations and their ability to market these innovations into products and services that meet current and future needs of customers. They also found that marketing capabilities have their most significant impact on the innovative output of firms with strong technological capabilities. This result shows that the more R&D competence a firm has, the more it benefits from strong marketing capabilities. They also found the relationship between marketing capabilities and technological capabilities leads to superior financial performance. Firms with a strong base of innovative technologies, for instance, gain the positive views of customers for their product benefits which means that customers use the past track record of consistent innovation as a guideline of future product development and quality of such firms. Marketing capabilities enhance the ability of a firm to create new technologies that have various applications across many industries.

On the contrary, researchers examined the impact on firm performance of technological capabilities (Coombs & Bierly 2006) with findings contrary to their prediction; technological capability is negatively associated with financial performance. Likewise, De Carolis (2003) also found conflicting empirical results. Her analysis indicating that technological competence is inversely related to market-based performance measures but is favourably associated with accounting measures. Specifically, technological capability has a positive impact on the return on assets of firms and a negative effect on the book value of their market.

Song, M et al. (2005) studied the impact of marketing capabilities, technological capabilities and their complementary effect on firm performance and whether technological turbulence moderated such effects. The main effects on the performance of marketing-related and technology-oriented capabilities were significant in both high and low levels of technological turbulence. Yet, the influence on the performance of marketing-related capabilities in the low technologically turbulent setting was stronger. The performance effect of implementing technology-related capabilities was the same for both scales of technological turbulence. The overall result indicates that the interaction effect between the two capabilities is significant only in the high turbulence environment.

Marketing scholars have examined various types of marketing capabilities and their relationship with firm performance (Krasnikov & Jayachandran 2008; Vorhies, Douglas W & Morgan 2005; Vorhies, Douglas W., Orr & Bush 2011). For example, a study by Morgan, NA, Vorhies and Mason (2009) shows that architectural and specialized marketing capabilities and their integration mediate the relationship between the strategy and performance of the firms. More recently, Vorhies, Douglas W., Orr and Bush (2011) established a positive correlation between customer-focused marketing capabilities and the financial performance of firms.

Moorman and Slotegraaf (1999) investigated the influence of technology and marketing capabilities on the level and speed of product development activities. Their study shows that firms were more likely to show improvement in quality and make these improvements faster compared to competitors when endowed with high production technology and product marketing capabilities.

Researchers have found strong evidence that market orientation and marketing capabilities are complementary assets that had a positive impact on firm performance (Morgan, NA, Vorhies & Mason 2009). Morgan, NA, Vorhies and Mason (2009) found that both ROA and perceived firm performance were directly affected by marketing capabilities. Ngo and O'Cass (2012) too noticed that marketing resources and

marketing capabilities lead to superior firm performance, indicating that when there is a complementary in marketing resources and marketing capabilities, the impact of firm performance is more significant.

3.8.3.2 Technological Capabilities and Innovation Performance

Firms invest in technological capabilities, the skills to deploy and use different resources and know-how to enable innovations (Anderson, P & Tushman 1990; Song, M et al. 2005). As such, capability scholars like Huang, H-C (2011) observed that various types of technological capabilities such as the exploring or exploiting of technological opportunities, core technology capability, and R&D decision autonomy lead to firm innovation in a highly competitive environment. Likewise, the research by Zhou and Wu (2010) on the role of technological capabilities in product innovation reveals that technological capabilities accelerate exploitation but has an inverted U-shaped relationship with exploration. In other words, their findings suggest a high level of technological capabilities are hindering explorative innovation.

This review of marketing and technological capabilities literature provides opportunities to reconcile conflicting findings on the impact of marketing and technological capabilities on firms' performance by testing the influence of both capability types on new product performance. There is also an opportunity to examine the interaction between a firm's marketing capability and its technological capabilities as a mediating variable between strategic orientation – NPP relationship. Further investigation is also necessary on the impact of marketing and technological capabilities, and their mediating effects on NPP in different settings. Section 3.8.4 discusses the concept of mediating and moderating variables, including the difference between these two variables.

3.8.4 Mediating and Moderating Variables

The role of mediators and moderators in social behavioural science was introduced by Baron and Kenny (Hayes, Andrew F 2009). To date, the increasingly importance of these two variables in research suggest that the meanings of the two terms are

necessary in order to avoid inconsistent, ambiguous, and possibly misleading results. As the definition of these terms are differ depends on the approach.

Intervening variable is postulated to exert an effect on an outcome variable. Establishing intervention response mediators – how an intervention works – can encourage researchers to either strengthen, add or remove certain components of intervention to make the intervention either more cost-effective or more efficient (Kraemer et al., 2002). The terms moderators and mediators were used until about 20 years ago. Such terms were used colloquially and not as scientific terminology. Yet in a landmark 1986 paper, Baron and Kenny suggested conceptual, strategic, and statistical to define and differentiate the two scientific terms (Baron & Kenny, 1986).

Such conceptual definitions defined that, if *M* specifies under what conditions *T* is related to *O*, a variable *M* is a moderator of the relationship between a target variable *T* and an outcome of *O* in a particular population. A variable *M* is a mediator of the *T* – *O* relationship if *M* helps explain how or why *T* relates to *O.* Though these conceptual definitions are succinct and clear, a systematic approach to apply these definitions in empirical research is necessary. Such approach is to determine whether the relationship between two variables *X1* and *X2* and an outcome *O* is one of moderation, mediation or neither, and whether *X1* moderates (or mediates) *X2* or whether *X2* moderates (or mediates) *X1* (Chmura, K. et, al., 2008).

In order to decide whether each variable serves as a moderator or mediator, two sets of criteria are used: eligibility and analytical criteria. The eligibility criteria to identify whether a variable is a candidate for consideration as a potential moderator (or mediator) based on temporal precedence and association (Kenny, 1979; Pearl, 2000; Rubin, 2004).

Nonetheless, there is compliance that it is unnecessary to show (1) temporal precedence to determine that variable *X* causes the outcome *O*. That is to say, *X* precedes *O* in time, and (2) association, that is, *X* is correlated to *O*. Hence, these particular criteria are then used to determine if a particular variable is eligible as a moderator or mediator.

The analytical criteria are statistical criteria used to explain empirically that an eligible variable actually acts as a moderator (or mediator) (Chmura, K. et. al., 2008). Referring to Baron and Kenny's approach, the target (*T*) variable is binary, the moderator or mediator (*M*) is either ordinal (e.g., age) or binary (e.g., gender), and the outcome variable (*O*) is ordinal.

Besides, the Baron and Kenny approach does not define an eligibility criterion regarding the temporal precedence of *M* and *T* to determine that *M* moderates *T* in its relationship with *O*. Also, the Baron and Kenny approach does not specify an eligibility criterion as to whether or not *M* and *T* are associated. Rather, they only suggest that "it is desirable" that *M* to be independent of *T* (Baron & Kenny, 1986). Section 3.8.4.1 and 3.8.4.2 discuss the mediator and moderator variables in the context of this research.

3.8.4.1 Firm Capabilities as a Mediator between Strategic Orientations and New Product Performance Link

Strategic orientation is claimed to influence NPP, and this relationship has received substantial research attention (Gatignon & Xuereb 1997; Hsu, TT et al. 2014). However, it is suggested that, to hypothesize and empirically test the direct impact of strategic orientation on NPP, is an insufficient simplification of a very complex causal relationship (Momrak 2012). Despite the general positive findings in the literature, a notable number of studies report low explanatory power Ellis (2006); another reports

an average explanatory power in the area, between six per cent and 12 per cent(Cano, Carrillat & Jaramillo 2004).

A number of authors have found non-significant effects or even negative performance outcomes of market orientation and business performance (De Luca, Verona & Vicari 2010; Kirca, Jayachandran & Bearden 2005) and in contrast, Perry and Shao (2005) found the reverse. In this case, a pure focus on orientations may not guarantee successful innovations as earlier the findings were mixed as to various performance consequences of these orientations. There may exist several mediators and moderators between the two variables according to research, hence a study of such mediators and moderators would be helpful for both academic research and managerial practice (Chen, Y et al. 2015).

Teece, Pisano and Shuen (1997) was one of the first to note that capabilities are tools to achieve strategic advantage, mostly through product innovation; and based on RBV, organizational capabilities as the ability to generate competitive advantage (Barney, Jay B 2001). Drawing further on an extensive range of sources, Ozkaya et al. (2015) summarize that orientations precede competencies.

Previous research on the direct paths from orientation to various performance outcomes has been mixed. Accordingly, mediators have been proposed (Rodríguez-Pinto, Carbonell & Rodríguez-Escudero 2011). It is evident that the role of firm capabilities which engaged with strategic orientation can produce favourable organizational results. Clearly, those studies indicate that to disentangle the direct versus indirect effects of strategic orientations on NPP; in this thesis, firm capabilities are proposed as mediator.

3.8.4.2 Firm Ambidexterity as a Moderator between Firm Capabilities and New Product Performance Link

Ambidexterity reflects the modification of a firm's capabilities with respects to its current resources and competencies (exploitation – focused practices), while also

developing strategies for future capabilities growth (Tushman & O'Reilly III 1996) . Another essential point is, the way a firm capitalizes on the extraction of current value while also planting seeds for future value creation. In summary, ambidexterity includes the building, modifying and reconfiguration of resources and competencies to accommodate two distinct processes, exploitation and exploration.

To elaborate, ambidexterity includes the ability of a firm to derive value from existing products and solutions, thus leveraging existing market opportunities while also predicting future consumer needs and exploring emerging needs offers and solutions to identify new demand opportunities (Atuahene-Gima 2005; March 1991; Mizik & Jacobson 2003). Simultaneous or single actions of firm capabilities exploitation and exploration are believed to boost new product performance. This is because a firm's outcome based on the two capabilities that have been identified as major drivers of new product performance (Eisend, Evanschitzky & Calantone 2016; Henard & Szymanski 2001; Moorman & Slotegraaf 1999).

The literature of ambidexterity is extended by integrating research that examined the relative impact of capabilities (Krasnikov & Jayachandran 2008), another research that examined how institutional context moderates the influence of a specific capability on important outcomes (Wu, J 2013). Meanwhile, Eisend, Evanschitzky and Calantone (2016) examined the moderating influence of important institutions in different countries based on firm capabilities and new product performance relationships.

It has been shown that technological and marketing capabilities are two important kinds of capabilities that are valuable assets for firms (Thompson, 2005). Thus, this research aims to enhance understanding of the main gaps associated with firm ambidexterity by investigating whether these two ambidexterity capabilities moderate the link between firm capabilities and NPP. To our knowledge few studies have considered these perspectives and then again, this problem is still a question mark especially for SMEs in developing countries.

3.9 Limitations of Previous Studies on NPP

This literature review identifies, there is little research on strategic orientation - NPP relationship using multiple orientations. Therefore, this research aims to use the combination of a firm's strategic orientation dimensions (market, entrepreneur and technology orientations) to examine the NPP in the context of Malaysian manufacturing SMEs. Secondly, there is little research about differences between the Bumiputera and non-Bumiputera firms in terms of their strategic orientation dimensions, firm capabilities and NPP. Most studies on SMEs in Malaysia were conducted based on single settings. Also, few studies reported that non-Bumiputera firms outperform Bumiputera firms; Bumiputera firms are found weak in management, fail in marketing, and having difficulties in obtaining financial assistance due to bad credit history. Understanding a firm's capabilities in the strategic orientation and NPP link and the firm ambidexterity moderator is limited. This research will, therefore, examine the role of different types of strategic orientations in terms of new product performance link through firm capabilities and at the same time exploring the moderating effect of a firm's ambidexterity (that is, how a firm's marketing and technological capabilities are used through exploration and exploitation in product innovation).

3.10 Summary

This chapter analyzed, discussed and highlighted findings from the literature on new product development and performance in a broad range of disciplines, indicating that new product performance has received broad acceptance, not only in larger firms in developed countries but also in developing countries. This research will focus specifically on manufacturing SMEs in Malaysia. The following chapter discusses the theory and develops a theoretical framework for this thesis. The relationships between constructs that constitute the establishment of the research hypotheses are also proposed and discussed.

CHAPTER 4

THE DEVELOPMENT OF A THEORETICAL FRAMEWORK AND HYPOTHESES

4.1 Introduction

This chapter presents the conceptual framework developed to outline the theorized relationships that depict a firm's strategic orientations, its capabilities and new product performance. The content of this chapter is built on the results of the literature review in Chapter 3 which provides a review of resource-based view (RBV) theory, strategic orientations, firm capabilities, firm ambidexterity and new product performance. Research hypotheses then are developed on the basis of the keys-relationships specified in this theoretical framework.

This chapter is organized as follows. First, an extensive review of the theory underpinning, the RBV is provided. Then, the concepts that form the conceptual framework are introduced and discussed with hypotheses that specify the relationships among the concepts based on the RBV then developed.

4.2 Resource-based View Theory

This research adopts the Resource-based View (RBV) to highlight the importance of resources and capabilities to firm performance. The RBV first proposed by Wernerfelt (1984) and subsequently developed through the publication of numerous papers in a wide variety of journals (Barney, Jay B & Arikan 2001; Barney, Jay B, Ketchen & Wright 2011; Kraaijenbrink, Spender & Groen 2010). Important theoretical work on RBV come from four sources: (1) the traditional study of distinct competencies; (2) Ricardian economics; (3) Pensorian economics; and (4) the study of anti-trust implications of economics (Barney, Jay B & Arikan 2001).

Throughout the 1990s, various authors tried to develop typologies of tangible and intangible assets in an effort to suggest that different types of assets can have different competitive effects on firms. For instance, Wernerfelt (1984) and Barney, J (1991) called assets "resources", Prahalad and Hamel (1990) developed a concept of "core

competencies" and, building on Selznick (1957) and others, added the term "competence" or "capabilities" to the resource-based vocabulary. In the late 1990s, Ireland and Hitt (1999) made the distinction between resources and capabilities by suggesting that resources are a firm's "fundamental" financial, physical, individual and organizational capital attributes, while capabilities are those attributes of a firm that enable it to exploit its resources in implementing strategies.

The RBV indicates that a firm can be regarded as a bundle of resources and competencies that play the most critical role and underpin a firm's competitive advantage and organizational performance (Barney, Jay B. 1996).

RBV develops a series of propositions based on its resource definitions and key assumptions. Among these propositions, four are particularly important to RBV logic (Peteraf 1993), namely: (1) factor market competition and temporary rents; (2) resource heterogeneity and temporary competitive advantages; (3) resource heterogeneity and immobility and persistent competitive advantage; and (4) factor market competition and sustained economic rents. Wernerfelt (2014) argues that the fundamental lesson of the RBV is for a firm to focus on what it can do better than others.

The two critical assumptions of RBV are resource heterogeneity and immobility. Heterogeneity in resources leads to market equilibrium as companies that are superior in terms of resource endowments and their ability to deploy their resources are more prepared to produce superior product offerings compared to their competitors (Dickson 1992). The concept of immobility suggests that some resources, some of the time, may be inelastic in supply, that is, more of a particular resource is not forthcoming even though demand for that resource is greater than its supply. Moreover, resources are difficult to flow from one firm to another (Barney, Jay B & Arikan 2001).

RBV proposes that a firm's performance is largely based on its resources and capabilities (Grant 1991). In other words, the organization's performance and competitive advantage – measured by rents or, more broadly, profit-earning ability –

is largely determined by its resources and capabilities, particularly those which are valuable, rare, inimitable and non-substitutable (VRIN) (Barney, J 1991; Smith, KA, Vasudevan & Tanniru 1996). RBV has become one of the dominant theoretical perspectives in strategic management and has been widely used in many disciplines, such as human resource management, innovation management, economics, marketing and international business (Barney, Jay B, Ketchen & Wright 2011). The influence of RBV owes much to its increasing use within the strategic management literature, flexibility to accommodate new theoretical insights and ability to be integrated into another perspective (Barney, Jay B, Ketchen & Wright 2011). It is widely agreed that this theory suggests that if the organization has all related resources combined with certain capabilities, it may ease the implementation of the firm's resources and capabilities and enhance performance.

This research asserts that the NPP implementation model positively affects NPP making it critical to identify how organizations utilize their capabilities in this area to enhance its NPP.

A firm consists of a collection of productive resources (Penrose, ET 1959) which can only contribute to the competitive position of a firm if they are exploited in such a way that they provide the firm with potentially valuable services. It is the firm's current stock of resources and how they are deployed that form the direction and speed of the firm's growth. Rubin (1973) recognizes, like Penrose, that resources are of value only if they are exploited, claiming that to make them useful, firms must process raw resources. Penrose and Rubin, Wernerfelt (1984) likewise assume that firms may achieve beyond average returns by identifying and acquiring resources that allow effective product market strategies to be implemented.

Contrary to the framework of industry analysis by Porter (1990) and Wernerfelt (1984) revealed that the sources profitability originates from the external environment and discovered that particularly the characteristics of the industry and the position of the firm is within the industry. The RBV proposes that the profitability of a firm is largely

determined by the nature of a firm's resources and capabilities that are valuable, rare, inimitable, and supported by the organization (Amit & Paul 1993; Barney, J 1991).

Barney, J (1991) was considered the first paper to formalise the RBV literature into a comprehensive, empirically tested theoretical framework. His framework assumes that resources and capabilities are distributed heterogeneously among companies and are imperfectly mobile. Such assumptions allow differences in firm resource endowments to occur and continue over time, resulting in firms with superior resource endowments enjoying a competitive advantage (Newbert 2007). Accordingly, firms with valuable, rare, inimitable and non-substitutable resources will be able to avoid competitors and maintain a competitive advantage over time (Barney, J 1991).

However, Priem and Butler (2001) critique the static nature of Barney's theoretical framework claiming that very little is known about the process (often referred to as the 'black box') of turning valuable, rare, inimitable and non-substitutable assets into a sustainable competitive advantage.

RBV researchers emphasised the importance of the process in transforming resources into financial performance and a competitive advantage in reaction to the missing link between resources possession and resource exploitation. For instance, Mahoney and Pandian (1992) suggested that it is the distinctive ability of the firm to leverage its resources that contribute to the firm achieving rents rather than having better resources. Likewise, a firm needs to leverage (Peteraf 1993) and manage its assets (Henderson & Cockburn 1994) to achieve a competitive advantage. Makadok (2001) also stressed that while a particular resource or capabilities provides potential latent benefits, each is not going to work in isolation. He claims that if a firm acquires better resources than competing firms and exploits them with proper capabilities, it can generate economic profit. Similarly, the capabilities of a firm will not create value if the firm fails to acquire the required resources. Bahadir, Bharadwaj and Srivastava (2008) further suggested that the process of transforming resources has been dominated by the role of resources in generating a competitive advantage.

Several researchers argued that easily acquired resources such as business assets and standardized process solutions will not necessarily lead to a sustained competitive advantage (Miller & Le Breton-Miller 2003; Ray, Barney & Muhanna 2004). In response, the RBV literature shifted its focus from resources to the processes in which resources have to be subjected to the full level of their values. The academic work on processes includes core capabilities (Leonard-Barton 1992), combinative capabilities (Kogut & Zander 1992), organizational capabilities (Russo & Fouts 1997), capabilities (Amit & Paul 1993), transformation-based competencies (Lado, Boyd & Wright 1992) and competences (Reed & DeFillippi 1990). The RBV scholars have begun to focus on the effect of these resource deployment processes (Barney, Jay B & Mackey 2005; Sirmon, Hitt & Ireland 2007) or capabilities (Kale & Singh 2007; Slater, Olson & Hult 2006) on firms' performance.

The emphasis on the role of capabilities extended the RBV theory, as it suggests that deployments of resources can be more effective drivers of sustainable competitive advantages than resources alone (Pisano & Teece 2007; Teece, Pisano & Shuen 1997). Nevertheless, DeSarbo et al. (2005) argued that a firm's ability to deploy resources through organizational capabilities may be more important than the absolute resource levels in driving performance.

RBV scholars have described capability as the ability of a firm to deploy resources, typically in combination with organizational processes, to achieve the desired end (Amit & Paul 1993). For firms to benefit from their resources, they must-have capabilities that are defined as bundles of skills and knowledge to deliver skills and coordinate their activities in such a way that competitive advantages are generated (Barney, J 1991; Day, George S 1990).

Given the conceptual and theoretical research on processes of resource deployment, there has been little empirical work to verify this theory (DeSarbo et al. 2005). Newbert (2007) found in his study of the RBV, that only eight of 55 related articles in leading management journals discussed aspects of both strategy and capabilities. Moreover,

only about half of the hypotheses tested were supported in those eight articles. This view is in line with other scholars who emphasize that the processes that intervene between resources and performance remain poorly understood and require further examination (Crook et al. 2008; Ketchen, Hult & Slater 2007; Sirmon, Hitt & Ireland 2007).

Newbert (2008) noticed that valuable and rare resources may not necessarily lead to excellent performance. A firm must first achieve the competitive advantages of combined exploitation that enable the firm to reduce costs, exploit market opportunities or neutralize competitive threats.

Additionally, Newbert (2007) stated in his analysis empirical work on RBV that the RBV has earned only moderate overall support. Consequently, Crook et al. (2008) critique Newbert's statistical approach as having important limitations such as the inability to compensate for sampling error claims for the possession of resources, especially resources that meet RBV criteria outlined by Barney, J (1991). Crool et al. (2008) concluded that contrary to Newbert's findings that RBV that has 'received only moderate support overall', the hypothesis of the RBV theory that resources drive performance still has strong support.

Although RBV has become one of the most influential theoretical perspectives to understand the drivers of superior performance and is a general theory about the relationship between resources and firm performance, it has limitations. For example, Kleinschmidt, Brentani and Salomo (2007) pointed out that traditional RBV does not explain how and why some firms achieve a competitive advantage in circumstances of unpredictable and rapid change. Moreover, according to Eisenhardt and Martin (2000), the real sources of competitive advantage are the capabilities whereby managers integrate, build and reconfigure the firm's internal and external competencies and resources to address changing environments. Additionally, RBV does not provide specific mechanisms through which the firm's resources and capabilities affect organizational performance, nor does it consider resources or

actions independently. Therefore, RBV provides an incomplete understanding of the underlying factors behind the firm's performance (Ahmad Husairi 2014).

Research is needed to better explain the link between resources, competencies and capabilities within the competitive environment a firm operates (Barney, Jay B & Zajac 1994).

4.3 The Development of a Theoretical Framework for New Product Performance

With regard to the application of RBV in product innovation and notwithstanding a significant body of research on the market, technology and entrepreneurial orientations, the nature of the relationship between a firm's strategic orientations (an important part of a firm's culture and resources) and product innovation outcomes remains under investigation (Grinstein 2008a, 2008b; Henard & Szymanski 2001; Kirca, Jayachandran & Bearden 2005).

Strategic orientations are seen as principles and regarded in the literature as the key resources which direct and influence the activities of a firm, and generate the behaviours intended to ensure its growth and performance (Hakala 2011). Strategic orientation facilitates a match between firm strategy and resource endowment. Major types of strategic orientations (i.e. market orientation, entrepreneur orientation and technology orientation) (Mu & Benedetto 2011) influence the front end of innovation (Spanjol, Qualls & Rosa 2011).

Building on the RBV perspective, extant research has shown that a firm's new product performance is primarily affected by its resources and competencies, particularly marketing and technological capabilities (Eisend, Evanschitzky & Calantone 2016; Kim, N, Shin & Min 2016; Morgan, NA, Vorhies & Mason 2009; Mu 2015) where the concept of 'resources' covers both firms' resources and capabilities. A firm's capabilities are its skills to deploy its resources and can be dynamic when the firm implements new strategies to reflect changing market environments by combining and transforming available resources in new and different ways (Teece, Pisano & Shuen

1997). Helfat (2000) and Teece, Pisano and Shuen (1997) argued that while possessing valuable, rare, inimitable and non-substitutable resources may be beneficial, firms also require complementary capabilities to be able to deploy the available resources in ways that match the market conditions and in order to drive firm performance. This research, therefore, aims to investigate the impact of the firm's resources and capabilities on new product performance, and the mechanism of how the resources and capabilities of the firm can influence new product performance.

Although prior research has examined the link between a firm's resources and capabilities and new product performance, little research has been devoted to the mechanisms on how such resources and capabilities have been used for improving NPP. This gap is referred to as a "black box" in the literature. The role of a firm's ambidexterity can be an important moderator between a firm's capabilities and new product performance. Such a critical mechanism can be responsible for transforming firms' capabilities into superior performance and thus needs further examination.

The role of ambidexterity in using a firm's resources and capabilities to improve its organizational performance remains unknown in terms of how a firm's resources have been explored or exploited to influence its organizational performance, including new product performance (Li, Y-H & Huang 2012). Most of the empirical studies of ambidexterity so far have focused on large firms (Uotila et al. 2009) making the study of how SMEs can benefit from their resources and how ambidexterity works in SME innovation a considerable theoretical contribution.

The theoretical framework proposed below outlines the main constructs: the firm's strategic orientations, the firm's capabilities, the firm's ambidexterity and the firm's new product performance so as to investigate the relationships between these areas also outlined in Figure 4.1.

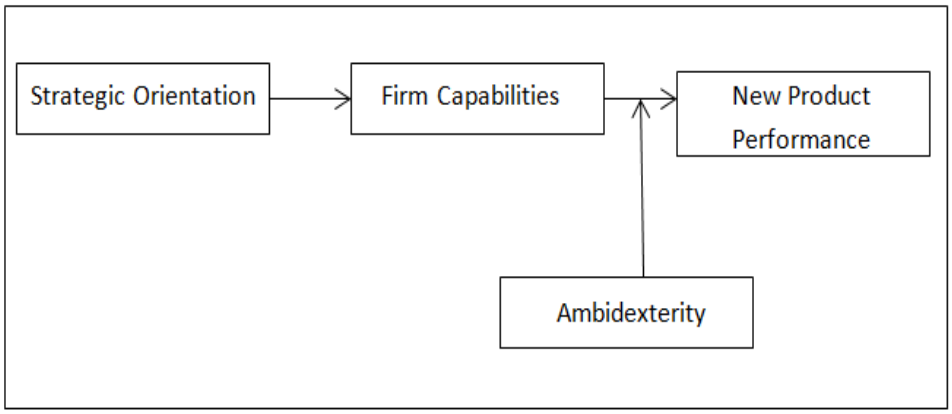


Figure 4.1: A theoretical framework for new product performance

It is important to hypothesize the relationships between constructs as per the theoretical framework illustrated in Figure 4.1, and these are presented as follows. Next, the conceptualization of all the constructs are discussed to establish appropriate hypotheses for this research.

4.4 Concept Definition and Hypotheses Development

This section discusses the conceptualization of all the constructs forming the theoretical framework and hypothesizes their relationships based on the RBV and empirical findings from the analysis of the literature.

4.4.1 Strategic Orientation

Strategic orientations are the principles that direct and influence the activities of the firm and generate the behaviours essential for the performance of the firm (Gatignon & Xuereb 1997). Different literature streams have developed their own orientation constructs such as customer orientation, entrepreneurial orientation and technology orientation to approach the problem from their specific perspectives (Hakala & KohtamÄKi 2010). Previous studies from Atuahene-Gima (1995), Im, Workman Jr and John (2004) and Langerak, Hultink and Robben (2004) investigated the relationship

between specific strategic orientation (market orientation) impacts on new product performance.

This research will study the three dimensions of strategic orientations: market, entrepreneur and technology orientation that can affect a firm's capability and new product performance. Hakala (2011) modelled strategic orientations as the independent variable to understand the influence of the orientations which can be combined in different ways to achieve the same objectives. The configuration of orientations in the manufacturing industry as discussed in this thesis can contribute to developing an understanding of the appropriate types of the strategy used in different industries.

The conceptualization of the three dimensions respectively forming strategic orientations is discussed in the next three sections, starting with market orientation, followed by entrepreneur orientation and finally, technology orientation.

4.4.1.1 Market Orientation

Researchers have employed numerous variables to define market orientation. Market orientation is defined by some as the organizational generation of market intelligence pertaining to current and future customer needs, dissemination of intelligence across departments and organizational responsiveness to this intelligence (Kohli, Ajay K. & Jaworski 1990). More specifically, Narver and Slater (1990) proposed three different subdimensions for market orientation, namely, customer orientation, competitor orientation and inter-functional coordination.

The concept of market orientation has been investigated in the marketing literature for decades and has become more important in other disciplines in recent years with the increasingly competitive global markets. Market orientation perspectives can be classified into the behavioural and the cultural stream (Kohli, Ajay K. & Jaworski 1990). These two groups of researchers, Narver and Slater (1990) and Kohli, Ajay K. and Jaworski (1990), have been important to the advancement of the market orientation concept.

Market orientation measures have been critique for emphasizing customers' expressed wants and needs but neglecting the latent needs of customers (Berthon, Hulbert & Pitt 1999). Sandvik and Sandvik (2003) found that the combination of dimensions reflects a market orientation that is valuable, rare and most likely to be costly when duplicated by competitors. The market orientation subdimensions cannot be seen as an independent representation of capability.

The measurements of market orientation employed in this research are based on the writings of Kohli, Ajay K. and Jaworski (1990) and Narver and Slater (1990) to fully integrate the different dimensions of market orientation. The following section discusses entrepreneur orientation, one of the strategic orientations dimension studied in this research.

4.4.1.2 Entrepreneur Orientation

Firms that tend to act autonomously, are willing to innovate and take risks, and have a tendency to be aggressive toward competitors and proactive relative to marketplace opportunities, are characterized as being entrepreneur orientated. Entrepreneur orientation is part of a strategic orientation which captures the specifically entrepreneurial aspects of a firm's strategies (Covin & Slevin 1986; Lumpkin & Dess 1996; Rauch et al. 2009). The entrepreneur's tendencies toward risk-taking, innovativeness and proactiveness are considered essential to entrepreneurial orientation.

Miller (1983) is regarded as a pioneer in developing the relative measurements of entrepreneur orientation and used the dimensions of "innovativeness," "risk-taking" and "proactiveness" to characterize and test entrepreneurship. Numerous researchers have adopted an approach based on Miller, as does the research presented here in this thesis.

Innovativeness reflects a firm's propensity to participate in and support new thoughts, novelties, experimentation and innovative processes that may result in new products, services or technological procedures. According to Kimberly (1981), innovativeness

represents a necessary willingness to depart from existing technologies or practices and venture beyond the current state of the art. In the broadest sense, innovativeness can occur along a continuum from a simple willingness to either try a new product line or experiment with a new advertising venue, to a passionate commitment to master the latest in new products or technological advances.

The concept of risk-taking is a quality that is frequently used to describe entrepreneurship and to differentiate entrepreneurs from hired employees, with a focus on the uncertainty and riskiness of self-employment. Risk has numerous meanings, depending on the context in which it is undertaken. Accordingly, firms with an entrepreneurial orientation are often represented by risk-taking behaviours, such as incurring heavy debt or making substantial resource commitments, in the interest of obtaining high returns by seizing opportunities in the marketplace (Lumpkin & Dess 1996).

Proactiveness can be of great importance to entrepreneur orientation because it suggests a forward-looking perspective that is accompanied by innovative or new venturing activity. Miller (1983) described an entrepreneur firm as one that is “first to come up with ‘proactive’ innovations”, a view supported by Lumpkin and Dess (1996) who maintain that a proactive firm is a leader rather than a follower because it has the will and foresight to seize new opportunities, even if it is not always the first to do so. The following section discusses and explains the conceptualization of technology orientation.

4.4.1.3 Technology Orientation

Firms today are forced to enhance their technological expertise to be competitive in the market and specifically in their respective industries, due primarily to the rapid advancement of technologies and the shortened life cycles of products and services. Technology orientation is described as the capability and strong willpower of firms to utilize sophisticated techniques in developing new products, rapidly integrating the latest technologies in business operations and proactively developing new

technologies as well as committing to create new product ideas (Gatignon & Xuereb 1997). Gatignon and Xuereb (1997) also found that technology-oriented firms excel in technical proficiency that drives innovation since these firms generally dedicate more resources to research and development (R&D) and actively employ the latest technology.

Technology-oriented firms can also have a robust and innovative capability. According to Gatignon and Xuereb (1997), firms should develop their technological orientation and their innovative capacity to increase their competitive advantage. It is very common for a technology-oriented firm to undertake complex, high risk and advanced innovation projects (Barczak 1994).

Accordingly, this research adapts the measurement of technology orientation to include the use of sophisticated technologies in new product development (Van de Ven, 1986), the rapid integration of new technologies (Kanter, 1988), proactive measures in developing new technologies (Burgelman & Sayles, 1986; Garud & Van de Ven, 1989) and proactive generation of new ideas (Kanter, 1988). The next sections discuss firm capabilities as another focal point of the theoretical framework of this research.

4.4.2 Firm Capabilities

Firm capabilities are the “complex bundles of skills and accumulated knowledge that enable firms to coordinate activities and make use of their assets” (Day, George S 1994). Similarly, Zhou and Wu (2010) defined them as the glue that brings organizational assets together and deploys them advantageously. Day, George S (1994) discussed the critical role of firm capabilities as a firm’s attempt to achieve advantage and superior performance, which differs from assets in that they are not observable, are difficult to quantify and cannot be given monetary values, as is the case for tangible plants and equipment.

Additionally, capabilities are deeply fixed in the organizational routines and practices and cannot be traded or imitated. Therefore, capabilities are the most likely source of

a competitive advantage. The following sections discuss the two very important and frequently studied dimensions of firm capabilities for product innovation: marketing capabilities and technological capabilities.

4.4.2.1 Marketing Capabilities

Research in the marketing literature focuses on market-related capabilities, which facilitate the effective deployment of market-based assets (Theodosiou, M, Kehagias, J & Katsikea, EK 2012). Marketing capabilities can also help an organization build and maintain a long-term relationship with customers and channel members.

Marketing capability concerns a firm's abilities in environmental scanning, market planning, market implementation and marketing skill development (Su, Peng, et al. 2013). Marketing capability can assist firms in introducing their products to customers in the best place, at the best time and at the best price, all of which can help firms realize greater profits (Morgan, NA, Vorhies & Mason 2009).

Measurement items for marketing capabilities in this research were derived from existing, well-validated scales identified by Song and Parry (1997). All items employed a Likert scale on a comparative basis, where respondents were asked how they rated their firm's capabilities in comparison to their major competitors.

4.4.2.2 Technological Capabilities

Technological capability reflects a firm's abilities to develop and use technological resources (Song, M et al. 2005) often calls for strong resource commitments. Since a firm's resources are limited, greater resources devoted to technological capabilities imply resources for commercializing product innovation, which increases returns from the innovation (Su, Xie, et al. 2013), an approach applied to this research where resources in small and medium enterprises are limited compared with larger firms.

A study conducted by Khayyat and Lee (2015) developed a new innovation measurement tool called a technological capability index (TC-index) to measure technological capabilities in developing countries. The four items measured in terms

of technological capabilities in this research were adapted from Song, XM and Parry (1997) as they best suit the research of SMEs in Malaysia.

4.4.3 Firm Ambidexterity

Firm ambidexterity refers to the ability of an organization to both explore and exploit the firm's resources so as to compete in markets where effectiveness, efficiency, control and incremental improvement are prized. Flexibility, autonomy and experimentation are also needed to compete in new technologies and markets (O'Reilly & Tushman 2013).

March (1991) views exploitation to be about efficiency, control, certainty and variance reduction, while exploration is about search, discovery, autonomy and innovation. Firms need to engage in sufficient exploitation and devote enough to exploration to ensure its current and future viability.

Recent studies (Caspin-Wagner, Ellis & Tishler 2012; Geerts, Blindenbach-Driessen & Gemmel 2010; Goossen, Bazzazian & Phelps 2012; Jansen, Van den Bosch & Volberda 2005; Raisch et al. 2009) used large samples with longitudinal data identify the effects of ambidexterity over time on organizational performance. While other studies focused on large and multi-unit firms (Raisch & Birkinshaw 2008; Tushman & O'Reilly III 1996) this research seeks to understand how ambidexterity works in small and medium-sized enterprises (SMEs). The following subsections are devoted to the discussion of the effect of a firm's ambidexterity dimensions on two of their capabilities, and the exploitation and exploration of a firm's marketing and technological capabilities.

4.4.3.1 Exploitation and Exploration of Marketing Capabilities

Exploitation is associated with the development of new knowledge about the firm's existing markets, products and capabilities, including activities such as refinement, efficiency, selection and improvement (March 1991) Exploration refers to activities such as search, variation, experimentation and discovery that goes beyond what is currently known about markets, products, technologies and capabilities. These

adaptive processes are seen as important variables in helping a firm achieve and retain a competitive advantage (March 1991).

Evidence from the marketing literature shows that marketing capabilities are important drivers of firm performance. However, very little is known about how firms use and improve their marketing capabilities (Vorhies, Douglas W & Morgan 2005). For example, marketing capabilities may be improved and new marketing capabilities may be created through the embedding of new market knowledge (Grant 1996). Or existing customer-focused marketing capabilities may be improved and new customer-focused marketing capabilities can be created through marketing exploitation and exploration (Vorhies, Douglas W., Orr & Bush 2011). Vorhies, Douglas W., Orr and Bush (2011) also found that ambidexterity in marketing exploitation and exploration exists and reported that firms cannot do both at high levels without risking a negative impact on customer-focused marketing capabilities.

This research seeks to understand and empirically examine the role of marketing exploitation and exploration within the relationship of firm capabilities and new product performance. A five-point Likert scale has been adopted from Atuahene-Gima (2005) with four items to measure marketing capabilities, exploitation and exploration.

4.4.3.2 Exploitation and Exploration of Technological Capabilities

According to March (1991), “the essence of exploitation is the refinement and extension of existing competencies technologies, and paradigms [whose] returns are positive proximate and predictable [whereas] the essence of exploration is experimentation with new alternatives [whose] returns are uncertain, distant, and often negative” (p.85).

Innovation is critical for firms to attain a sustainable competitive advantage and adapt to turbulent environments (Uotila et al. 2009; Zahra & George 2002). A firm must search, identify and assess alternative information from different sources in order to create innovation. After identifying possible useful information, the firm must transfer that understanding from the source and edit it to make it understandable to the firm.

The firm must then use and transform the knowledge into particular product models that constitute product innovation (Carlile 2004; Smith, KG, Collins & Clark 2005).

Technological capabilities are the set of skills the firm has in building and leveraging different technologies and systems (Zahra & Nielsen 2002). Technological capabilities are multifaceted (Zahra, Neubaum & Larrañeta 2007) and include R&D, manufacturing and combined capabilities. Research has established the critical role of technological capability in innovative activities. For instance, Moorman and Slotegraaf (1999) discovered that technological capabilities not only foster new product creativity but also promote the pace of product development while Cohen and Levinthal (1990) indicated that technological capabilities encourage organizational learning and generate product innovation.

An organization's long-term success depends on its ability to exploit its current capabilities while simultaneously exploring fundamentally new competencies (Levinthal & March 1993; March 1991). Understanding the technological capabilities of a firm from an ambidexterity perspective is still unclear especially in SMEs that often have limited resources and capabilities compared with larger counterparts.

4.4.4 New Product Performance

New product performance has been examined by researchers in several disciplines, including marketing, strategic management, organizational behaviour, engineering and operations management. New product performance is extremely important to firms since it echoes the analysis of measurement and comparison of current achievement subsequent to specific goal achievement (Yang, Y et al. 2012b).

The success of a firm is not just difficult to achieve, but also multifaceted and difficult to measure. The success or failure of a new product development project in a firm can be assessed in many ways, including customer satisfaction, financial return and technology advantage (Griffin & Page 1996).

This thesis adopted the measurements of new product performance developed by Griffin and Page (1996) as the firms to be surveyed consist of SMEs from different industries which may adopt different strategies. The measurements included customer satisfaction, revenue goal, profitability goal, launch on time, quality guideline and performance specification to assess overall product development success. The following section explains the construct specification that formed the basis for the development of the conceptual framework and the hypothesized relationships.

4.4.5 Hypotheses Development

The proposed theoretical framework depicted in Figure 4.1 specifies the relationships between strategic orientations, firm capabilities, firm ambidexterity and new product performance so as to examine the impact of strategic orientations and firm capabilities on new product performance, whether firm capabilities mediate the relationship between strategic orientations and new product performance, whether firm ambidexterity moderates the relationship between firm capabilities and new product performance.

4.4.5.1 Strategic Orientation and New Product Performance

According to strategic orientation literature and strategic choice theory, a firm's strategic orientations are critical, because they are part of a firm's strategy that involves the commitment of a large number of resources to develop these orientations. Most literature focused on a particular strategic orientation and the effect of the orientation on firm performance (Gnizy, E. Baker & Grinstein 2014) and found that a particular orientation, such as market orientation and entrepreneur orientation, can positively influence a firm's performance (Kirca, Jayachandran & Bearden 2005; Rauch et al. 2009).

Strategic orientation originally derived from the market orientation concept, a popular means of measuring firm performance. A strategic orientation offers a means to comprehend the actions that firms take to enhance their profitability and competitive advantage. Strategic orientation reflects core abilities leading to superior and

sustainable company success (Lau & Bruton 2011). Research analyzing more than one strategic orientation though is comparatively limited (Deutscher et al. 2016; Hakala 2011).

Studies from the 1990s on market orientation and performance link (Kohli, Ajay K. & Jaworski 1990; Narver & Slater 1990) found that a high level of market orientation leads to superior business performance because the orientation provides unifying efforts and projects of individuals and departments within the organization.

Market orientation is also an important antecedent of product innovation behaviours, activities and performance (Atuahene-Gima 1996a; Slater & Narver 1994) though empirical results are inconsistent with several researchers finding negative or non-significant relationships between market orientation and organizational performance (Greenley 1995; Harris 2001).

A study by Atuahene-Gima and Ko (2001) identified market orientation and entrepreneur orientation to be synergistic where both interact positively to affect product innovation activities and performance. An alignment between market orientation and entrepreneur orientation is argued to be valuable, difficult to imitate and a rare resource that provides the firm with the competency to develop and market new products to customers with benefits superior to those offered by the competition. The resource-based theory supports these observations (Barney, J 1991) so this research aims to test the impact of each dimension of the strategic orientation separately on new product performance.

Firms with higher entrepreneur orientation are more open to new information, more eager to engage in dynamic learning processes and more willing to invest in cooperative R&D and product development, all to generate stronger innovation, positively related to innovative and financial performance (Jiang et al. 2016). Entrepreneur orientation has a significantly positive effect on performance and on the ability to bring technology and products quickly to the market (Clausen & Korneliussen 2012).

Firms with strong entrepreneur orientation can perform much better than those without (Hult, Snow & Kandemir 2003; Rauch et al. 2009). In other studies, entrepreneur orientation has been shown to impact on new product development (NPD) performance positively (Danneels, Erwin & Kleinschmidt 2001; Li, Y et al. 2008). The ability to take risks, be more innovative and initiate change sets firms apart from low-entrepreneur orientation firms in terms of NPD performance (Zhou, Yim & Tse 2005). Each subdimension of entrepreneur orientation has its unique benefits that may provide the firm with capabilities to enhance NPD performance (Morgan, T et al. 2015). Therefore, this research has developed the following hypotheses:

H1a: A firm's market orientation has a positive effect on its new product performance.

H1b: A firm's entrepreneur orientation has a positive effect on its new product performance.

Narver and Slater (1990) focused on technology orientation and argued that strategic orientation is a critical component of profitability for both manufacturing and service firms.

A firm wishing to develop an innovation that is superior to the competition needs to have a strong technology orientation (Gatignon & Xuereb 1997). Consumers favour products and services with technological superiority. Consistent with this viewpoint, firms allocate their resources to R&D, acquire new technologies actively and use sophisticated new technologies (Gao, Zhou & Yim 2007). Empirical evidence also shows that a firm with a technology orientation has a positive relationship with new product performance (Gatignon & Xuereb 1997) and firm performance (Voss & Voss 2000). These observations lead to the development of the following hypothesis:

H1c: A firm's technological orientation has a positive effect on its new product performance.

4.4.5.2 Firm Capabilities and New Product Performance

Extant literature has established the role of marketing capabilities in a firm's performance outcome generally and for new product development performance specifically (Calantone, Roger J., Harmancioglu & Droge 2010; Morgan, NA, Vorhies & Mason 2009; Mu 2015; Vorhies, Douglas W., Orr & Bush 2011). Findings in several studies, (Helfat 2000; Su, Peng, et al. 2013) show that the integration of technological capability and marketing capability is the most effective way to leverage these capabilities.

Complementary effects of resources are more likely to deter competitors from imitation and thus increase firm effectiveness (Hsu, TT et al. 2014; Moorman & Slotegraaf 1999; Ngo & O'Cass 2012). These effects can occur in different forms such as resources–resources, resources–capabilities and capabilities–capabilities of marketing and technology as evidenced in several studies (Moorman & Slotegraaf 1999; Song, M et al. 2005) that examined the impact of complementary marketing capabilities and technological capabilities on firms' organizational performance.

The resource-based view (RBV) indicates that a firm with superior marketing capabilities can achieve superior business performance because the firm can provide its target customers with a greater value such as higher quality products, competitive sales prices and better customer services (Takata 2016). Empirical studies consistently suggest that marketing capabilities have a direct positive effect on the firm's performance measure (Morgan, NA, Vorhies & Mason 2009) a view echoed by Ngo and O'Cass (2012) who maintained that marketing capabilities are significant drivers of firm performance. These researchers also reported that the impact of a firm's marketing capabilities on its performance is greater when the firm's market orientation influences the level of marketing resources it owns, and their capability to deploy such resources.

Capability-based theorists argue there is a difference in performances among firms with different resource possession (e.g. Prem & Butler, 2001; Ray, Barney & Muhanna,

2004). Variance in firm performance over time depends on which resources are deployed by the firm that match its dynamic market environment (Eisenhardt & Martin 2000; Morgan, NA, Vorhies & Mason 2009). Based on this logic, the impact of marketing capabilities on firm performance has been of significant interest to marketing scholars (Kim, N, Shin & Min 2016; Morgan, NA, Vorhies & Mason 2009; Vorhies, Douglas W., Orr & Bush 2011), especially when/since a firm's strong marketing capability not only provides communication and promotion of the new product in commercialization but can also play a leading role in developing a competitive new product (Kim, N, Shin & Min 2016).

Deployment of marketing capabilities has a significant effect on market share and profitability (Capron & Hulland 1999). Moreover, a firm's distinctive marketing capabilities influence its performance (Morgan, NA, Vorhies & Mason 2009) and firms can also create barriers to competitive imitation and acquisition with marketing capabilities, all of which can lead to superior firm performance (Krasnikov & Jayachandran 2008). Therefore, this research proposes that:

H2a: A firm's marketing capabilities have a positive effect on its new product performance.

Firms with strong technological capabilities can generate more value than those with weak technological capabilities (Wu, J 2014). The technological capabilities of firms from developing countries can facilitate innovation, which in return drives productivity growth (Katalinic et al. 2014).

Firms require stronger technological capabilities in developing new products because they can better assimilate and acquire the needed knowledge from outside sources (Ritala 2012), modify new product design, lower costs, and improve the quality of product innovation (Su, Xie, et al. 2013).

Technological capabilities have been considered a key factor in enabling firms of developing countries to perform better in innovation, which is critical to their economic development and international competitiveness (Katalinic et al. 2014). Companies

need to foster their technological capabilities to achieve strong performance, as argued by Barney, J (1991) and Barney, Jay B and Arikan (2001) based on the RBV. A firm with strong technological capabilities enables its product designs to make new products easy to manufacture, reduce development time and accelerate their launch time to targeted markets (Hsu, TT et al. 2014). Therefore, this research hypothesizes that:

H2b: A firm's technological capabilities have a positive effect on its new product performance.

4.4.5.3 The Mediating Effects of Firm Capabilities on the Relationship between Strategic Orientation and New Product Performance

Although the relationship between strategic orientation and firm performance has long been identified, little research has been devoted to understanding the mechanisms underlining the relationship. Hooley, GJ et al. (2005) suggested that one way to examine the effect of a firm's market orientation on its organizational performance is to understand the role of firm resources and capabilities. Any comprehensive configurational approach analyzing the effect of different configurations of entrepreneur orientation, market orientation and technological orientation on firm performance is still missing (Deutscher et al. 2016).

This research, therefore, proposes that firm capabilities, a key concept that describes the efficiency of the new product development (NPD) process, could be a missing link in the examination of a firm's strategic orientation to its new product performance. The following competing hypotheses propose that:

H3a: A firm's marketing capabilities mediate the relationship between market orientation and new product performance.

H3b: A firm's technological capabilities mediate the relationship between market orientation and new product performance.

H3c: A firm's marketing capabilities mediate the relationship between entrepreneur orientation and new product performance.

H3d: A firm's technological capabilities mediate the relationship between entrepreneur orientation and new product performance.

H3e: A firm's marketing capabilities mediate the relationship between technology orientation and new product performance.

H3f: A firm's technological capabilities mediate the relationship between technology orientation and new product performance.

4.4.5.4 The Moderating Effects of Firm Ambidexterity on the Relationship between Firm Capabilities and New Product Performance

Ambidexterity has been the subject of many studies in the mainstream marketing, technology and management literature, and the central management challenge and strategy to sustain and succeed in long-term business (March 1991).

Recent literature has also pointed out the role of ambidexterity in using the firm's resources and capabilities to improve its organizational performance, identifying ambidexterity as a potential mechanism by which a firm's resources affect its performance. However, when it comes to how a firm's resources have been explored or exploited to influence new product performance, much remains unknown (Li, Y-H & Huang 2012). The best practices using ambidexterity are believed to simultaneously balance between explorative and exploitative innovation (He & Wong 2004; Hughes et al. 2010; Raisch & Birkinshaw 2008; Raisch et al. 2009).

This research, therefore, is focusing on new product development in SMEs, an area and the role of ambidexterity (Chang & Hughes 2012; McDermott & Prajogo 2012) rather than large firms and ambidexterity (Uotila et al. 2009) as a moderating factor in the relationship between a firm's capabilities and new product performance. The following hypotheses, therefore, propose that:

H4a: The exploration of a firm's marketing capabilities moderates the relationship between marketing capabilities and new product performance.

H4b: The exploration of a firm's technological capabilities exploration moderates the relationship between technological capabilities and new product performance.

H4c: The exploitation of a firm's marketing capabilities exploitation moderates the relationship between marketing capabilities and new product performance.

H4d: The exploitation of a firm's technological capabilities moderates the relationship between technological capabilities and new product performance.

Figure 4.2 presents the theoretical framework and hypotheses to be tested in this research.

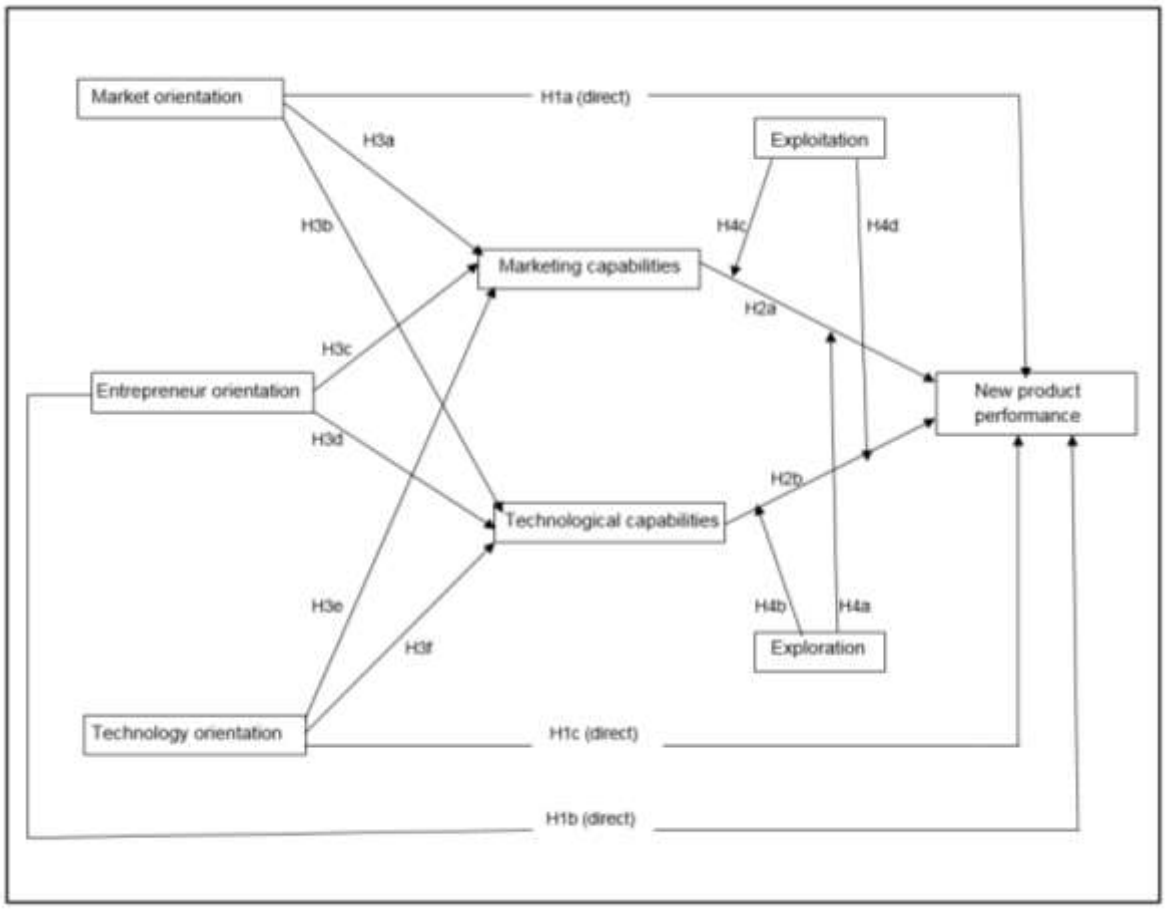


Figure 4.2: The hypothesized relationships among a firm's strategic orientations, capabilities, ambidexterity and new product performance

4.5 Summary

This chapter developed the theoretical framework (**Error! Reference source not found.**) and hypotheses regarding the relationships between the constructs in the framework. All research hypotheses developed are listed below:

H1a: A firm's market orientation has a positive effect on its new product performance.

H1b: A firm's entrepreneur orientation has a positive effect on its new product performance.

H1c: A firm's technological orientation has a positive effect on its new product performance.

H2a: A firm's marketing capabilities have a positive effect on its new product performance.

H2b: A firm's technological capabilities have a positive effect on its new product performance.

H3a: A firm's marketing capabilities mediate the relationship between market orientation and new product performance.

H3b: A firm's technological capabilities mediate the relationship between market orientation and new product performance.

H3c: A firm's marketing capabilities mediate the relationship between entrepreneur orientation and new product performance.

H3d: A firm's technological capabilities mediate the relationship between entrepreneur orientation and new product performance.

H3e: A firm's marketing capabilities mediate the relationship between technology orientation and new product performance.

H3f: A firm's technological capabilities mediate the relationship between technology orientation and new product performance.

H4a: The exploration of a firm's marketing capabilities moderates the relationship between marketing capabilities and new product performance.

H4b: The exploration of a firm's technological capabilities moderates the relationship between technological capabilities and new product performance.

H4c: The exploitation of a firm's marketing capabilities moderates the relationship between marketing capabilities and new product performance.

H4d: The exploitation of a firm's technological capabilities moderates the relationship between technological capabilities and new product performance.

The following chapter describes and discusses the research methodology used in this thesis, including the measures of the constructs and the development of the questionnaire, data collection and statistical techniques used for testing the hypotheses proposed in this chapter.

CHAPTER 5

METHODOLOGY

5.1 INTRODUCTION

This chapter presents the justification for the methodology used for data collection and analysis to examine the framework model proposed in Chapter 4. This chapter begins with an overview of the research paradigm, research design and then describes the development of the survey instruments, sampling and recruitment procedures, data collection procedures and data analysis methods.

5.2 RESEARCH DESIGN

A research design is a framework that guides the process of data collection and analysis for a study (Churchill Jr & Iacobucci 2005). Research design choice should be consistent with other elements of a research project. Determining a suitable research design for this research project is essential to the data generation and analysis strategy. Quantitative research is best applied for testing a theory or hypotheses with numerical data (Bryman 2008). To examine the phenomena from which particular understandings of this phenomenon can be gained, and explanations attempted, this research adopted a deductive quantitative approach as the methodology to investigate the relationships among a firm's strategic orientations, capabilities, ambidexterity and new product performance in Malaysian manufacturing firms. This research presents the exploratory research design, which is characterized by the extensive literature review, a collection of quantitative data, data analysis and the document itself. Table 5.1 shows the three stages of research.

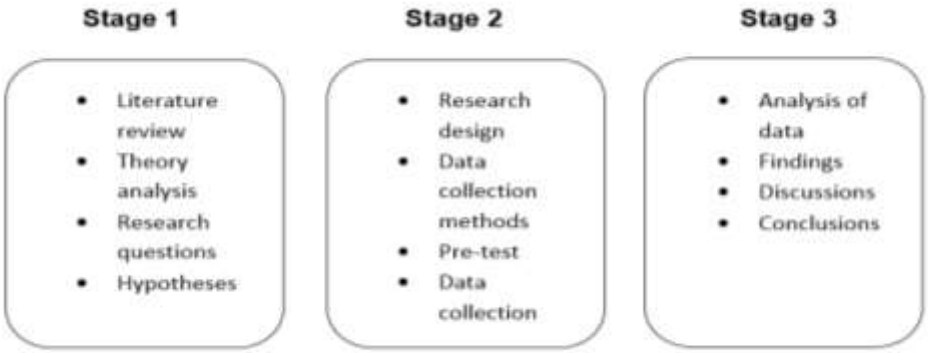


Table 5.1: The process of a deductive study

Source: Adapted from (Karami 2010) and author

Stage 1 of the research design was an extensive review of the literature including relevant models and information from prior studies relating to the dimensions of strategic orientation, theoretical models, and new product performance (i.e., customer satisfaction, revenue, profit). The dimensions of strategic orientation include market orientation, entrepreneur orientation and technology orientation. Firms' capabilities dimensions concentrate on marketing and technological capabilities (refer to Figure 4.2). The literature review analysis lead to establishing the research objectives; the theoretical model and hypotheses.

At Stage 2, data was collected using a survey in order to test the theoretical model and hypotheses. The main survey was conducted after the pre-test was done. The required sample was based on the sampling method (refer to 5.4.4) and the required sample number was derived from the need to perform structural equation modelling (SEM).

At the final stage, data was processed and examined using statistical methods. Data was first screened to check values were entered correctly, if there were missing values or outliers to confirm the normality on the distribution of the variables. Kline (2015) stressed the importance of these procedures as they can avoid the potential failure of the model estimation and the crash of fitting programs. After this stage, the cleaned

data was used for further statistical analysis process, followed by exploratory factor analysis (EFA), then confirmatory factor analysis (CFA) and lastly by the structural equation modelling (SEM).

SEM is a second-generation technique established to analyze the inter-relationship among multiple variables in a model. SEM has been accepted as an important tool for analysis in academic research (Anderson, JC & Gerbing 1988; Hair, Joseph F & Black 1998; Kline 1998), including strategic management (Hair, Joe F, Ringle & Sarstedt 2011; Morgan, RE & Strong 1998). SEM is known as an advanced multivariate statistical process which enables the researcher to construct theoretical concepts, to test their measurement reliability, to hypothesise and test a theory about their relationship, and also to take into account measurement errors and to consider direct and indirect effects of variables on one another (Awang, Z, Afthanorhan & Asri 2015; Hair, Joe F, Ringle & Sarstedt 2011).

5.2.1 Research Paradigm

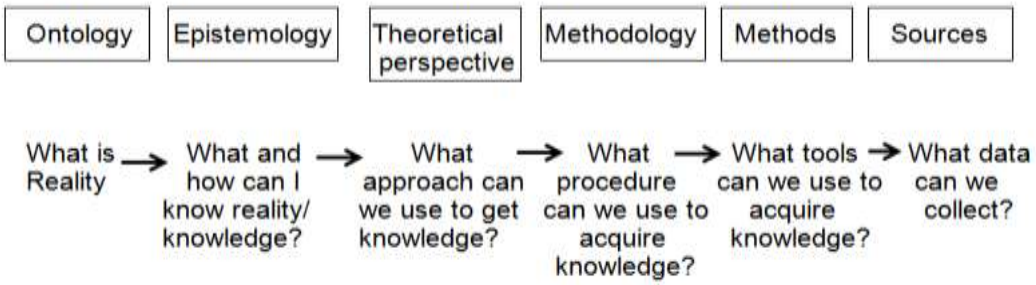
This research is generally associated with positivism because it describes an approach to the study of society that relies specifically on scientific evidence, such as experiments and statistics (quantitative research) to reveal a true nature of how society operates. The term ‘paradigm’ was originally used to describe the progress of scientific discoveries and a paradigm is a set of linked assumptions about the world that serve a regulative a framework of philosophical traditions shared by the members of a research community (Kuhn 1970; Kuhn & Hawkins 1963).

A research paradigm can be regarded as the “basic belief system or worldview that guides the investigator” (Guba & Lincoln 1994). Kuhn (1970) stated that a research paradigm is the set of common beliefs and agreements that were shared between scientists about how problems should be understood and addressed.

Research paradigms can be classified through their ontology, epistemology and methodology (Guba 1990). The ontology describes the “reality”; meanwhile, epistemology is the relationship between the reality and the researcher, and the

techniques used by the researcher in discovering that reality is known as a methodology. Ontology and epistemology guide the researcher to create a whole outlook of how knowledge is viewed, which approach is suitable for the researcher to use in order to acquire knowledge and choose the right methodological strategies to discover that knowledge. This relationship is illustrated in Figure 5.1 below:

Figure 5.1: The Relationship between ontology, epistemology and methodology



Source: Crotty (1998), Hay (2002) and Patel (2015)

Past research paradigms were examined to determine the most appropriate research paradigms and approaches to conduct this research. The four research paradigms proposed by Sobh and Perry (2006) are presented in Table 5.2 to show their differences. The next section justified the paradigm chosen for this research.

Table 5.2: Four research paradigms

Element	Paradigm Positivism	Constructivism	Critical theory	Realism
Ontology	Reality is real and apprehensible	Multiple local and specific "constructed" realities	"Virtual" reality shaped by social, economic, ethnic, political, cultural, and gender values, crystallised over time	Reality is "real" but only imperfectly and probabilistically apprehensible and so triangulation from many sources is required to try to know it
Epistemology	Findings true – researcher is objective by viewing reality through a "one-way mirror"	Created findings – researcher is a "passionate participant" within the world being investigated	Value mediated findings – researcher is a "transformative intellectual" who changes the social world within which participants live	Findings probably true – researcher or value-aware and needs to triangulate any perceptions he or she is collecting
Common methodologies	Mostly concerns with a testing of theory. Thus, mainly quantitative methods such as: survey, experiments, and	In-depth unstructured interviews participant observation, action research, and grounded theory research	Action research and participant observation	Mainly qualitative methods such as case studies and convergent interviews

	verification of hypotheses

Source: Based on Perry et al. (1999), which itself was based on Guba and Lincoln (1994).

Note: Essentially, ontology is "reality", epistemology is the relationship between that reality and the researcher and methodology is the technique used by the researcher to discover that reality.

5.2.2 Justification of Paradigm Choice

This research seeks to develop and validate a theoretical model and test the hypotheses developed in this model. The technique applied is the foundation of the positivist research strategies. According to Wicks and Freeman (1998), this method allows the researcher to test their hypotheses based on the objective being measured and leads to support their findings. The quantitative approach involves the verification of hypotheses, and also provides strong reliability and validity (Amaratunga et al. 2002; Cavana, Delahaye & Sekaran 2001).

The positivist belief focuses on the concepts that must be operationalized and empowers the realities to be measured quantitatively (Crossan 2003). The variables being investigated here are the dimensions of strategic orientation, firm capabilities, ambidexterity and new product performance. Therefore, to quantify the measurement of variables this research employed a questionnaire to test the hypotheses proposed on the relationship between variables, and then analyzed with rigorous statistical methods. Model validation of the measurement and structural model involves assessing construct validity and reliability using a structural equation modelling (SEM) technique. It is the role of the researcher to interpret the analysis results against the hypotheses and to ensure the data is not misinterpreted.

In the positivist assumption, the role of a researcher is to be independent when a topic or subject is being examined. Creswell and Clark (2007) emphasised that the researcher and reality are separate, and the results ought to be replicable regardless of who conducts the investigation, and the replication of the results is primarily for

verification purposes. This research uses the positivist approach because it offers a new opportunity to identify the dimensions of strategic orientations and firm capabilities and how this model impacts new product performance in Malaysian manufacturing firms.

5.2.3 Research Time Zone

The cross-sectional study design, also known as one-shot or status studies, is adopted here (Kumar, R 2005; Sekaran & Bougie 2016) due to the large population size of the Malaysian SMEs and their wide geographical location across Malaysia. This method is very useful when the collection of data on a phenomenon cannot be directly observed. This design is the best-suited investigation of the prevalence of a phenomenon, situation, problem or issue by taking a cross-section of a population. The overall picture that would be obtained at the time the study is conducted is the strength of this design. This approach was considered as the most popular form of survey, less expensive and easy to administer (Sekaran & Bougie 2016; Zikmund & Babin 1997). It has been reported that cross-sectional studies are appropriate to test the relationship between variables (Graziano & Raulin 1993; Samson & Terziovski 1999) making it appropriate to test the relationships among variables.

5.3 SURVEY DEVELOPMENT

5.3.1 Development of Survey Instruments

This research uses a survey questionnaire as an instrument to gather data. According to Messer and Dillman (2011), a good questionnaire generally should be simple, straight to the point and also readable (refer Section 4.3). This research used the validated scales (refer Section 5.3.2.2) adopted from the literature review and used in previous but different contexts. In designing the instrument the wording and arrangement of questions are also very important as the type of question, language used and order of items may lead to a biased response. Krosnick (2018) suggested conventional wisdom about optimal question design that can be summarised as follows, that is to:

- use simple and familiar words to avoid technical terms, jargon, and slang;
- use simple syntax;
- avoid words with ambiguous meaning, i.e., aim for wording that all respondents will interpret in the same way;
- strive for wording that is specific and concrete;
- make response options exhaustive and mutually exclusive;
- avoid leading or loaded questions that push respondents toward an answer;
- avoid double-barrelled questions, ask about one thing at a time; and
- avoid questions with single or double negations

The first question in the survey is a filter question and serves to filter the appropriate respondents and avoid asking questions that are not relevant to the target sample.

5.3.2 Questionnaire Design

Questionnaire design is considered a critical component in mail and internet surveys because it is a major means of communication between researchers and respondents (Dillman, Don A 2011; Dillman, D. A. et al. 2007).

5.3.2.1 Questionnaire Contents

Sekaran and Bougie (2016) defined a questionnaire as 'a preformulated written set of questions to which respondents record their answers". The most widely used data collection techniques within the survey strategy is a questionnaire (Cooper, RD & Schindler 2011; Kumar, S & Phrommathed 2005).

There are six parts to the questionnaire developed for this research. The first part of the questionnaire comprises the strategic orientation dimensions, followed with the second part which entailed firm capabilities. The third part of the questionnaire asks questions about the firms' ambidexterity. Part Four is about the new product development process and Part Five, the new product performance. The last part lists questions concerning the participants' demographic profile. It was estimated each

respondent would require approximately 15 to 20 minutes to complete the questionnaire (refer Appendix 1).

A five-point Likert-type scale is commonly and frequently used by researchers to measure the variables in interval-level measurement. This research measure the research variables of firms' strategic orientation, firms' capabilities, and ambidexterity. The Likert five-point scale is applied as follows:

1. Strongly Disagree
2. Disagree
3. Neither Agree nor Disagree
4. Agree
5. Strongly Disagree
6. Not Applicable/Do not measure

The five-point Likert scale items are constructed to represent ordinal categories, where the inclusion of Not Applicable/Do not measure would mean that six-item categories with a nominal scale level form the basis of an exhaustive statistical analysis. Not Applicable/Do not measure can be chosen by some respondents as some of the matters/items cannot be answered because it is not what they are practising. It is unreasonable for a person to be given no choice except to choose 1 – 5 for an item which is not applicable to them.

Parts 1-5 contained questions about the variables in the proposed model. The final part, Part 6 is the demographics of the respondents and their organizations. Table 5.3 summarises each part of the questionnaire contents.

Table 5.3: Summary of Each Part of the Questionnaire Contents

Section	Contents	Purpose
Part One	Sixteen questions • Six questions each measuring market orientation and entrepreneur orientation • Four questions measuring technology orientation	To assess the dimension that defined strategic orientations
Part Two	Eight questions • Four questions each measuring marketing capabilities and technological capabilities	To assess the dimensions of firm capabilities to test the mediation effect between the relationship of strategic orientations and new product performance
Part Three	Sixteen questions • Four questions each measuring marketing capabilities (exploitation and	To assess the firm ambidexterity explicitly on marketing capabilities and technological capabilities (exploitation and exploration)

	exploration) and technological capabilities (exploitation and exploration)	
Part Four	One question each • Procedure of new product development • Categories of new product developed • New product main target market • Twelve questions on steps taken in new product development process	To gather information about the processes of new product development involved in the firms
Part Five	One question each • Year new product launched • Does the firm measure success/failure of new product? • Degree of innovativeness of the product Six questions • Measure used to rate new product performance	To classify the degree of innovativeness of the new product and statement measuring of new product performance of their current new product launched. Following the Product Development & Management Association (PDMA) guidelines
Part Six	Eleven questions on respondents' demographic and organization	To cover the respondents' and firms' background

A cover letter containing the ethics approval, researcher's contact information, and the purpose of the study were included at the front page of the questionnaire (refer

Appendix 2). A Participation information consent form (PICF) was also attached to the questionnaire that highlights the importance of their participation in this thesis and the assurance of anonymity (refer Appendix 2).

5.3.2.2 Measurement Development

The questionnaire was developed using established measures. However, to test the content validity of measures originating from studies in developed nations such as the US, the UK/Europe and Australia, expert evaluation and a pre-test was undertaken in the Malaysian context.

Extensive evaluation of the questionnaire was firstly conducted by senior academics from the School of Management, RMIT University. They are the experts in the area of the study. According to Diamantopoulos and Winklhofer (2001), the evaluation is particularly fundamental for formative constructs used in the questionnaire. The format of the questionnaire was also refined to enhance readability and appearance. A pre-test was conducted (refer Section 5.3.3).

The first question uses a filter question “Yes or No” to help respondents avoid answering questions that do not pertain to them. Respondents who answer “Yes” to the filter question then continue to answer more detailed follow-up questions, whereas those who answer “No” are not qualified to respond further on the topic. The purpose of this filter question is to reduce respondent burden and not waste participant or researcher time in collecting meaningless data (Allen 2017). Since this research served to study new product performance the filter question was “Has your organisation developed a new product since 2014?” Participants answering “Yes” to the filter question proceeded to answer the rest of the questionnaire, whereas participants answering “No” did not.

The following sections explain the measure for each construct shown in the conceptual framework in Figure 4.1.

5.3.2.3 Measures of Market Orientation

Two market orientation measures are most widely used in the literature; the MARKOR (Kohli, Ajay K, Jaworski & Kumar 1993) and MKTOR scales (Narver & Slater 1990). Customer orientation and competitor orientation dimensions are "all activities involved in acquiring information about the buyers and competitors in the target market and disseminating it throughout the business(es)" (Narver & Slater 1990, p. 21). Inter-functional coordination refers to "the coordinated utilisation of company resources in creating superior value for target customers" (Narver & Slater 1990, p. 22), and in line with the extant literature, this research uses this established scale of market orientation.

The market orientation scale comprises six items: customer orientation (2 items), inter-functional coordination (2 items), and competitor orientation (2 items). Responses were recorded along a five-point Likert Scale ranging from 1 "Strongly Disagree" to "Strongly Agree". The two questionnaires were reversed to help response bias and consider reliability and validity of the questionnaire. Table 5.4 shows these items.

Table 5.4: Measures and instruments of the questionnaire for market orientation

Measures	Statements	Instruments and Remarks
Intelligence generation	1. We meet customers at least once a year to find out what products/services they will need in the future. 2. We do a lot of in-house market research.	Narver and Slater (1990) 5-point Likert scale
Market intelligence dissemination	3. We have an interdepartmental meeting at least once a quarter to discuss market trends and development. 4. Marketing personnel spend time discussing customers' future needs without our functional departments.	

Responsiveness to market intelligence	5. It takes us forever to decide how to respond to competitor price changes. 6. We tend to ignore changes in our customers' product/service needs.	

5.3.2.4 Measures of Entrepreneur Orientation

Miller (1983) suggested that a firm's degree of entrepreneurship could be seen as the extent to which they innovate, take risks, and act proactively. These three "entrepreneurial" dimensions of strategy were selected from total of eleven such dimensions (Miller & Friesen 1978). These innovative, proactive, and risk-taking actions taken by a firm may be affected by any number of actors inside or outside the firm (Shapero & Sokol 1982). The study of EO allows the introduction of traditional management terminology and variables such as strategy, performance, and organizational structure into entrepreneurship research.

Given the agreement that Miller (1983) conceptualization captures a wide range of a firm's entrepreneurial activities, its measures are used in this research to measure EO, a concept also proposed by Covin and Slevin (1986). A focus on innovation, proactiveness, and risk-taking is used here to refer to a firm's entrepreneurial orientation and is measured using five-items that comprise six items: pro-active (2 items), risk-taking (2 items), and innovativeness (2 items). Table 5.5 shows the measures and instruments of entrepreneur orientation.

Table 5.5: Measures and instruments of the questionnaire for entrepreneur orientation

Measures	Statements	Instruments and Remarks
Proactiveness	1. We act boldly in order to achieve objectives.	

	2. We typically adopt a very competitive posture.	
Risk-taking	3. We invest heavily in marketing. 4. We spend large amounts of money in new products/services.	Covin and Slevin (1989), Khadwalla (1976/1977) and Miller and Fiesen (1982) 5-point Likert scale
Innovativeness	5. We give special attention to research and development. 6. We consider new ideas/approaches as very important.	

5.3.2.5 Measures of Technology Orientation

Four items measured the technology orientation construct. A combination of scales provided a more comprehensive measurement of technology orientation. The items for the technology orientation scale relate to the use of sophisticated technologies in new products development (Van de Ven 1986), the rapidity of integration of new technologies (Kanter 1988), and proactivity in developing new technologies (Burgelman and Sayles 1986; Garud and Van de Ven 1989), and generating new products ideas (Kanter 1988).

A five-point Likert Scale ranging from 1 “Strongly Disagree” to 5 “Strongly Agree” was used to record the responses. Table 5.6 presents the items used to measure the technology orientation construct.

Table 5.6: Measures and instruments of the questionnaire for technology orientation

Measures	Statements	Instruments and Remarks

The use of technology orientation that represent the use of sophisticated technologies in new product development, integration of new technologies, proactivity in developing new technologies and generating new ideas.	1. We use sophisticated technologies in our new product development. 2. We use rapid integration of new technologies. 3. We are proactive in developing new technologies. 4. We are proactive in generating new ideas.	Van de Ven (1986), Kanter (1988), Burgelman and Sayles (1986), Garud and Van de Ven (1989) and Kanter (1988) 5-point Likert scale

5.3.2.6 Measures of Firm Resources

Firm resources: marketing and technological capabilities are measured by using the items developed by Song and Parry (1997) with four items each. In measuring marketing and technological capabilities, respondents were asked to rate the capabilities of their firm in comparison with their competitors along a five-point Likert Scale ranging from 1 “Much worse” to 7 “Much better”. Each scale for marketing and technological capabilities consisted of four items. Table 5.7 and Table 5.8 list the measures for constructs used in this research to measure marketing and technological capabilities.

Table 5.7: Measures and instruments of the questionnaire for marketing capabilities

Measures	Statements	Instruments and Remarks
Measure market-related capabilities such as marketing communications, and marketing relationship with partners	1. We are good at understanding customer needs. 2. We are good at creating customer relationships. 3. We are good at maintaining customer relationships.	Vorhies and Morgan (2005) 5-point Likert scale

	4. We are good at sharing trust and goals with strategic partners.	

Table 5.8: Measures and instruments of the questionnaire for technological capabilities

Measures	Statements	Instruments and Remarks
To asses a firm's ability to use various technologies.	1. We are acquiring important technology information. 2. We are identifying new technology opportunities. 3. We are responding to technology changes. 4. We are mastering state-of-art technologies.	Gatignon and Xuereb (1997) and Song (2005) 5-point Likert scale

5.3.2.7 Measures of Firm Ambidexterity (Exploitation and Exploration)

Marketing capabilities exploitation and exploration were measured using four items each following Atuahene-gima (2005). Meanwhile, technological capabilities exploitation and exploration also include 4-items each, also adapted from Atuahene-Gima (2005) to measure how firms divide attention and resources with explorative versus exploitative objectives.

According to March (1991, p. 71), exploitation and exploration are the two basic "adaptative processes". Exploitation refers to the development of new knowledge about the firm's existing markets, products, and capabilities, while exploration refers to the development of new knowledge that goes beyond what is currently known about markets, products, technologies and capabilities.

Respondents were asked to evaluate the product development team in the new product development processes. Responses were recorded by using a five-point Likert Scale ranging from 1 "Strongly Disagree" to 5 "Strongly Agree". Items measuring

marketing and technological capabilities (exploitation and exploration) or the firm ambidexterity are displayed in Table 5.9 and Table 5.10.

Table 5.9: Measure and instruments of the questionnaire for marketing capabilities ambidexterity (exploitation and exploration)

Measures	Statements	Instruments and Remarks
Exploitation	1. Consistently re-examining information from previous projects	

	and/or studies to modify existing marketing processes. 2. Routinely adapt existing ideas when developing new marketing processes. 3. Incrementally and routinely improve our existing marketing procedures. 4. Focusing changes in marketing procedures on improving efficiency.	Atuahene-Gima (2005), and Kyriakopoulos and Moorman (2004) 5-point Likert scale
Exploration	1. Continually developing new marketing procedures that are very different from others developed in the past. 2. Routinely introducing new marketing procedures which are daring, risky, or bold. 3. Consistently using market knowledge to develop new marketing processes which deliver different outputs from existing processes. 4. Using marketing knowledge to "break the mould" and create new marketing processes not used before	

Table 5.10: Measures and instruments of the questionnaire for technological capabilities ambidexterity (exploitation and exploration)

Measures	Statements	Instruments and Remarks

Exploitation	1. Upgrading current knowledge for familiar products. 2. Investing in exploiting mature technologies that improve the productivity of current innovation operations. 3. Enhancing abilities in searching for solutions to customer problems that are near to existing solutions. 4. Upgrading skills in product development processes in which the firm already possesses rich experience.	Atuahene-Gima (2005) 5-point Likert scale
Exploration	1. Acquiring manufacturing technologies and skills entirely new to the firm. 2. Learning product development skills and processes entirely new to the industry. 3. Acquiring entirely new managerial and organizational skills that are important for innovation. 4. Learning totally new skills in funding new technology and training R&D personnel.	

5.3.2.8 Measures of New Product Performance

Measuring new product outcomes from innovation is the focal of this research, so the PDMA measures suggested by Griffin (1993) were used to ask respondents to select their most recent new product and indicate whether they had measured the success of that project. If so, they were asked about the success measures used and how well they thought the new product had performed on the six core measures, using a five-point scale ranging from 1 “Well below average” to 5 “Well above average”. The respondents were also asked about their perception of the product’s overall success

ranging from 1 “Very unsuccessful” to 5 “Very successful”. Items measuring new product performance are shown in Table 5.11.

Table 5.11: Measures and instruments of the questionnaire for new product performance

Measures	Instruments and Remarks
Customer satisfaction	Well below average Below average Average Above average Well above average
Revenue goal	
Profitability goal	
Launch on time	Do not measure
Quality guideline	Following the Product Development & Management Association (PDMA) guidelines
Performance specification	

The following sections discuss the question wording and physical characteristics of the questionnaire which are also important before the next process: the questionnaire distribution.

5.3.2.9 Question Wording and Sequencing

This survey was conducted in Malaysia, and the questionnaire was in English. That is, it was not translated into Bahasa Malaysia because all of the target respondents were all highly educated and held top-level positions in their organizations. Feedback gathered from the academia during the pre-test (refer Section 5.3.3) confirmed the simplicity and ease of understanding of the questions, and so there was no need for translation.

The order in which the questions are placed is a critical component of research, so questions that identify with the research objectives were presented first in the questionnaire.

Churchill Jr and Iacobucci (2005) proposed that phrasing each question will reduce problems such as item nonresponse, incorrect answers, and misunderstanding. These suggestions have been considered in designing the questionnaire.

5.3.2.10 Questionnaire - Physical Characteristics

This research implemented both hard-copy and online surveys as justified in for using Sections 5.5.1.1 and 5.5.1.2. The physical form of the questionnaire included considering the physical layout, appearance, paper and printing quality and interactive, so that participants to transmitted survey responses to the researcher by clicking the "submit" button on the webpage. Basic question options such as Likert-type scales, drop-down menus (for nominal or categorical items), and filter questions (to tailor surveys to individual characteristics of survey respondents) as to vary the order of question responses reduced question order bias (Wright 2005).

The wording for the introduction of the questionnaire can also influence the respondents' cooperation. The first page both the postal and internet survey contained a brief introduction to the researcher, the purpose of this survey, and asked and acknowledged support from respondents, and assuring that all information would be kept confidential. All questions were numbered to help respondents answer the questionnaire and to simplify the processes of editing, coding, and tabulating the responses.

The size of the questionnaire is another design issue. The smaller size is preferable as long as it does not look crowded. Given the number of questions, the thickness of the physical appearance is also critical so this questionnaire was presented on A4 paper with both sides printed and bound in a booklet.

The colour of the questionnaire was also considered in designing the questionnaire. It is reported that the effects of colours on response rates contrast significantly. Brennan and Charbonneau (2005) for example used four different colours: red, green, blue and purple and found the most effective colour overall was purple. Contrarily, there is no significant difference between the response rates with the use of yellow and white from

the study of Buttle and Gavin (1997), and the study of Greer and Lohtia (1994) also no significant impact on response rates by the use of different colours (pink, green, yellow, and white). Also, in a survey of highly educated professional people, Gullahorn and Gullahorn (1963) found no significant difference in response rates when comparing green to white questionnaires. Therefore, no special colour was used for the paper questionnaire in this research. The online survey used here employed web survey software (Section 5.5.1.2).

5.3.3 Pre-testing

The pre-test was conducted before the main study with, the main purposes of checking the understanding of questions, and appropriateness of scales used. Twenty questionnaires were emailed to academia to get their feedback on the representativeness, simplicity, and ease of understanding the questions. Feedback leads to some adjustments, and overall the pre-test showed that most respondents could understand the questions without difficulty.

5.3.4 Consideration of Reliability and Validity of Survey Questionnaire

In this research, the theoretical framework and hypotheses were drawn and developed from the literature review. Variables were selected by their utility and modified to fit the research purposes. Measurement scales were adopted and adapted from existing scales and revised to better fit the research context.

The wording of two particular items under Market Orientation was reversed to help prevent response bias. The validity of the two negative statements under Market Orientation item was checked.

Reliability refers to the extent to which your data collection techniques or analysis procedures will yield consistent findings (Saunders, M, Lewis & Tornhill 2016). Pursuant to Yin (2013), with the main objective of running a reliability test being to minimize the errors and biases in research. Reliability reflects the quality of the scales used, in that it quantifies the extent to which scores are affected by the ubiquitous measurement error (Raykov 2009). Cronbach's alpha (α) is the most common method

used to assess the reliability of the measurement scale or internal reliability (Sekaran & Bougie 2016). Different levels of acceptance have been suggested in the literature and discussed in Section 6.3.2.3. This research uses 0.60 as the minimum level to indicate the internal consistency of constructs.

Through confirmatory factor analysis (CFA), the assessment for reliability could be made based on internal reliability, composite reliability and average variance extracted (AVE). The objective of reliability remains the same, which is to check the reliability of the developed measurement model in measuring the latent constructs, as discussed in Section 6.3.3.4.

Meanwhile, validity means “measure what is intended to be measured” (Field 2013), and explains how well the collected data covers the actual area of investigation (Ghauri & Grønhaug 2010). Nunnally, J and Bernstein (1994) suggested, a valid construct should have three important aspects: (1) the construct should be a good representation of the domain of observables related to the construct; (2) the construct should represent the alternative measures adequately; and (3) the construct should be closely related to other constructs of interest. Content validity (refer to Section 5.3.2.2), discriminant validity (refer Section 6.3.3), convergent validity (refer Section 6.3.3.1), and construct validity (refer Section 6.3.3.2) were examined in this research.

5.4 SAMPLE DESIGN

5.4.1 Population

The first step to finding the appropriate sample to study is to identify the target population to match the research purpose and context (Malhotra & Birks). Population refers to the entire group of people, events, or things of interest that the researcher wishes to investigate (Sekaran & Bougie 2016). This research investigated the factors that influence new product performance in the Malaysian manufacturing firms specifically the SMEs so, the target population needs to be SMEs that have developed new products since 2014. The most important innovation or innovations produced by

the firm over the previous three years serves as the benchmark and this survey was conducted in 2017.

The target population is the Malaysian' Small Medium Enterprises (SMEs) manufacturing firms. More specifically, the population was selected only for those firms engaged in new product development (NPD) activity with a new product developed. The Malaysian SME manufacturing sector consists of approximately 47,000 firms (2016 data), and it is impossible to tell how many of these firms are involved in NPD and have developed new products since 2014. It is very challenging to select firms for the survey because of the lack of a list of firms known for carrying out NPD in Malaysia. The lists of manufacturing firms in Malaysia provided by the Malaysia Investment Development Authority (MIDA) was used as the sampling frame and contained 1700 manufacturing SMEs.

As a whole, 900 firms were selected based on the details provided such as the firm's name, address, contact person email, the contact person's position in the firm specifically those who are involved in NPD such as the CEO or director, project manager, process manager, and team leader. These people can provide the insight of the NPD process in their firms with a clear and accurate view of the new product their firms have developed or are developing.

The invitations with the website link attached and unique survey access tokens were emailed to the contact persons for the online survey to be completed. Follow up calls and four email reminders were made to those firms that had yet to respond to the online survey.

Surveys were also posted with cover letters to the selected 900 firms also received invitation emails for the web survey. Prepaid envelopes were also attached with an address for easy return of the completed surveys. Follow- up calls were also made to those firms yet to return the survey via mail/postal. Many of the follow-up calls chose to answer the survey online rather than returning the survey via mail/postal. Final data

collected from the selected firms using online and mail surveys, with the postal or mail survey the lowest return rate.

5.4.2 Sampling Technique/Design

A nonprobability sample that conforms to certain criteria is called purposive sampling. There are three major types – judgement or purposive sampling, quota sampling, and random sampling (Cooper, RD & Schindler 2011). The purposive sampling method was chosen because it refers to the types of firms included in the invited sample, that is the manufacturing industry, and specifically, the SMEs involved in product innovation.

5.4.3 Sampling Frame

Churchill Jr and Iacobucci (2005) claimed that selecting an appropriate sample frame would make this research more feasible yet remain robust because as it is rarely possible to study all cases of a defined population.

The sample was drawn from a government agency database, the Malaysian Investment Development Authority (MIDA). MIDA provided 1700 contact details for manufacturing firms in Malaysia. However, only 900 manufacturing firms from the list have a valid email address and postal address, so all 900 firms were selected to participate in this research.

This research is limited to a single country setting, Malaysia where SMEs are very prominent contributors to economic development (Saleh & Ndubisi 2006) and as a country aims to be a developed economy by 2020 (Nasir, Al Mamun & Breen 2017).

5.4.4 Sample Size Consideration

Sekaran and Bougie (2016) defined sample size as the actual number of subjects chosen as a sample to represent the population. It is important to determine the sample size properly so as to make an inference about the population for any study activity. The sample size is critically vital in a statistical analysis since it has a bearing on sampling error. Some researchers recommend that the sample size for most

research should be larger than 30 and less than 500, to use multiple regression analysis, and have the ratio of observations to independent variables not fall below five. If the researcher plans to use factor analysis on a study, the same ratio considerations discussed under multiple regression analysis should be used. The suitable sample size in multivariate research should be several times larger than the number of variables in the study (preferably 10-fold) (Cavana, Delahaye & Sekaran 2001; Kotrlik & Higgins 2001).

AMOS was intended to be used to test the model developed in Chapter 4. In structural equation modelling (SEM), a larger sample size is required to ensure the stability of the power and parameter estimates and errors (Schumacker & Lomax 2010). Numerous rules-of-thumb have been presented: (a) a minimum sample size of 100 or 200 (Bearden, Sharma & Teel 1982), (b) 5 or 10 observations per estimated parameter (Bentler & Chou 1987; Bollen 1990), and (c) 10 cases per variable (Nunnally, JC & Bernstein 1967). Many researchers have argued about the total number in a sample size when using SEM. Hair, Joseph F and Black (1998) recommended that the minimum sample size be 100, to ensure the appropriate use of maximum likelihood estimation. On the other hand, a minimum sample size of 150-200 will guarantee the credibility of the findings (Anderson, JC & Gerbing 1988).

Based on the above arguments and since scholars do not agree about the definite sample size, a minimum sample size for this research was set at 150, taking into consideration the number of valid manufacturing firm databases provided by MIDA. The final sample gathered 209 respondents.

As stated in Section 5.4.2, the G* power analysis developed by Faul et al. (2009) was used to obtain a sample size. This application provides a different experience of calculating the sample size based on effect size, standard error, power and number of predictors. The result of the sample calculated using the G* power software is 92. The power of approximately 80% is used and considered sufficient for this research, as illustrated in Figure 5.2.

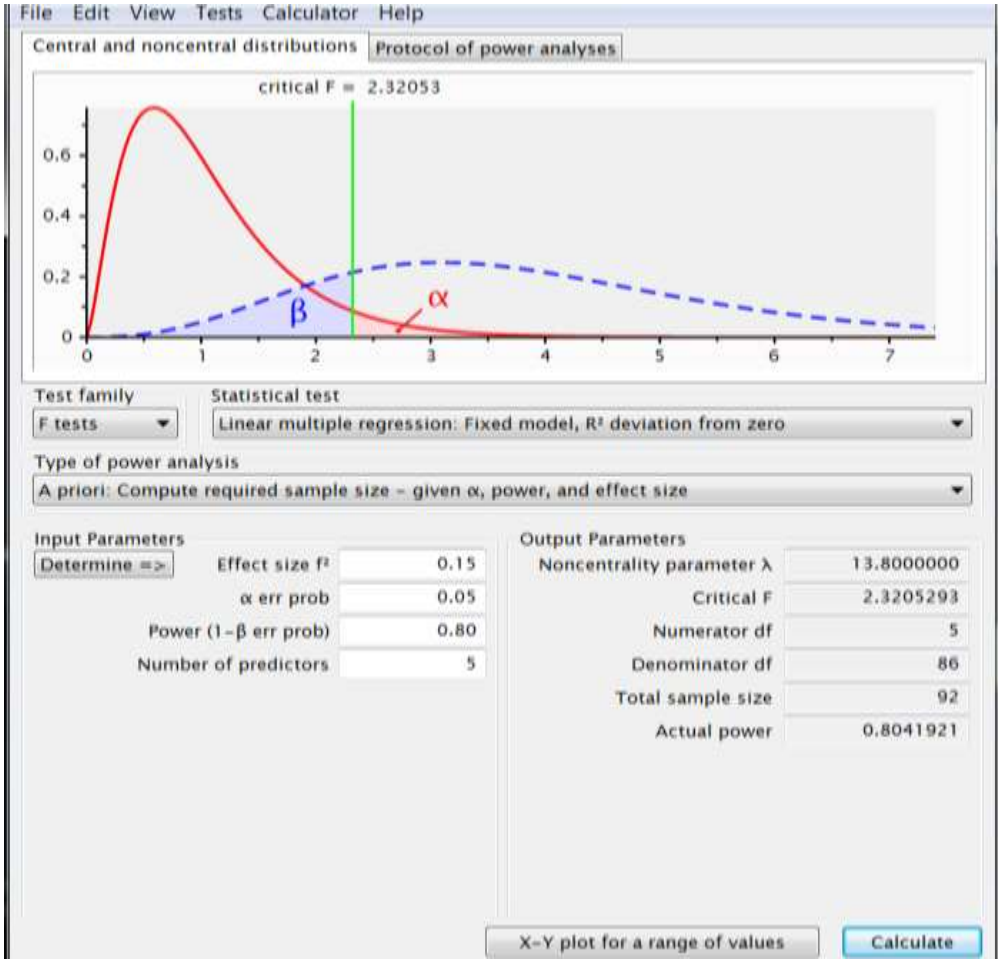


Figure 5.2: Determination of the sample size based on G* Power Analysis

5.5 DATA COLLECTION

5.5.1 Data Collection Method Considerations

Churchill Jr and Iacobucci (2005) reported there are three general methods in collecting primary data; namely personal interview, telephone interview, and mail questionnaires. The past decade has seen an increment in internet use and computer-mediated communication and has prompted an increase in the utilisation of online surveys (Wright 2005). The choice of data collection method depends on the research objectives, the type of data to be collected, time and frequency of data collection, follow-up period, data scoring requirements, the target population, available resources, and regulatory frameworks for research (Marcano Belisario et al. 2014).

One of the most important advantages and strengths of the online and postal questionnaire is the low cost. These two methods are useful because data was to be collected from a large population scattered through a large geographical area. The costs involved in these methods include the cost to design, develop, printing and postage. The best choice is online and postal surveys.

These methods also provide data with less bias compared to interviews. In online and postal surveys, demographic data such as age, and gender may not have an effect on the respondent's answers. Greater anonymity also guaranteed. Respondents are likely to answer more questions and are more confident to give honest answers, thereby decreasing errors. A postal and online survey has low cost and less time-consuming (Tajvidi 2015), and for the online survey, LimeSurvey was used for those reasons.

5.5.1.1 Justification for Using a Postal Survey

A postal cross-sectional survey involving those involved in the NPD process in Malaysia was undertaken during July to December 2017. After about six months and follow-up phone calls, a total of 91 completed questionnaires were returned, representing a 14.6% response rate for the postal survey only. This response rate is close to the sufficient response rate (i.e. 15 to 20 per cent) for a questionnaire survey (i.e. Standen, 1998). The response rate is considered sufficient and reasonable in the context of Malaysia and based on the fact that the response rate for survey method through the post in Malaysia is around 10 to 16 per cent (Pricewaterhouse Coopers 2002).

The advantages of a postal survey are as follows (Bhattacherjee 2012; Tajvidi 2015):

- Unobtrusive. Postal surveys are inexpensive to administer because bulk postage is cheap in most countries.
- Data can be collected from a large population due to geographical dispersion.
- Less bias in reducing nonresponse rate; decrease bias errors; characteristics such as age, gender may effect responders' answer.

5.5.1.2 Justification for Using an Online Survey

An online survey was also conducted to bundle with the postal survey mode so as to increase the response rate. The online survey also offers lower costs and enables large sample sizes. The advantages of an online survey include ("Tools for Organizational Development," 2008):

- *Comparable or lower costs than paper*. After discussion, comparison and consideration of various web survey software, LimeSurvey version 2.64.7+ an open source script is written in PHP was chosen. The script is free and downloaded at www.limesurvey.org. The domain at http://www.malaysia-survey.com/innovation/index.php/355599?lang=en was registered for this purpose.
- *Ease of use/convenience*. Participants were given Web address and issued with unique tokens in their invitation emails. They had access to the eight-webpage survey that took no more than 20 minutes of their time. Participants had to click through the questions to the last 'Thank you' page with no need to mail the completed survey back.
- *Immediate access to data and report*. LimeSurvey has several features such as providing access to individual and aggregated responses received up to a particular point of time. It is also convenient to import the dataset into SPSS for statistical analysis.
- *Customisable and programmable logic*. The Royal Melbourne Institute of Technology logo is used on the first page of the web survey. Patterns to make respondents answer certain questions according to their firm was designed and this effectively shortened their survey time.
- *Eliminating missing data*. LimeSurvey uses JavaScript that prevents respondents from moving to the next question without having fully completed the current question. This feature ensured a completed dataset.

The response rate between the postal and online survey is presented next.

5.5.2 Questionnaire Distribution and Response Rate

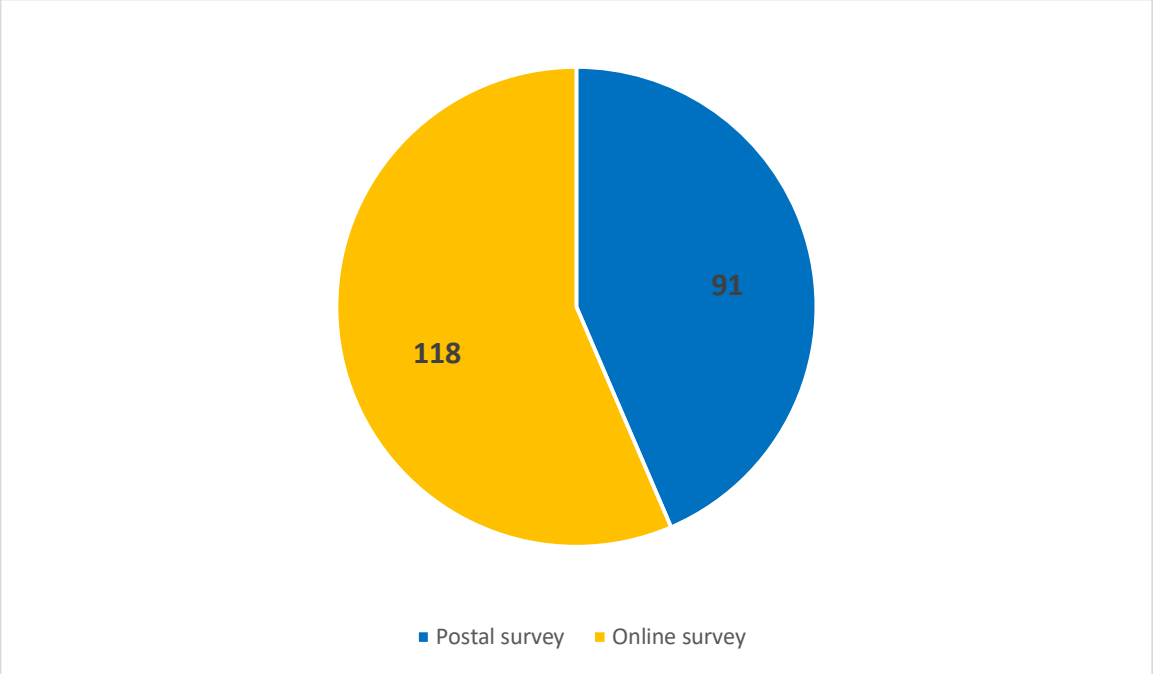
It took approximately nine months to collect data from the respondents. The questionnaires were collected from July 2017 to March 2018. Three hundred envelopes were posted during the first phase in July 2017 based on purposive sampling.

In December 2017, another 600 envelopes were posted. Of the 900 questionnaires distributed, both postal and online, only 209 completed surveys were usable, based on the criteria provided for the sample.

A total of 91 questionnaires were returned via post, and 118 questionnaires were answered via the web survey, making 209 questionnaires usable. The 23.22 per cent valid response rate was obtained and these remaining questionnaires then further analysed in this. Sixty-six responses were unusable because they did not have a new product developed. The response rate is considered to be adequate when compared to other similar studies in the literature. For instance, Mahmood and Hanafi (2013) conducted a survey among manufacturers in Malaysia, which yielded a 15.86 per cent response rate. Similarly, Bakar and Ahmad (2010) conducted their survey on product innovation performance among Malaysian SMEs achieved a response rate of 15.4 per cent. Hence, this is an acceptable response rate.

This result accounted for a usable response rate of 23.22 per cent. The breakdown for these figures is for a completed postal survey with 91 responses (10.1%) and 118 responses (13.1%) for an online survey. This percentage shows that the response rate for the postal survey is lower than the online survey. **Error! Reference source not found.** shows the number of respondents between postal and online survey.

Figure 5.3: Number of respondents between a postal and online survey



An independent-sample t-test identified no significant difference in the postal (*M*=4.18, *SD*=0.47) and online survey [*M*=4.19, *SD*=0.56; *t*(194) = -.148, *p*=.883]. Therefore, it can be concluded that there is no significant difference between the two independent groups; of the postal and online survey.

5.5.3 Unit of Analysis

This research focuses on the analysis at the organizational level. CEOs/Directors, project managers, and team leaders were identified as appropriate key respondents since they were involved in the new product development process for manufacturing firms in Malaysia.

5.5.3.1 Participants

The participants were CEOs/Directors of the firms, project managers, process managers, and team leaders chosen for their position in their firms and involved in new product development (NPD) processes. These respondents are experienced with NPD and can provide accurate information. The choice of research participants have been determined by the focus of this research and enable to meet the research aim

and answer the research questions (Saunders, MN 2012), and own judgement is used to select a sample (Greener 2008). Purposive sampling through internet recruitment and survey methods has become increasingly popular among researchers who, at a relatively low cost, sample the hard-to-reach (Barratt, Ferris & Lenton 2015; Fricker 2008). The aim was to obtain a minimum sample size of approximately 200 respondents as appropriate for running structural equation modelling (Hair, Joe F, Ringle & Sarstedt 2011). Section 5.4.4 exhibits the method of obtaining a sample size using the G* power analysis.

5.5.4 Data Collection: Incentive and Problems

The main survey was carried out between July 2017 and March 2018. The common issue facing by the researchers collecting data in Malaysia is the low response rate, so an online survey was bundled to obtain an adequate response rate.

5.5.4.1 Incentive Techniques

There are two types of incentives used to increase the response rate: monetary and non-monetary (Hansen, RA 1980; Yu & Cooper 1983). Though the use of incentives has not been found to be related to response rates and, for studies of organisations, the use of reminders was associated with lower response rates (Baruch & Holtom 2008). Increases in the size of the monetary incentive offered appeared to have decreasing marginal gains (Fox, Crask & Kim 1988). James and Bolstein (1990) identified that a combination of follow-up mailings and monetary incentive produced a significantly higher response rate than an equivalent number of mailing without an incentive. Larger monetary incentives tended to produce: (1) a greater degree of effort expended in completing the questionnaires (i.e., number of short answers and comments provided, and number of words written, and (2) comments were more favourable toward the survey sponsor.

This research offered respondents a nonmonetary incentive, of viewing the preliminary results. Respondents had to attach their business card on the returned questionnaire or tick “Yes” for a copy of results on the web survey. Only nine respondents were

interested. Small gifts such as fridge magnets were given to the respondents who completed and returned the questionnaires.

5.5.4.2 Data Collection Problems

The data collection phase is the most challenging and time-consuming process, especially when it is organizational research in Malaysia. The low response rate is a common issue for researchers collecting data in Malaysia as manufacturers cannot be easily convinced and persuaded to participate in surveys.

Calls, emails and reminders were follow up strategies to encourage completed and returned response, many agreed verbally. The online survey offers numerous benefits to the researcher, but the response rate in Malaysia is discouraging. Several emails returned undelivered, and some respondents replied they were unable to participate or had resigned from the company.

Access to informants presents a big obstacle. The database provided does not have the specific list of firms have a new product since 2014 to date. The database emails provided were not updated. The attitude of Malaysian participants to answer the questionnaire is not positive when it is an organizational research as Malaysian companies are known to 'despise' participating in surveys (Abdullah, NL, Jamaludin & Talib 2013).

Figure 5.4 presents the complete characteristics of the research of this research.

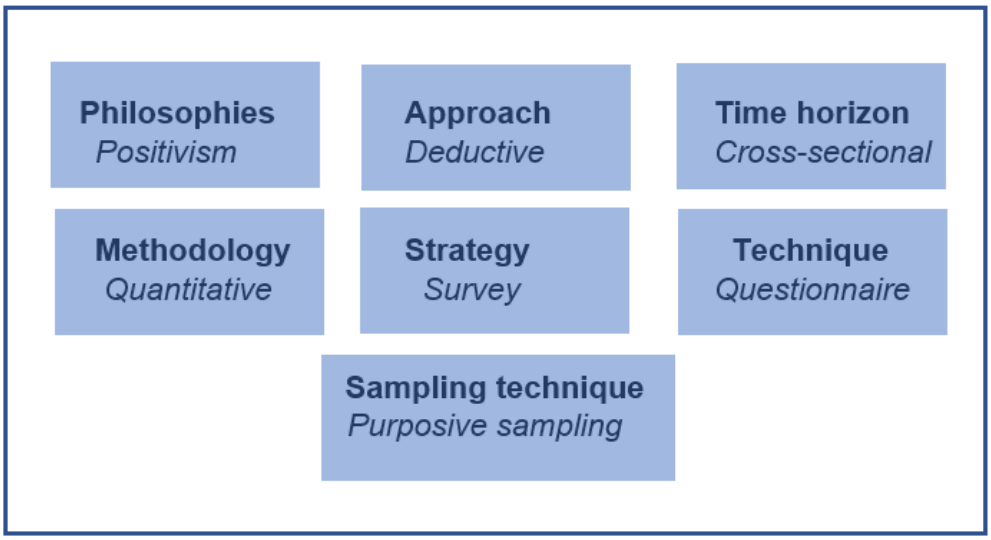


Figure 5.4: Characteristics of the research

The next sections discuss on the data analysis and data analysis techniques and follow with the descriptive statistics of the respondents.

5.6 DATA ANALYSIS

Data analyses were undertaken in three stages: data screening, validation of the measurement model and evaluation of the structural model (Hair, Joe F, Ringle & Sarstedt 2011). As a preliminary step, the data screening process included visual inspection of the data for identifying and correcting errors in the data set as well as identifying missing data and tests for violation of statistical assumptions such as normality (Field 2016; Hair, Joseph F et al. 2007; Pallant 2016). The dataset here was initially analysed using IBM SPSS Statistics Version 24 in the data screening process as presented in section 5.6.2. The descriptive statistics results are presented in Section 5.8. The researcher tested a set of relationships between independent variables and dependent variables and the dataset was tested using covariance-based software; the Analysis of Moment Structure (AMOS). The SEM assumptions are discussed in section 5.7.2.

5.6.1 Data Editing and Coding

All received questionnaires were input into SPSS and questionnaires received via the web survey were downloaded to SPSS by the researcher. Churchill Jr and Iacobucci (2005) suggested personal handling of all questionnaires to ensure consistency of treatment and reduce data entry errors. All the data was rechecked before any analysis was conducted. The qualifying question, Yes or No for a new product developed since 2014 established whether to proceed or to discard.

All the questionnaires were numbered and separated into different parts accordingly, and all questions were closed and scaled.

5.6.2 Preliminary Data Screening and Analysis

Data screening is vital to ensure reliability, usability, and trustworthiness. Data screening enables the researcher to detect and fix problems, such as missing values, outliers and extreme values. Treatment of missing values and outliers can be done to avoid biases in the existing data and obtain a more accurate analysis.

5.6.2.1 Data Cleaning

Data cleaning is a process of removing irrelevant, incomplete or inaccurate data from the database. Careful consideration is required in this process as it will significantly affect the final statistical results. SPSS and descriptive statistics were used to check for data anomalies and missing data.

The very first step in exploring the data was to look for any incorrectly entered data. Nine cases were found where respondents ticked the negative statement and the positive statement. The negative statement was used to reduce response bias. The next step was to look for cases with incomplete data. All data was assumed to be entered correctly because the nature response selection and automated checks were eliminated by the Web survey software. Outputs for the descriptive statistics are illustrated in **Error! Reference source not found.** and **Error! Reference source not found.**.

Table 5.12: Example of SPSS Constructs Summary

Item (s)		MO1	MO2	MO3	MO4	MO5(R)	MO6(R)
N	Valid	205	206	207	206	208	208
	Missing	4	3	2	3	1	1
Mean		4.307	4.369	4.242	4.131	3.851	4.308
Std. Error of Mean		0.663	0.617	0.591	0.668	1.160	0.631
Variance		0.597	0.433	0.421	0.446	1.345	0.704
Range		4	3	3	3	4	4

Note: MO1, MO2, MO3, MO4, MO5(R), and MO6(R) are sample items under Market Orientation construct

Error! Reference source not found. shows the frequency of missing values for Market Orientation construct where item MO1 has 205 valid (non-missing) and four missing values. Missing values or missing data occurs when respondents answered 'Not Applicable' on the survey. In another case, missing values occur when data is not properly coded or entered into the system during the data entry process, which in this research, did not happen because all data was transferred directly from LimeSurvey. SPSS was used to code "999" as the 'discrete missing value' for each variable.

Inaccurate analysis results and invalid conclusions are due to a failure to correct data errors at the first stage. The frequency table was used to detect data entry errors. **Error! Reference source not found.** shows the number and percentage of missing values (Not Applicable) for the Market Orientation construct where the 'Not Applicable' answer was given (refer Appendix 1). Each of the missing values was cross-checked

with the original questionnaire to ensure the necessary corrections or amendments were made in the database.

Table 5.13: Example of Frequency Table for Market Orientation Construct

PART ONE (Q1): We meet customers at least once a year to find out what products/services they will need in the future.

		Frequency	Per cent	Valid Per cent	Cumulative Per cent
Valid	Strongly disagree	3	1.4	1.5	1.5
	Disagree	2	1.0	1.0	2.4
	Neither agree or disagree	17	8.1	8.3	10.7
	Agree	99	47.4	48.3	59.0
	Strongly agree	84	40.2	41.0	100.0
	Total	205	98.1	100.0	
Missing		4	1.9		
Total		209	100.0		

5.6.2.2 Outliers Treatment

Outliers refer to data values that are extreme (Schumacker & Lomax 2010). According to Byrne (2016), a data set containing either small or large values that differs from the values of items are considered as outliers. The detection of outliers is an essential step that needs to be carried out before data analysis could be performed. Outliers

can distort the results of the data analysis because it could influence mean, standard deviation, and correlation coefficient values. There are two methods to detect outliers, (i) univariate method, that examines each variable individually, and (ii) multivariate method, that takes into account associations between variables in the same dataset.

The univariate method was used to detect outliers in the dataset. Univariate outliers display an extreme value in one variable. Z-standardised values (Z score) of the data were calculated to detect univariate outliers. Z-score shows how much each score deviates from the mean. Any standardised value (Z scores) larger than 3.29 is considered a univariate outlier (Tabachnick, BG & Fidell 2007). Hair, Joe F, Ringle and Sarstedt (2011) recommended a rule of thumb whereby a univariate outlier occurs when the Z-score value is outside the range off ±3 to ±4 for a large sample (more than 80). This research used a Z-score of ±4. Histograms that show the frequency of Z-scores of all the variables are constructed and examined to detect for outliers. There are no outliers in the dataset when a histogram displays a bell-shaped curve that indicates the data is normal.

5.6.2.3 Normality Test

Checking normality is an important early step in almost every multivariate analysis. A normality test was conducted to measure that the data was normally distributed across the population sample and that there were no excessively high or low scores from a few respondents which can then skew the overall results (Hair, Joseph F et al. 2010). Skewness measures the distribution's degree of asymmetry, while kurtosis measures the peakedness of the distribution (Hair Jr & Lukas 2014). Data is considered to be normally distributed when the absolute value of skewness is between -2 to +2 and kurtosis is between -7 to +7 (Byrne 2010). Table 5.14 indicates that this data is normally distributed since the skewness value for the main variables were in the range -0.027 to 0.242, and a kurtosis value is in the range of -0.769 to 0.266. Therefore, the empirical measures of skewness and kurtosis for all constructs from the questionnaires confirm no issue of multivariate non-normality in the data set.

Table 5.14: Normality Test for Main Research Variables

Item (s)	N	Mean		Skewness		Kurtosis	
	Statistic	***Statistic***	***Std. Error***	***Statistic***	***Std. Error***	***Statistic***	***Std. Error***
MO	202	4.198	0.41042	**-0.029**	0.171	**0.016**	0.341
EO	206	4.1723	0.49534	**-0.027**	0.169	**-0.769**	0.337
TO	202	4.1708	0.55977	**-0.397**	0.171	**-0.16**	0.341
MC	208	4.3161	0.5191	**-0.427**	0.169	**-0.417**	0.336
TC	202	4.2327	0.53341	**-0.371**	0.171	**-0.509**	0.341
MCi	202	4.0903	0.48312	**0.242**	0.171	**-0.008**	0.341
MCr	199	3.9736	0.69558	**-0.355**	0.172	**-0.33**	0.343
TCi	209	4.2356	0.46813	**0.111**	0.168	**-0.163**	0.335
TCr	205	4.1134	0.69284	**-0.659**	0.17	**0.266**	0.338
NPP	180	3.8546	0.55067	**-0.256**	0.181	**0.011**	0.36

Notes: MO (Market Orientation), EO (Entrepreneur Orientation), TO (Technology Orientation), MC (Marketing Capabilities), TC (Technological Capabilities), MCi (Marketing Capabilities Exploitation), MCr (Marketing Capabilities Exploration), TCi (Technological Capabilities Exploitation), TCr (Technological Capabilities Exploration), NPP (New Product Performance).

The normality test for individual constructs (refer Appendix 3).

5.7 DATA ANALYSIS TECHNIQUES

5.7.1 Structural Equation Modelling (SEM)

For more than a century statistical analysis has been an essential tool for social science researchers. To understand more complex relationship associated with current research directions, it is essential to apply more sophisticated multivariate data analysis methods.

SEM is a statistical technique in which the parameters in the measurement models and structural model can be estimated simultaneously (Anderson, JC & Gerbing 1988). The use of SEM in social science research as an analytical tool has been widely applied in management and marketing studies (Hair, Joe F, Ringle & Sarstedt 2011). SEM can access the model fit through a range of fit-indices as well as test both the measurement and structural model.

SEM provides a confirmatory technique rather than exploratory because the aim is to confirm the relationships between factors and their underlying measures and to confirm the hypothesised relationships between factors for latent variables (Byrne 2016). Awang, Z, Afthanorhan and Asri (2015) reported that SEM provides a comprehensive means of assessing and modifying the measurement models, as well as the structural model as a confirmatory approach.

There are two sub-models in SEM: (i) user can assess how well the observed (or indicator) variables represent the latent variables (unobserved variables or often referred to as a construct) that they are hypothesised to measure which is called ‘Measurement Model’; and (ii) user can estimate the strength of interrelationships amongst those unobservable or latent constructs, called a ‘Structural Model’ (Gallagher, Ting & Palmer 2008). The issues of validity and reliability of a measurement model can be addressed using confirmatory factor analysis (CFA) as presented in Section 6.3.3.

SEM can provide an overall test to evaluate the fitness of a model and the individual parameter estimate test simultaneously (Hair, Joseph F & Black 1998; Hair, Joe F,

Ringle & Sarstedt 2011). According to Awang, Z (2012) AMOS can analyse and test complex relationships, examine the theoretical framework directly, find models that best fit the data at hand and explore the “how and why” in one’s data making AMOS one of the most powerful SEM software. It is widely claimed that AMOS is more user-friendly especially for beginners (Gallagher, Ting & Palmer 2008) than others such as LISREL.

5.7.2 SEM Assumptions

Several assumptions need to be met in order to apply SEM as an analytical tool. Tabachnick, BG and Fidell (2007) reported that one of the SEM requirements is the sample size which needs to be adequate to ensure that covariance and correlations are more stable. It also requires three or more indicators per factor. A sample size of 100 is usually sufficient for convergence (Gerbing & Anderson 1985), and a sample size of 150 will usually be sufficient for a convergent and proper solution. A minimum sample size in SEM is as small as 50 (Anderson, JC & Gerbing 1984). Hair, Joe F, Ringle and Sarstedt (2011) suggested that the minimum sample size accepted is 100 to ensure the appropriate use of maximum likelihood estimation (MLE). A sample size of 400 and over is too large and considered undesirable because the methods can become too sensitive and lead to a poor model fit (Hair, Joe F, Ringle & Sarstedt 2011; Tanaka 1987). The appropriate sample size for SEM has been discussed in Section 5.4.4 as have the assumptions of the normality of data, independent observations, random sampling of respondents and the effect of missing data and outliers.

Bollen (1990) and Bearden, Sharma and Teel (1982) proposed that a smaller sample size will suffice if the variables are reliable, the effects are strong and the model not overly complex. This research had an effective sample size of196, and therefore, is considered to be appropriate for conducting SEM.

5.7.3 Moderating Effect Analysis

One of the research objectives is to test whether the relationship between a firm's capabilities and new product performance depends on (is moderated by) the value of a third variable (firm ambidexterity).

A moderator analysis is used to determine whether the relationship between a firm's capabilities and new product performance is different for firm's ambidexterity (exploitation and exploration). The continuous dependent variable is "new product performance", the continuous independent variable is "firm capabilities" and the moderator variable is "firm ambidexterity", consisting of two groups: "exploitative" and "explorative".

5.7.3.1 Moderation and Statistical Interaction

A moderation analysis for this research is when the effect of an independent variable on a dependent variable depends on the value of a moderator variable. Moderation is depicted in Figure 5.5 in a process in which the effect of firm capabilities on new product performance is influenced by, or dependent on, firm ambidexterity.

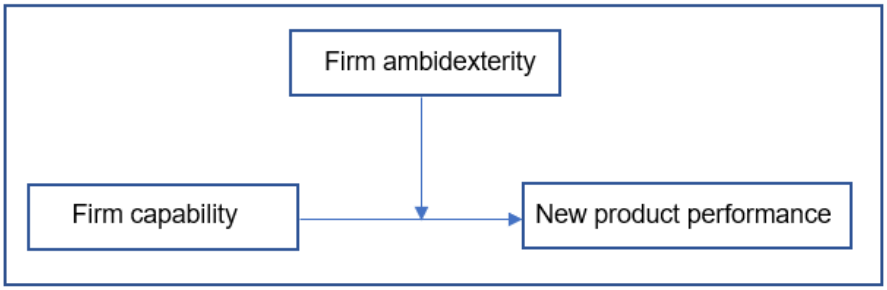


Figure 5.5: The conceptual model for moderator analysis

A multiple regression was chosen to determine if a moderator effect exists by using an interaction term. The independent variable (firm ambidexterity) is multiplied with the moderator variable (firm ambidexterity). And then, added to the regression model to predict the dependent variable (new product performance), as illustrated in Figure 5.6.

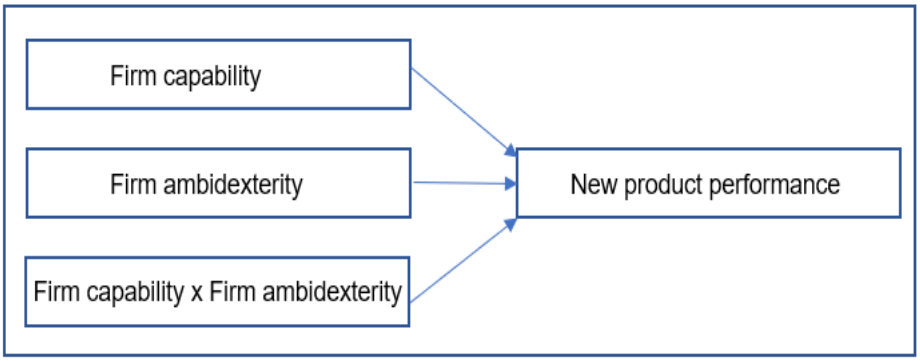


Figure 5.6: The statistical model for a moderator analysis

The three terms used in the regression model for predicting the dependent variable are the independent variable, the moderator variable and a new interaction term. The interaction term for statistical significance is tested to determine the moderator effect.

There are nine assumptions to conduct the moderator analysis (Hayes, Andrew F. 2017). The first four assumptions of a moderator analysis were met this research design. They are a: (a) continuous dependent variable; (b) continuous independent variable; (c) moderator variable; and (d) independence of observations.

The other five assumptions related to the nature of the data were tested using SPSS Statistics, according to steps suggested by Field (2016) and Pallant (2016).

Assumption #5: Linearity testing. The independent variable collectively is linearly related to the dependent variable and each independent variable is linearly related to the dependent variable. Linearity was established by visual inspection of a scatterplot.

Assumption #6: Multicollinearity testing. There was no evidence of multicollinearity, as evidenced by no tolerance values less than 0.651.

Assumption #7: Outliers, leverage points and influential cases testing. These are the unusual point that can have a negative effect on the moderator analysis by affecting the parameters of the multiple regression models as well any inferences.

Assumption #8: Homoscedasticity testing.

Assumption #9: Normality testing. This is generally considered the least important of the assumptions associated with multiple regression analysis. The common method: the Shapiro-Wilk tested for normality (refer Section 5.6.2.3).

5.7.3.2 Moderating Effect Testing Procedure

There are two main objectives that can be achieved with the output from a moderator analysis with a continuous moderator: (1) to determine whether a moderator effect exists; and (2) if a moderator effect exists, to determine how the relationship between the independent and dependent variable is different for different values of the dichotomous moderator variable. Specifically,

- To determine if a moderator effect exists: the primary goal of moderator analysis is to determine whether the interaction term is statistically significant. If it is significant, it does have a moderator effect, but if not, it does not have a moderator effect.
- Simple regression line analysis: once established a statistically significant interaction, two simple regression lines can be inspected. The relationship can be understood depending on what the relationship looks like, whether the relationships are positive or negative, and whether the relationships are statistically significant.
- To compare two simple regression lines: based on the increase in R^2 being statistically significant.
- Procedure for differences at specific points: to compare the difference on the dependent variable between the two groups of the moderator variable at specific values of the independent variable.
- To interpret differences at specific points.
- Procedure and interpretation when there is no statistically significant interaction: if there is no moderator effect, to run a multiple regression with main effects only.

5.8 PROFILE OF THE RESPONDENTS

This section presents the demographic information gathered from the survey. In Part Six of the questionnaire, respondents were asked to provide their background information such as age, educational level, position, and the length of service in the industry. Respondents also were asked about their organizational background (i.e., year of business establishment, the majority of ownership, total of full-time staff, and the firm's turnover).

It is also important to ensure that only eligible respondents such as the CEO/Director, project managers, process managers, and team leader can participate in this survey because the findings critically depend on the information respondents provide. The details of respondents' demographic profiles are presented in Table 5.15.

Table 5.15: Demographic Profile of the Respondents

Respondent's Profile		Frequency	Percentage (%)
Ownership	Bumiputera	84	40.2
	Chinese	67	32.1
	Indian	3	1.4
	Others	55	26.3
	Bumiputera	84	40.2
	Non-Bumiputera	125	59.8

Full-time staff	Less than 5	3	1.4
	5 to 74	116	55.5
	75 to 200	75	35.9
	200+	15	7.2
Firm's turnover	<RM300K	4	1.9
	RM300K-RM15m	109	52.2
	RM15m-RM50m	59	28.2
	>RM50m	15	7.2
	Prefer not to answer	22	10.5
Age	25 years or less	6	2.9
	25 - 30 years	30	14.4
	31 – 40 years	66	31.6
	41 – 50 years	56	26.8
	51 – 60 years	17	8.1
	Above 61 years	7	3.3
	Prefer not to answer	27	12.9

Table 5.15 Demographic Profile of the Respondents (continued)

Respondent's Profile	Frequency	Percentage (%)

Education	Secondary	10	4.8
	Certificate	8	3.8
	Diploma	27	12.9
	Bachelor's degree	128	61.2
	Master's Degree	35	16.7
	Doctorate	1	0.5
Position	CEO/Director	50	23.9
	Project Manager	17	8.1
	Process Manager	9	4.3
	Team Leader	24	11.5
	Others (new product development team)	109	52.2
Background	Engineering	42	20.1
	Science	22	10.5
	Business	86	41.1
	Tradesperson	14	6.7
	Others	45	21.5
Working experience	< 1 year	6	2.9
	1 – 5 years	57	27.3
	6 – 10 years	73	34.9
	>10 years	73	34.9

In terms of the firm's ownership, 40.2 per cent of respondents work with Bumiputera firms, 32.1 per cent with Chinese firms, 26.3 per cent work with other firms and only 1.4 per cent work with Indian firms. These percentages (40.2% Bumiputera firms and 59.8% non-Bumiputera firms in the dataset) show an appropriate spread of firms. In

terms of the number of full-time staff, 55.5 per cent of firms have five to 74 staff, 35.9 per cent of firms have full-time staff ranging from 75 to 200, and only 1.4 per cent of firms have less than five full-time staff.

Demographic data showed that a majority of the respondents are aged 31 to 40 years (31.6%). The second-largest was the respondents in the age group range of 41 to 50 years (26.8%) followed by 25 – 30 years (14.4%). Respondents who are above 61 years and below 25 years, formed the smallest group with 3.3 per cent and 2.9 per cent, respectively. Of the total number of respondents, 61.2 per cent hold a bachelor's degree, 16.7 per cent a Master's degree, 12.9 per cent have a diploma, 3.8 per cent have a certificate, and only 4.8 per cent secondary education.

The majority of respondents held the position of "others", who were dealing with new product development in the firms (52.2%), with 23.9 per cent the CEO/Director, 11.5 per cent the team leaders, followed with project managers and process managers with 8.1 per cent and 4.3 per cent respectively. These figures convey that the respondents are experienced with the process of the new product development in their firms, making their responses valuable pin terms of providing answers to the research questions.

It was 41.5 per cent of total respondents who indicated they had a business background, 20.1 per cent reported they had an engineering background, 10.5 per cent stated they had a science background, and only 6.7 per cent informed they were tradespeople. The majority of respondents had been in the industry for six to 10 years and more (69.8%) while 27.3 per cent had been in the industry for one to five years. Respondents who have been in the industry for less than one year were only 2.9 per cent. These figures indicate that most respondents are experienced in their employment.

5.8.1 Types of Firm Ownership

Of the 209 firms surveyed, 84 firms are Bumiputera firms, followed with Chinese owned firms 67, others with 55 firms and only 3 Indian owned firms. The Bumiputera

owned firms are 40.2 per cent, Chinese owned firms are 32.1 per cent, and other owned firms are 26.3 per cent. Figure 5.7 shows the breakdown of firm ownership.

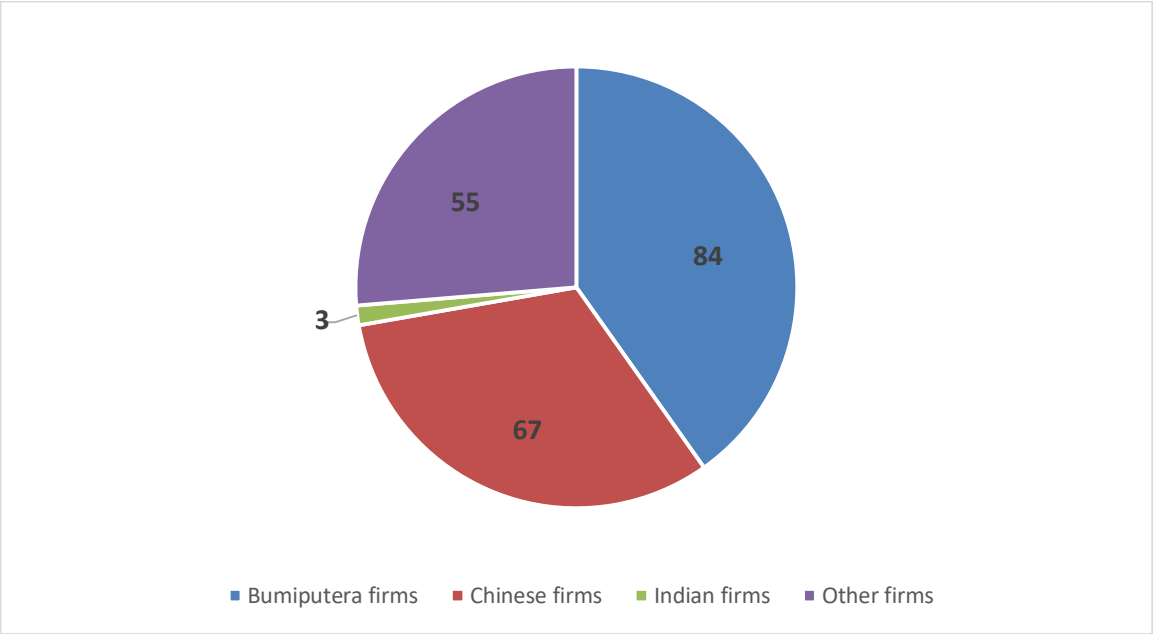


Figure 5.7: Types of Firm Ownership

Figure 5.7 shows the breakdown of the number of firms owned by all ethnicities in Malaysia. Figure 5.8 depicts the breakdown between Bumiputera and non-Bumiputera firms with a good representation of both.

5.8.2 Firm Ownership between Bumiputera and non-Bumiputera

According to the Malaysian Federal Constitution under article 153, the Malays together with other indigenous groups of Malaysia, are recognized as the “sons of soil” or the Bumiputera. Figure 5.8 exhibits the breakdown of firm ownership between the Bumiputera and non-Bumiputera accordingly. Non-Bumiputera firms are those owned by Chinese, Indian and others.

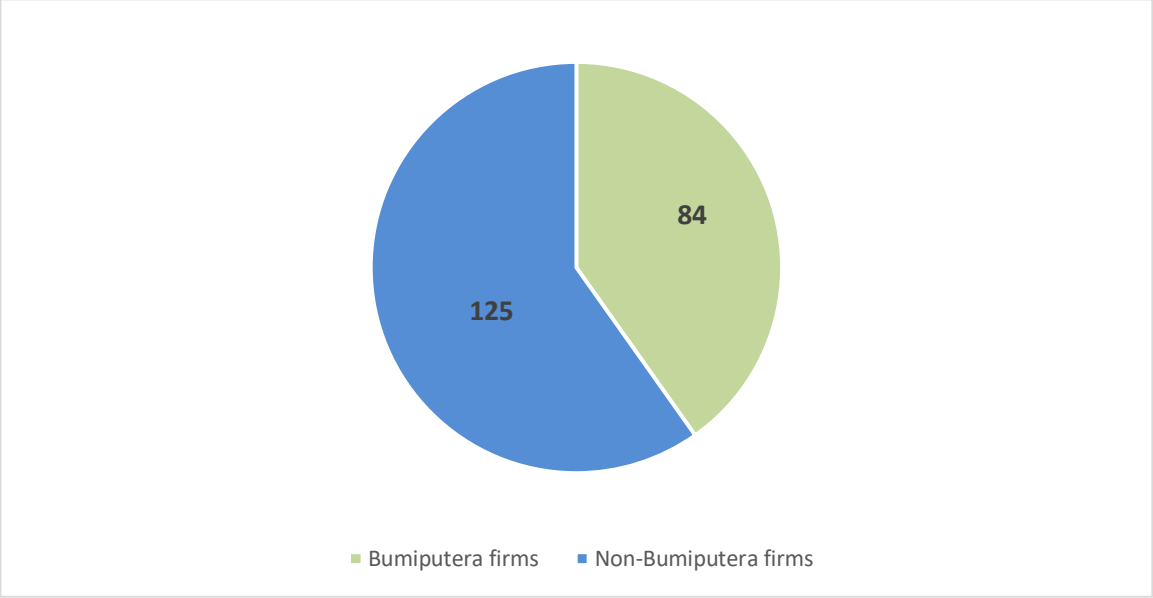


Figure 5.8: Firm Ownership between Bumiputera and non-Bumiputera

Figure 5.8 indicates that the proportion of firms surveyed with 40.2 per cent and 59.8 per cent of Bumiputera and non-Bumiputera firms, respectively.

5.8.3 Firms' Project Strategy

Figure 5.9 illustrates the breakdown of firms surveyed in terms of the project strategies they embraced. Nearly half the firms are using incremental innovation projects which is the improvement or revision of existing products, and cost reduction (48.8%). Meanwhile, there is 36.3 per cent of the firms using more innovative project strategies such as an addition to existing products, and new-to-the-company (36.3%). The other firms (14.4%) utilized a radical innovation project strategy that is new-to-the-world. This figure shows that among these three categories of a firm's project strategy, incremental innovation project strategy scores the highest.

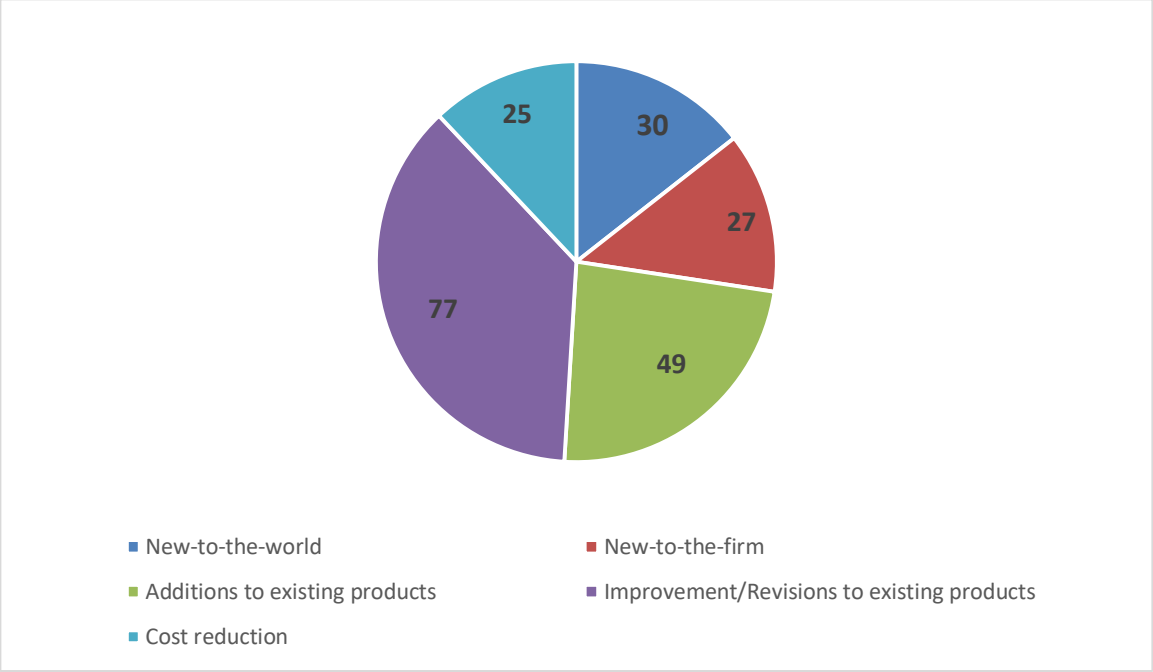


Figure 5.9: Firm's Project Strategy

The data shows that manufacturing firms in Malaysia are slow to innovate as evidence by the 14.4 per cent of firms surveyed introducing new products to the market as new-to-the-world. Many firms are only producing products that are cost reductions (12%), new-to-the-firm (12.9%), additions to existing products (23.6%), and the largest is improvement or revisions to existing products (37%).

This research was also set out to determine whether there are similarities or differences between Bumiputera and non-Bumiputera firms in terms of strategic orientations, firm capabilities and new product performance in the Malaysian SMEs. The following Section 5.9 presents the *t*-tests conducted on *Bumiputera* and non-*Bumiputera* firms to determine whether a difference exists between the mean of the two independent groups on a continuous dependent variable. The data were split between Bumiputera and non-Bumiputera for this purpose.

5.9 T-tests on *Bumiputera* and non-*Bumiputera* Firms

One key objective of this research (Research Question 5), was to examine whether strategic orientations, firm capabilities, firm ambidexterity and new product performance differed between *Bumiputera* and non-*Bumiputera* firms in Malaysia. This objective was achieved by conducting a series of independent sample *t*-tests based on the following six assumptions following Field (2016) and Pallant (2016):

Assumption #1: One dependent variable that is measured at the continuous level (strategic orientations, firm capabilities and firm ambidexterity).

Assumption #2: One independent variable that consists of two categories (*Bumiputera* and non-*Bumiputera*).

Assumption #3: Independence of observations means there is no relationship between the observations in each group of the independent variable or between the groups themselves. For instance, in this study, two groups were selected based on their type of ownership (i.e. a *Bumiputera* group and a non-*Bumiputera* group). As each observation (firm) was independent from the other in the sample, both met this assumption.

Assumption #4: No significant outliers in the two groups. There were no outliers in the data, as assessed by inspection of a boxplot.

Assumption #5: Dependent variables are normally distributed, the sample size is sufficient (more than 30 respondents), and the violation of this assumption should not cause any major problems (Field 2016). This procedure was reported in Chapter 5, Section 5.13.1. The value for the main variables was in the range -0.207 to 0.242, and the kurtosis value was in the range of -0.769 to 0.266.

Assumption #6: Homogeneity of variances.

This procedure was examined by conducting Levene's test where results show that the homogeneity of variances for marketing and technological capabilities were p = .882, p = .160 respectively, and (p = .198, p =.240, p = .707, p = .796) for marketing

capability exploitation and exploration and technological capability exploitation and exploration. However, three variables (market orientation, entrepreneur orientation and technology orientation) violated the assumptions of homogeneity of variances (p = .097, p = .310, p = .036).

The underlying assumptions of the *t*-tests concerned populations, not samples. In running *t*-tests, the variances of each sampled group were used to test this assumption that the variances are equal (or similar) (Salkin 2010). Problems develop when the variances of the groups are extremely different from one another (if the value of the largest variance estimates is more than four or five times that of the smallest variance estimate), but in this case there was no significant difference in variance estimate between the two groups.

An independent *t*-test was conducted to compare strategic orientations (market orientation, entrepreneur orientation and technology orientation), firm capabilities (marketing capabilities and technological capabilities), firm ambidexterity (exploitation and exploration) and new product performance in *Bumiputera* and non-*Bumiputera* firms. An independent *t*-test can indicate whether there is a significant difference in the mean scores for the two groups (Pallant 2016). In this case, an independent *t*-test was appropriate because there were two independent groups; namely *Bumiputera* and non-*Bumiputera* firms. This survey included 78 *Bumiputera* and 118 non-*Bumiputera* firms. The independent *t*-test results have been summarized in Table 5.16.

Table 5.16: The Independent t-test Results between Bumiputera and non-Bumiputera Firms for Strategic Orientations, Firm Capabilities, Firm Ambidexterity and New Product Performance

Variable		Types of Ownership *Bumiputera* n=78	Non-*Bumiputera* n=118	*t*	*p*
Market orientation	M SD	4.26 (0.427)	4.15 (0.550)	1.545	.124
Entrepreneur orientation	M SD	4.16 (0.550)	4.24 (0.548)	-1.030	.304
Technology orientation	M SD	4.13 (0.585)	4.17 (0.693)	-0.339	.735
Marketing capabilities	M SD	4.25 (0.535)	4.29 (0.519)	-0.476	.635
Technological capabilities	M SD	4.23 (0.544)	4.37 (0.606)	-1.584	.115
Marketing capabilities exploitation	M SD	4.08 (0.450)	4.03 (0.552)	0.583	.561
Marketing capabilities exploration	M SD	3.93 (0.642)	3.93 (0.735)	0.049	.961
Technological capabilities exploitation	M SD	4.22 (0.466)	4.18 (0.499)	0.646	.519
Technological capabilities exploration	M SD	4.13 (0.669)	4.07 (0.670)	0.560	.576
New product performance	M SD	3.76 (0.592)	3.95 (0.586)	-2.103	.037

Of note in Table 5.16 is that only new product performance indicates a significant difference between the two independent groups. The sections below describe and discuss the results for each of the variables in the *t*-test.

5.9.1 Strategic Orientations (Market orientation, entrepreneur orientation and technology orientation)

The market orientation mean of *Bumiputera* firms was 4.26, 0.11 higher than that of non-*Bumiputera* firms (4.15). A statistically insignificant difference was evident in market orientation between *Bumiputera* firms and non-*Bumiputera* firms.

Another independent *t*-test was conducted to compare the entrepreneur orientation mean for *Bumiputera* and non-*Bumiputera* firms. There was also an insignificant difference in mean for *Bumiputera* firms *(M*=4.16, *SD*=.550) and non-*Bumiputera* firms (*M*=4.24, *SD*=.548; *t* (191)=-1.030, *p*=.304).

The technology orientation mean for *Bumiputera* firms was 4.13, 0.04 lower than that of non-*Bumiputera* firms (4.17). There was also a statistically insignificant difference in technology orientation between *Bumiputera* firms and non-*Bumiputera* firms.

5.9.2 Firm Capabilities (Marketing capabilities and technological capabilities)

The marketing capability mean for *Bumiputera* firm was 4.25, 0.04 lower than the technology orientation mean for non-*Bumiputera* firms (4.29).

The technological capabilities mean for *Bumiputera* firms was 4.23, 0.14 lower than that of non-*Bumiputera* firms (4.37). These results indicate no statistically significant difference in marketing and technological capabilities between *Bumiputera* firms and non-*Bumiputera* firms.

5.9.3 Firm Ambidexterity (Exploitation and exploration)

The marketing capability (exploitation) mean for *Bumiputera* firms was 4.08, 0.05 higher than that for non-*Bumiputera* firms (4.03), while there was no statistically significant difference in marketing capability (exploitation) between *Bumiputera* firms and non-*Bumiputera* firms (the means of both groups were equal). Similarly, there was

no statistically significant difference in marketing capability (exploration) between *Bumiputera* firms and non-*Bumiputera* firms.

There was no significant difference in terms of technological capabilities (both exploitation and exploration) between *Bumiputera* firms and non-*Bumiputera* firms, as shown in Table 7.2.

5.9.4 New Product Performance

An independent *t*-test was also conducted to compare the new product performance mean of *Bumiputera* firms with that of non-*Bumiputera* firms. There was a significant difference in mean between *Bumiputera* firms *(M*=3.76, *SD*=.592) and non-*Bumiputera* firms [*M*=3.95, *SD*=.586], with *p*=.037.

The independent *t*-test analysis indicated that there was only one variable showing a significant difference between *Bumiputera* and non-*Bumiputera* firms, namely, new product performance.

Although there is little difference found between Bumiputera and non-Bumiputera, but this is a critical issue in Malaysia for Bumiputera people.

5.10 Discussion on the *t*-test result comparison between *Bumiputera* and non-*Bumiputera* Firms

The research was designed to investigate whether there is a significant difference between *Bumiputera* and non-*Bumiputera* firms in the manufacturing industry in Malaysia, based on several factors which are important to their innovation. These factors include the firms' strategic orientations, marketing and technological capabilities, the deployment of these capabilities (ambidexterity) and new product performance.

The firms' new product performance was found to indicate a statistically significant difference between the *Bumiputera* and non-*Bumiputera* firms, and no difference was found in the strategic orientations, firm capabilities or firm ambidexterity. These

findings suggest that other dimensions of strategic orientation (i.e., learning orientation) be examined in future research.

The influence of firms' strategic orientations and capabilities on their organizational performance is inconclusive. A study conducted by Yahya et al. (2011), reported an indifferent comparison between *Bumiputera* and non-*Bumiputera* firms in Malaysia in terms of their perception of management skills and impacting firm success. No significant difference was also reported in socio-cultural values between *Bumiputera* and non-*Bumiputera* firms (Peterson 1988). Other studies on SMEs in Malaysia and the organizational differences between *Bumiputera* and non-*Bumiputera* show that *Bumiputera* entrepreneurs still lag in terms of involvement in business, and economic achievement, while the non-*Bumiputera* whose domination of the country's entrepreneurial activities keeps improving (Zainol & Daud 2011). *Bumiputera* firms reported having a low level of efficiency and low productivity (Zain et al. 2012). Jamak et al. (2012) show *Bumiputera* firms failed mainly due to lack of management, sales and marketing skills, and poor competitive abilities.

However, these research findings may be due to their focus on the micro-enterprises run by Malaysian Malays involved in very small-scale business activities, whereas this research focused on SMEs in the Malaysian manufacturing industry.

There are plausible explanations for the research findings reported in this thesis. The first is the dynamic change in the innovation environment, such as the fast development of technology, shortened product life-cycle and rapid change in consumer preferences. Consequently, open innovation has become very popular in SMEs and crucial to their innovation performance. Contrary to tradition where new product development relied heavily on internal resources and capabilities, open innovation today is "based on the fundamental idea that useful knowledge is now widespread through society" (Vanhaverbeke 2017). Therefore, the deep and extensive engagement with external knowledge networks and communities has become a crucial factor in terms of influencing new product development and performance. This

research examined the effect of internal resources and competences on new product performance and not the role of external knowledge and engagement. The second plausible reason for the difference between *Bumiputera* and non-*Bumiputera* firms could be the relatively small sample size used in this research which may not represent the entire population. This research used subjective measurements of respondents' perceptions which may occur differences in understanding and interpretation.

5.11 SUMMARY

This chapter established the rationale for adopting a positivist paradigm in gathering plausible answers to the research questions with the aim of testing the hypotheses using the developed model. This chapter detailed the methods used, the research design, constructing and administrating of the instruments, data collection and data analysis procedures. Data analyses and results are presented and discussed in Chapter 6 and 7. In Chapter 6 which is specifically on SEM will discuss the issues related to unidimensionality, reliability and validity, goodness-of-fit model, assessing the measurement model using CFA and confirming the structural model. Correspondingly in Chapter 7 will focus on mediation analysis and findings.

CHAPTER 6

DATA ANALYSIS, FINDINGS AND DISCUSSION PART 1

6.1 Introduction

This chapter presents and discusses the findings of the new product performance model as developed and presented in Chapter 4. One of the research objectives of is to examine the effect of a firm's strategic orientations (market orientation, entrepreneur orientation and technology orientation) on new product performance and how these effects are mediated by the firm's marketing and technological capabilities. The survey conducted in the Malaysian manufacturing industry had 209 firms respond.

This chapter is organized as follows. The next section describes the analytical procedures and techniques used for conducting preliminary analyses to screen the data for structural equation modelling. These techniques included a Homoscedasticity Test for an equal variance of the group, a Kaiser-Meyer-Olkin Test for Sampling Adequacy, Variance Inflation Factor (VIF) for multicollinearity, a split sampling test for a non-response bias test, and Harman's one-factor test for common method variance. The measurement model (Figure 6.1) was then analyzed and examined using a confirmatory factor analysis to examine the reliability and validity of the measurements for each construct in the model. The full structural equation model was tested using AMOS 24. Section 6.5 presents the key findings of the structural equation model with all direct, indirect and total effects. Finally, the findings and hypotheses tests are presented and discussed.

6.2 Preliminary Data Screening Tests

6.2.1 Homoscedasticity Test

Field (2016) suggested using Levene's test for examining the assumption of homogeneity of variance or homoscedasticity. The situation is referred to as the homogeneity of variance when the variances of groups are equal. When the variances of groups are different (not homogeneous), this situation is known as

heteroscedasticity (Kobayashi & Pillai 2013). The F-statistic test is conducted to determine whether the variance of the two groups are equal. A Sig. (*p*) value of less than .05 indicates a violation of the assumption. Homoscedasticity is not met when the assumption is violated and the data is said to be in a state of heteroscedasticity. In this study, Levene's test was performed using the main research variables as a comparison factor. The result of Levene's test is shown in Table 6.1.

Table 6.1: Test of Homogeneity of Variance for the Main Variables

	Levene's Test for Equality of Variances	
Variables	**F**	**Sig.**
Market Orientation	0.589	0.445
Entrepreneur Orientation	1.911	0.170
Technology Orientation	7.007	0.009
Marketing Capabilities	0.114	0.736
Technological Capabilities	0.784	0.378
Marketing Capabilities Exploitation	0.968	0.328
Marketing Capabilities Exploration	0.189	0.665
Technological Capabilities Exploitation	2.691	0.104
Technological Capabilities Exploration	4.511	0.036
New Product Performance	0.151	0.698

The result shows that Sig (*p*) values for eight variables were greater than .05 (p >.05), suggesting that the equal variance assumption of homoscedasticity was met, with the exception of two variables, namely, technology orientation and technological capabilities exploration which were less than 0.05. Early results suggested that heteroscedasticity was not a problem with a balanced design; the false positive rate can be much less than 0.05, meaning the power of the test is reduced (Glass,

Peckham & Sanders 1972). Therefore, it can be concluded that the homoscedasticity assumption is met for all individual constructs.

6.2.2 Sampling Adequacy Test (Kaiser-Meyer-Olkin Test)

To assess whether the variables in the sample are adequate to correlate and appropriate for factor analysis, sampling adequacy was determined using the Kaiser-Meyer-Olkin (KMO) test. In order to justify the adequacy of the sample, a KMO value greater than 0.5 was used as a threshold (Field 2016; Kaiser 1974; Tabachnick, B & Fidell 2013).

The KMO test results are represented in Table 6.2. The KMO values for all the main variables are above the threshold value of 0.50, with Market Orientation at 0.663 and Marketing Capabilities Exploration at 0.835. Therefore, the samples used for this research can be considered adequate.

Table 6.2: Kaiser-Meyer-Olkin Measure of Sampling Adequacy for the Main Variables

Construct(s)	Kaiser-Meyer-Olkin Measure of Sampling Adequacy	Bartlett's Test of Sphericity		
		Approx. Chi-Square	*df*	Sig.
Market Orientation	0.663	174.229	15	.000
Entrepreneur Orientation	0.769	387.973	15	.000
Technology Orientation	0.723	429.463	6	.000
Marketing Capabilities	0.780	408.857	6	.000
Technological Capabilities	0.800	391.318	6	.000
Marketing Capabilities Exploitation	0.782	315.109	6	.000
Marketing Capabilities Exploration	0.835	507.637	6	.000
Technological Capabilities Exploitation	0.802	399.973	6	.000
Technological Capabilities Exploration	0.766	512.514	6	.000
New Product Performance	0.817	561.990	15	.000

Note: KMO value is above 0.50, significant at $p<0.05$

6.2.3 Multicollinearity Test (Variance Inflation Factor)

Multicollinearity is a problem that arises when two or more predictor variables in a regression model are highly correlated, suggesting that some items may be redundant. Sarstedt, Ringle and Hair (2017) suggested the Variance Inflation Factor (VIF) and Tolerance level computed to measure the degree of multicollinearity among the indicators. The higher the value of VIF, the greater the degree of collinearity. The VIF value should be below 10 as the common acceptable threshold value (Hair, Joseph F & Black 1998; Johnson, RA & Wichern 2007). Multicollinearity problems arise when a

VIF value is 10 or higher. In terms of tolerance level, the value should be more than 0.2 since a lower value may be indicative of an excessive or serious multicollinearity problem (Hair, Joseph F & Black 1998; Menard 2002). The results show that the VIF value was lower than 10 for all the constructs, ranging from 1.462 to 0.259, and the tolerance levels were all greater than the 0.2 (Refer Appendix 3 – Appendices 6.1, 6.2 and 6.3). Multicollinearity is unlikely to be an issue with the data.

6.2.4 Non-Response Bias Test

This research also used the procedure suggested by Armstrong and Overton (1977) to examine the non-response bias. The sample was split into early response and late response groups and the mean responses to the research variables in this study were then compared.

The cut-off date was set to classify the responses into two groups; first wave (early response) and second wave (late response). The date was recorded sequentially based on the date respondents answered their surveys through LimeSurvey. The difference between early and late responses was measured using the independent *t*-test at a significance level of $p < 0.05$.

The t-test results (refer Appendix 3 – Appendices 6.4 and 6.5) indicate that all the variables were insignificant at a significant level of $p > 0.05$. A non-bias response issue was not detected in this research.

6.2.5 Common Method Variance (CMV)

According to Podsakoff et al. (2003), common method variance (CMV) is the “variance that is attributable to the measurement method rather than to the constructs that the measures represent”. It is important to estimate the CMV that might occur when data from a study is collected using the self-report approach (Spector 2006). Podsakoff et al. (2003) recommended performing Harman’s one-factor test to detect the presence of CMV among the variables. All variables in this research were entered into exploratory factor analysis (EFA) to determine whether a single factor accounts for the

majority of the covariance among the variables. The result of Harman's one-factor test is attached (Refer Appendix 3 - Appendix 6.6).

Harman's one-factor test extracted 11 factors, with a total variance of 75.86 per cent at an Eigenvalue of 1.14 (Eigenvalue > 1). The first factor accounted for 31.54 per cent of the variance, which fell below the recommended threshold of 50 per cent (Podsakoff et al. 2003). As none of the resulting factors accounted for the majority of the variance, it is reasonable to conclude that the common method variance was not prevalent in this research. All assumptions have been met.

6.3 Testing the Model of New Product Performance using Structural Equation Modelling (SEM)

6.3.1 Introduction

The major objective of this research is to test the model (developed in Chapter 4) on new product performance in Malaysian SME manufacturing firms. There are 11 hypotheses in the model. Figure 6.1 shows all the observed variables and their posited constructs in the proposed model. All the 11 hypotheses are presented by one arrow, pointing from one construct to another. In this chapter, the proposed model was tested with the data collected from the Malaysian SME manufacturing firms.

The procedure for the test are presented in the following sections and the key analytical results are then presented and discussed.

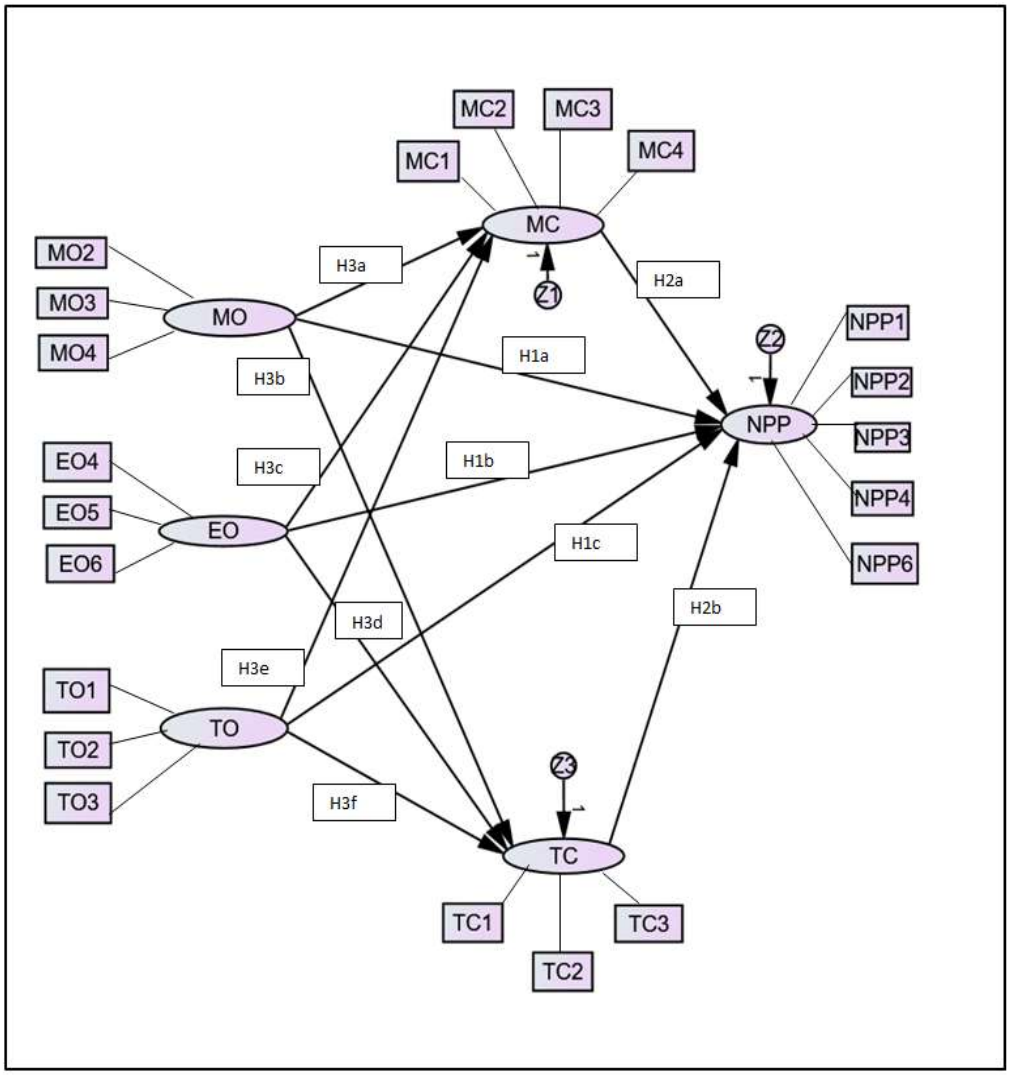


Figure 6.1: Path Diagram for New Product Performance Model

The hypothesized relationships are illustrated in the form of a path using SEM. The SEM diagram consists of the endogenous construct, exogenous construct, measurement error and arrows representing relationships between the constructs (refer Figure 6.1). The endogenous construct is the dependent variable, meaning it correlates with other factors within then model being studied. It can be a positive or negative correlation (Awang, Z, Afthanorhan & Asri 2015).The exogenous construct is considered independent where one variable within the formula does not dictate a formulaic relationship (Awang, Z 2012).

The endogenous constructs in this research are market orientation, entrepreneur orientation and technology orientation, while the exogenous construct consists of marketing capability, technological capability and new product performance.

The single-headed arrows in Figure 6.1 represent the causal relationships, in which one construct is dependent on another. For instance, the arrow connecting market orientation with new product performance represents the direct causal relationship that is hypothesized between these two constructs. The residual errors have been represented as (z) in small circles. Figure 6.1 represents the 11 hypotheses.

Strategic Orientations Effect on New Product Performance

H1a: Market orientation has a positive impact on new product performance

H1b: Entrepreneur orientation has a positive impact on new product performance

H1c: Technology orientation has a positive impact on new product performance

Firm Capabilities Effect on New Product Performance

H2a: A firm's marketing capabilities have a positive impact on new product performance

H2b: A firm's technological capabilities have a positive impact on new product performance

The Mediating Effects of Firm Capabilities on the Relationship between Strategic Orientations and New Product Performance

H3a: A firm's marketing capabilities mediate the relationship between market orientation and new product performance

H3b: A firm's technological capabilities mediate the relationship between market orientation and new product performance

H3c: A firm's marketing capabilities mediates the relationship between entrepreneur orientation and new product performance

H3d: A firm's technological capabilities mediate the relationship between entrepreneur orientation and new product performance

H3e: A firm's marketing capabilities mediate the relationship between technology orientation and new product performance

H3f: A firm's technological capabilities mediate the relationship between technology orientation and new product performance

6.3.2 Test of the Measurement Model

As depicted in Figure 6.1, the measurement model refers to constructs and their measurements (represented in the rectangular boxes). Following the procedures recommended by Awang, Z (2012), Anderson, JC and Gerbing (1988) and Fornell and Larcker (1981), several techniques were employed to measure the model's internal consistency, external consistency and measurement reliability. After this, confirmatory factor analysis was undertaken to test the reliability and validity of the measurement model.

6.3.2.1 Examining the Internal Consistency of the Measurement Model

It is very important to achieve internal and external consistency in measurement (Churchill Jr & Iacobucci 2005; Huang, X, Soutar & Brown 2004). As proposed by Churchill Jr (1979), correlation coefficients of variables from the same construct were calculated and examined to check for the internal consistency of the variables. The numbers of original observed variables and remaining variables for each of the proposed constructs in this study are displayed in Table 6.3. The results provide evidence that internal consistency has been achieved.

Table 6.3: Original and Remaining Variables for Each Proposed Construct

Name of constructs	Number of original variables	Number of variables taken out	Number of remaining variables
Market Orientation	6	0	6
Entrepreneur Orientation	6	0	6
Technology Orientation	4	0	4
Marketing Capabilities	4	0	4
Technological Capabilities	4	0	4
New Product Performance	6	0	6
Total	30	0	30

6.3.2.2 Examining the External Consistency

None of the variables were dropped off for further analysis since none of the correlation coefficients among the 30 variables had higher cross-construct correlation coefficients than those within the construct.

An exploratory factor analysis (EFA) using the maximum likelihood method was also conducted. Initially, market orientation showed there were two factors, possibly caused by two-reverse statements. After two items were removed, market orientation indicated only one factor. Two items were also removed from entrepreneur orientation since these two items did not load together on the same construct.

Confirmatory factor analysis (CFA) was used instead of EFA because the latter is an exploratory method utilized to identify factor structure between a set of observed variables without relying on predetermined relationships. Following Bagozzi and Yi (2012), CFA aims to verify whether a set of measurement items shares sufficient common method variance to be regarded as measures of a single intended factor. CFA is generally used to define and remove measurement items that load weakly on intended constructs, thus, establishing unidimensionality. Five items were removed due to their low loading on the corresponding factor.

6.3.2.3 Preliminary Reliability Analysis

Malhotra, Kim and Agarwal (2004) stated that reliability is defined as the extent to which measures are free from random or unstable error and therefore yield consistent results. Reliability is also an indicator of convergent validity (Hair, Joe F, Ringle & Sarstedt 2011).

The remaining 21 variables were examined for internal reliability based on their coefficients (alpha). The values of alpha for the six constructs are listed in Table 6.4. The values of alpha for all six latent variables were between 0.675 and 0.895. A reliability value of 0.70 or higher is acceptable (De Vaus 2002), however, Hatcher, Hulme and Ellis (1994) assert that reliability estimates of 0.60 and above are considered reasonable for an exploratory study.

An explanation of the CFA procedure is provided below, and the alpha values for these six constructs from the original variables are also listed following the EFA and CFA analysis.

Table 6.4: The Reliability Coefficient of Each Construct in the Final Model

Number of latent variables	Exploratory factor analysis		Confirmatory factor analysis	
	Items	α	Items	α
1. Market orientation	4	0.624	3	0.675
2. Entrepreneur orientation	4	0.766	3	0.752
3. Technology orientation	4	0.873	3	0.895

4. Marketing capabilities	4	0.849	4	0.849
5. Technological capabilities	4	0.850	3	0.871
6. New product performance	6	0.854	5	0.843
Total	26		21	

6.3.3 Confirmatory Factor Analysis

6.3.3.1 Convergent Validity of the Observed Variables

Convergent validity refers to the degree to which different methods used to measure the same construct produce similar results (Anderson, JC & Gerbing 1988) and is based on the correlation between responses obtained by maximally different methods of measuring the same construct. Surveys such as that conducted by Garver and Mentzer (1999) have shown that convergent validity can be tested by determining whether the items in a scale converge or load together on a single construct in the measurement model. A confirmatory factor analysis (CFA) is used to analyze convergent and discriminant validity by assessing the measurement model developed.

Cheng, EW (2001) presents two methods commonly used by researchers to evaluate the validity of the measurement model: testing each construct separately or testing all constructs together at one time. This research used pooled CFA, and structural equation modelling with Analysis of Moment Structure (AMOS) version 24 was adopted to examine the convergent validity of the constructs used. Table 6.5 exhibits the loadings, R squares, standard errors and t-values for each variable in the model.

Table 6.5: The Loadings, R-Squares, Standard Errors and t-Values for Each Variable in the Model

Variable	(λ)	R^2	Std Error	t-values
Market orientation:				
We do a lot of in-house market research	0.552	0.305	0.128	5.984
We have interdepartmental meetings at least once a quarter to discuss market trends and development	0.659	0.434	0.133	6.620
Market personnel spend time discussing customers' future needs with our functional department	0.734	0.539	0.037	5.583
Entrepreneur orientation				
We spend large amounts of money on developing new products/services	0.648	0.420	0.126	8.301
We give special attention to research and development	0.770	0.593	0.107	9.692
We consider new ideas/approach as very important	0.756	0.571	0.024	7.117
Technology orientation				
We use sophisticated technology in our new product development	0.935	0.874	0.069	15.822
We use rapid integration of new technologies	0.862	0.743	0.020	6.935

We are proactive in developing new technologies	0.893	0.797	0.067	14.589

Variable	(λ)	R^2	Std Error	t-values
Marketing capabilities				
We are good at understanding customer needs	0.727	0.528	0.146	8.707
We are good at creating customer relationships	0.889	0.790	0.157	10.549
We are good at maintaining customer relationships	0.870	0.757	0.170	10.136
We are good at sharing trust and goals with strategic partners	0.655	0.429	0.018	9.292
Technological capabilities				
We are acquiring important technology information	0.847	0.717	0.140	7.019
We are identifying new technology opportunities	0.824	0.679	0.072	13.580
We are responding to technology changes	0.846	0.716	0.090	14.082
New product performance				
Customer satisfaction	0.573	0.329	0.093	7.544
Revenue goal	0.969	0.940	0.134	9.832

Profitability goal	0.778	0.606	0.112	9.699
Launch on time	0.710	0.504	0.133	8.589
Performance specification	0.734	0.538	0.330	7.183

The loadings ranged from 0.552 to 0.969; that is, moderate to high. The critical ratio (*t*-test) for factor loading was also used to assess convergent validity. Convergent validity exists when the factor loadings are statistically significant. The critical ratio (C.R) or the t-values for all the estimated parameters exceeded the benchmark of ± 1.96 and were found to be statistically significant, ($p<0.05$) with the standard error (S.E) not excessively large or small (Byrne 2016). Therefore, the convergent validity of the constructs in the measurement model was achieved (Anderson, JC & Gerbing 1988; Byrne 2016).

6.3.3.2 Construct Reliability and Variance Explained

Based on the loadings (λs) and variance of measurement errors provided by AMOS 24, the reliability for each construct in the model was calculated using the statistical tools package. The results of construct validity and variance explained are shown in Table 6.6.

Table 6.6: Construct Reliability and Variance Explained

Construct	Construct reliability	Variance explained
Market orientation (MOR)	0.768	0.642
Entrepreneur orientation (TOR)	0.770	0.528
Technology orientation (EOR)	0.925	0.805

Marketing capabilities (MC)	0.868	0.626
Technological capabilities (TC)	0.877	0.704
New product performance NPP)	0.872	0.583

The results presented in Table 6.6 indicate the reliabilities range from 0.768 to 0.925, indicating all the values are well accepted (Bohrnstedt & Marwell 1978; Nunnally, JC & Bernstein 1967). The values of variance extracted range from 0.528 to 0.805, showing that the variance extracted is above the acceptable level (Fornell & Larcker 1981). Overall, it can be said that the measurement model in this study has an acceptable level of reliability and validity.

6.3.3.3 Goodness of Fit Index for the Measurement Model

The overall indicators of the model fit are shown in Table 6.7. By examining these indicators, it can be seen that the final measurement model fitted the data very well. The $\chi 2$ per degree of freedom was only 2.002, which was very close to unity, and less than 3. The probability was 0.000, which was the widely used acceptable significance level of 0.05. These results indicate the proposed measurement model fitted the data well.

Table 6.7: The Overall Goodness of Fit Index of the Measurement Model and the Correlation Coefficients between the Constructs in the Model

Variables	MOR	EOR	TOR	MC	TC
Market orientation (MOR)					
Entrepreneur orientation (EOR)	.487**				
Technology orientation (TOR)	.385**	.720**			

Marketing capabilities (MC)	.507**	.492**	.539**		
Technological capabilities (TC)	.303**	.673**	.716**	.688**	
New product performance (NPP)	.238**	.208	.325**	.439**	.399**

Goodness of fit			
$\chi 2/df$	=	2.002	(p=0.000)
Goodness of Fit Index (GFI)	=	0.863	
Comparative Fit Index (CFI)	=	0.926	
Tucker Lewis Index (TLI)	=	0.908	
Non-Normed Fit Index (NFI)	=	0.864	
Root Mean Square Error of approximation	=	0.072	

6.3.3.4 Assessment of Discriminant Validity of the Model

Discriminant validity is defined as the degree to which measures of different constructs are unique (Gallagher, Ting & Palmer 2008; Lee, J-H & Scott 2006) and the extent to which an item does not relate to the measure of other constructs (Malhotra, Kim & Agarwal 2004). The average variance extracted (AVE) has to be bigger than the variance of the correlation in order to achieve discriminant validity (Hair, Joe F, Ringle & Sarstedt 2011). It has been reported by Garver and Mentzer (1999) that in order to test for discriminant validity, the researcher needs to verify that the scales developed to measure different constructs are certainly measuring the different construct. The table of discriminant validity of constructs can be referred to in Table 6.8. The presence of discriminant validity is shown when there is a relatively low correlation between constructs and the discussion of each construct follows.

Table 6.8: The Discriminant Validity of the Constructs

	EO	MC	MCi	MCr	MO	NPP	TC	TCi	TCr	TO
EO	0.767									
MC	0.443	0.641								
MCi	0.041	0.015	0.972							
MCr	0.057	0.013	0.866	0.947						
MO	-0.027	-0.071	0.399	0.296	0.848					
NPP	-0.025	-0.048	-0.031	0.142	-0.034	0.686				
TC	-0.143	-0.307	-0.010	-0.041	-0.024	-0.028	0.858			
TCi	0.354	0.576	-0.028	-0.045	0.026	-0.160	-0.267	0.860		
TCr	0.080	-0.038	-0.027	-0.032	-0.021	-0.034	-0.041	-0.015	0.981	

TO	-0.135	-0.329	0.053	0.034	0.044	-0.042	0.823	-0.259	-0.043	0.804

a) Strategic Orientation (market orientation, entrepreneur orientation and technology orientation)

Each of the constructs exhibited a larger variance than its correlation coefficients. For instance, the average variances extracted (AVE) of market orientation, entrepreneur orientation and technology orientation were 0.84, 0.77 and 0.80, respectively. The correlation coefficients among these three constructs were 0.11 (covariance between market orientation and entrepreneur orientation), 0.21 (covariance between entrepreneur orientation and technology orientation), and 0.12 (correlation between market orientation and technology orientation). These figures show that each of these constructs is uniquely present in the dimensions of strategic orientation.

b) Firm Capabilities (marketing capabilities and technological capabilities)

Marketing capabilities and technological capabilities indicated an average variance of 0.64 and 0.86, respectively. The correlation between marketing capabilities and technological capabilities was 0.12, representing a dimension of firm capabilities. This also suggests that marketing capabilities and technological capabilities constructs are also uniquely present.

c) New Product Performance

The average variance extracted (AVE) for new product performance was 0.69. The covariance between new product performance and firms' capabilities, namely, marketing capabilities and technological capabilities, was 0.8 and 0.11, respectively. The covariance between new product performance and the dimensions of strategic orientation was 0.6 (between new product performance and market orientation), 0.5 (between new product performance and entrepreneur orientation), and 0.11 (between

new product performance and technology orientation). This also indicates that new product performance is a unidimensional construct.

Overall, the confirmatory factor analysis shows that the measurement model in this research has an acceptable goodness-of-fit and level of reliability and validity to proceed to the structural model.

6.4 Testing the Proposed Structural Model

6.4.1 Specification of the Model

The path diagram of the final structural model for this research is shown in Figure 6.1. The specified observed variables are reflected in the theoretical framework developed in Chapter 4.

6.4.2 Identification of the Model

According to Baumgartner and Homburg (1996), in order to permit a unique estimation of parameters of the hypothesized model, the levels of identification are determined by the sufficiency of information in the sample matrix. The identification problem is whether or not sufficient information is available to identify a solution to a set of structural equation models (Hair, Joe F, Ringle & Sarstedt 2011). A model can be under-identified, just-identified or over-identified. In this case, the desired state of the CFA and SEM model has been achieved given the measurement model. That is, a solution can be found with positive degrees of freedom and a corresponding of at least two goodness-of-fit-value, as suggested by Hair, Joe F, Ringle and Sarstedt (2011). The values for RMSEA, CFI, TLI and $\chi 2$ values recorded exceed the threshold level.

6.4.3 Estimation of the Model

Structural equation models are usually estimated using maximum likelihood estimation (MLE) (Baumgartner & Homburg 1996) because the MLE is the default method in AMOS, and can handle both small and large sample sizes. Before proceeding to SEM analyses, estimates of parameters are important because these are used to generate the estimated population covariance matrix for the model.

AMOS 24 provides indicators for the overall goodness-of-fit, namely, the Goodness of Fit Index (GFI), the Comparative Fit Index (CFI), the Tucker Lewis Index (TLI), the Non-Normed Fit Index (NFI) and the Root Mean Square Residual (RMSR). Table 6.9 summarizes the result of the final full measurement model.

Table 6.9: Summary of goodness-of-fit indices – Proposed Model

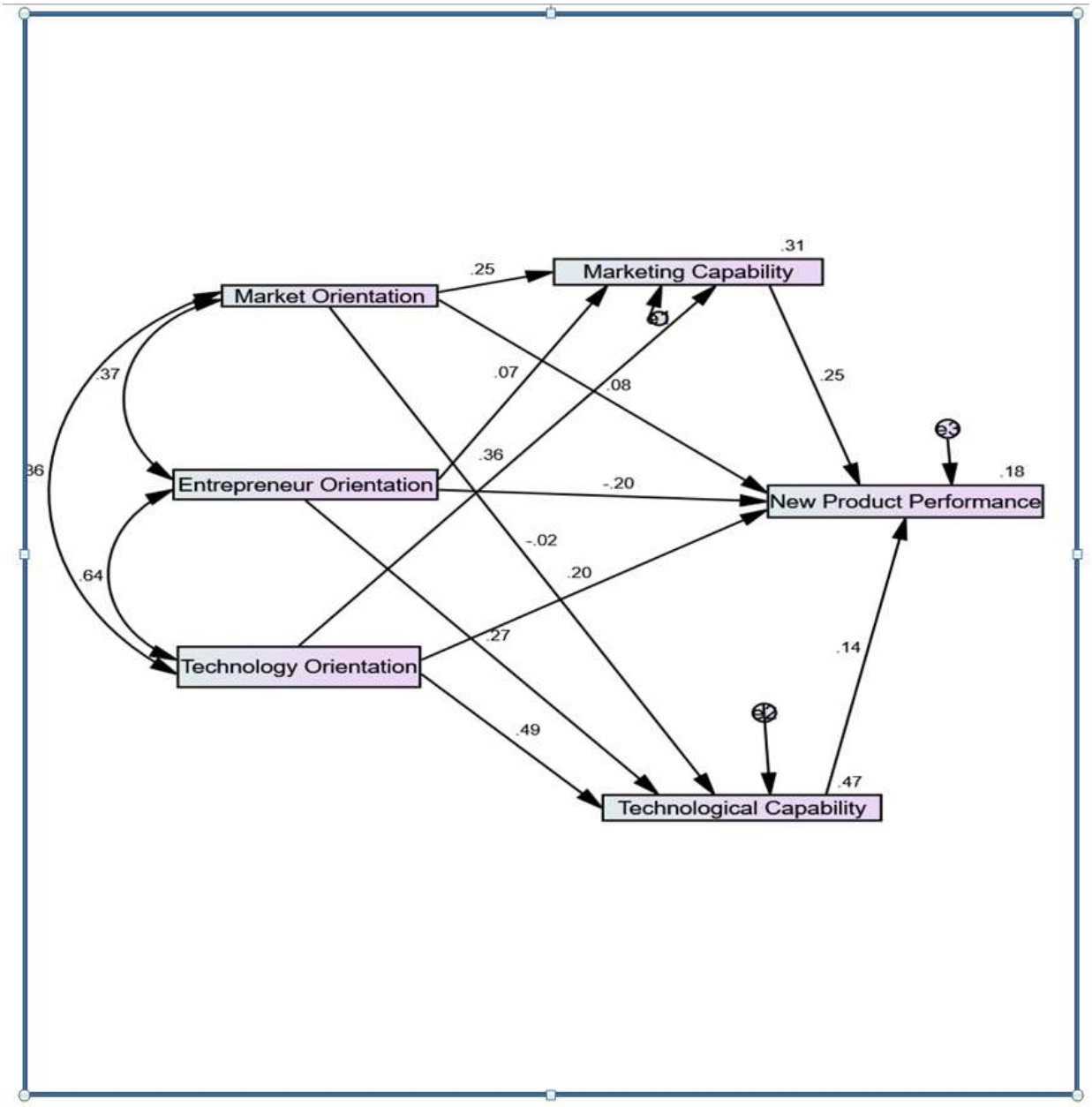
GoF Measure	Statistic Measure	Index Value (*n*=209)	Recommended Value
Absolute	Root mean square error of approximation (RMSEA)	0.072	≤0.08
	Goodness of Fit (GFI)	0.863	≥0.90
Incremental	Comparative Fit Index (CFI)	0.926	≥0.90
	Tucker-Lewis Index (TLI)	0.908	≥0.90
	Non-normed Fit Index (NFI)	0.864	≥0.90
Parsimonious	Normed $\chi 2\,(\chi 2/df)$	2.002	≤3.00

The value of CFI and TLI, 0.926 and 0.908 respectively exceed the threshold level of 0.90, indicating an acceptable fit (Hair, Joe F, Ringle & Sarstedt 2011). The values of AGFI (0.863) and NFI (0.864) are close to 0.90, suggesting a reasonable fit based on the writings of Tabachnick, BG and Fidell (2007) and Hair, Joe F, Ringle and Sarstedt (2011). The RMSEA indicated a value of 0.072. The correlations between underlying constructs were less than 0.85 (refer Appendix 6. 7). The results confirm that the proposed model fits the data adequately. The following sections present the findings of this thesis.

6.5 Findings

The direct effects, indirect effects and total effects from the exogenous constructs to the endogenous constructs in the theoretical framework can be seen in Figure 6.2.

Figure 6.2: Diagram with Direct Effects, Indirect Effects and Total Effects of the Proposed Model



6.5.1 The Direct, Indirect and Total Effects among the Model Constructs

Table 6.10 presents the direct, indirect and total effects among the model constructs.

Table 6.10: The Direct, Indirect and Total Effects among the Constructs

Path	Direct Effect β	Indirect Effect β	Types of Mediation	Total Effect β
MO → NPP	.081			.142*
EO → NPP	-.198*			-.143*
TO → NPP	.199*			.356*
MC → NPP	.248**			
TC → NPP	.137			
MO →MC → NPP		.063*	Indirect-only/Full mediation	
MO → TC → NPP		-.002	Non-mediation	
EO → MC → NPP		.018	Non-mediation	
EO → TC → NPP		.037	Non-mediation	
TO → MC → NPP		.090*	Complementary/Partial mediation	
TO → TC → NPP		.067	Non-mediation	

	Direct Effect β
MO →MC	.254***
EO → MC	.073
TO → MC	.362***
MO → TC	-.015
EO → TC	.268***
TO → TC	.487***

Note: The values for direct, indirect and total effects in this table are completely standardized solutions from the AMOS 24

*: significant at α = 0.05 (two-tailed)
**: significant at α = 0.01 (two-tailed)
***: significant at α = 0.001 (two-tailed)

Table 6.10 shows that the ***β*** value for all hypothesized relationships were reported. Two of the three total effects were positive. Therefore, the two hypotheses (H1a and H1c) were supported by the data in terms of their total effects. The total effect of entrepreneur orientation on new product performance was negative so the result failed

to support hypothesis (H1b) regarding a total positive relationship between entrepreneur orientation and new product performance.

With regard to the direct effect of the three dimensions of strategic orientations on new product performance, only the direct effect of technology orientation on new product performance was statistically significant.

The effect of marketing capabilities on new product performance was positive and significant and supports hypothesis (H2a). However, the effect of technological capabilities on new product performance was not significant, although positive. Therefore, hypothesis (H2b) is not supported.

A robustness test “analyzes the uncertainty of models and tests whether estimated effects of interest are sensitive to changes in model specifications” (Neumayer & Plümper 2017). To test the robustness of the results, an alternative measurement of new product performance, customer satisfaction, was used as the dependent variable, following the procedure suggested by (Lu & White 2014). Customer satisfaction has been widely regarded as one of the most frequently used success criteria in SMEs (Huang, X, Soutar & Brown 2004). In the case of SMEs, understanding customers are very important to the new product success.

The results of this robustness test show that the significant interaction terms in this model are similar and consistent in sign with the AMOS results, offering a robust test of the empirical model. The direct effect of technology orientation on new product performance is significant (***β*** = .164), and the total effect of technology orientation on new product performance (***β*** = .345). Meanwhile, the direct effect and the total effect of the entrepreneur orientation on new product performance were negative (***β*** = -.186) and (***β*** = -.155), respectively. These results do not show much difference from the value reported in Table 6.10 of using all new product performance measurements. Taken together, these results suggest that the results using all of new product performance measurements are robust.

6.5.2 The Mediating (Indirect) Effects among the Model Constructs

The mediating effect of firm capabilities between strategic orientations and new product performance indicated indirect effects. The findings presented in Table 6.10 show that marketing capabilities serve as an indirect-only mediator (full mediation) for the relationship between market orientation and new product performance. Thus hypothesis (H3a) is supported. Market orientation shows a statistically and positive indirect effect through marketing capabilities in regard to new product performance (***β*** = .063**). However, market orientation does not have a significant direct effect on new product performance (***β*** = .081). Instead, market orientation impacts new product performance only through marketing capabilities.

Technology orientation is also mediated by marketing capabilities in a complementary mediating effect (partial mediation) on the relationship between technology orientation and new product performance. There is also a significant direct impact of technology orientation on new product performance (***β*** = .199*). The indirect effect between paths is significant at (***β*** = .090*) so supports hypothesis (H3e). Both the direct and indirect effects have positive coefficients establishing a complementary mediation and indicating that the effect of technology orientation on new product performance is partially mediated by marketing capabilities. Technology orientation impacts new product performance directly and indirectly through marketing capabilities supporting complementary mediation whereby a combined effect is yielded (***β*** = .356). However, technology orientation has stronger direct effect (***β*** = .199*) on new product performance compared to the indirect effect (***β*** = .090*).

Other four mediating effects of strategic orientations on new product performance are not statistically significant. Therefore, hypotheses (H3b, H3c, H3d and H3f) are not supported. Table 6.11 summarizes the test results for the 11 hypotheses in the theoretical model.

Table 6.11: Summary of Results for Hypothesized relationships

	Hypotheses	Results
H1a	Market orientation has a positive impact on new product performance	Supported
H1b	Entrepreneur orientation has a positive impact on new product performance	Not supported
H1c	Technology orientation has a positive impact on new product performance	Supported
H2a	A firm's marketing capabilities have a positive impact on new product performance	Supported
H2b	A firm's technological capabilities have a positive impact on new product performance	Not supported

Table 6.11: Summary of Results for Hypothesized relationships (continued)

	Hypotheses		Results
H3a	A firm's marketing capabilities mediate the relationship between market orientation and new product performance	Indirect-only/Full mediation	Supported

H3b	A firm's technological capabilities mediate the relationship between market orientation and new product performance	Non-mediation	Not supported
H3c	A firm's marketing capabilities mediate the relationship between entrepreneur orientation and new product performance	Non-mediation	Not supported
H3d	A firm's technological capabilities mediate the relationship between entrepreneur orientation and new product performance	Non-mediation	Not supported
H3e	A firm's marketing capabilities mediate the relationship between technology orientation and new product performance	Complementary/Partial mediation	Supported
H3f	A firm's technological capabilities mediate the relationship between technology orientation and new product performance	Non-mediation	Not supported

6.6 Discussion - Effects of the Strategic Orientations on New Product Performance

The main objective of this research was to develop a theoretical model and to assess the relationships between firm resources, firm capabilities and new product performance. Underpinned by the Resource-based View (RBV) and based on an extensive literature review, the theoretical framework of new product performance was developed in Chapter 4. The measurement of the constructs in the framework was then validated. A total of 11 hypotheses were tested in an attempt to answer the first three research questions out of the five raised in Chapter 1:

1) How do the strategic orientations of firms impact new product performance in Malaysian manufacturing SMEs?

2) How do the marketing and technological capabilities of SMEs impact new product performance?

3) Do firms' capabilities mediate the relationship between strategic orientations and new product performance?

6.6.1 The Effects of Strategic Orientations on New Product Performance

This research selected the three strategic orientation dimensions of market orientation, entrepreneur orientation and technology orientation to understand and test how these three dimensions impact new product performance in the Malaysian manufacturing industries, particularly for SMEs, and are presented and discussed from both direct, indirect and total impacts, explaining 11 hypotheses: H1a to H3f.

6.6.1.1 The Effects of Market Orientation on New Product Performance

Market-oriented firms focus on the demand from customers or potential customers that help the firms offer innovations most likely to be appreciated by customers through intelligence generation, market intelligence dissemination, and responsiveness to market intelligence.

The results presented in the previous section reveal that market orientation does not have a significant direct effect on new product performance but has a total effect through its indirect impact on new product performance, as well as through the mediation of marketing capabilities. This result supports hypothesis (H1a) that market orientation has a positive impact on new product performance. As market orientation may not be the strongest factor, its direct effect on performance may differ according to contextual factors. Market orientation can become a strong factor in combination with other important performance antecedents, such as marketing capabilities.

There is considerable evidence for the mediating role of firm capabilities in the market orientation-new product performance relationship. This research contends that market orientation may improve new product performance via firm capabilities. Essentially, this research found that market orientation influenced new product performance

through the mediating effect of marketing capabilities which is reported in Section 6.5.2.

The findings also reveal that market orientation does not have a significant direct impact on new product performance. Langerak, Hultink and Robben (2004) stated in their study that market orientation has no direct relationship to new product performance and organizational performance. The result here confirmed the result obtained by previous researchers.

Atuahene-Gima (1995) reported no direct effect of market orientation on perceived market share growth. Interest in this relationship has remained unfaltering for its vital significance, also confirmed by the results reported here. However, this does not mean that market orientation is not a significant predictor to new product performance.

Some studies, for instance Baker and Sinkula (2007), Pelham and Wilson (1996), and Slater and Narver (1994) have demonstrated, that environmental conditions (i.e., competitive intensity, market turbulence, technological change, buyer power, seller concentration) and firm factors (i.e., type of firms, size of firms, age of firms), and market orientation could be positively related to new product performance. Their studies were performed on larger firms and in different geographical areas, have maintained that market orientation has a positive direct impact on new product performance. However, the results of those studies using survey data are often mixed.

Drawing on the RBV, the literature postulates that a firm with a superior market orientation achieves superior firm performance because the firm can understand current and future customers and factors (e.g., competition and regulation) affecting them. This research focused on SMEs in a developing country and presents for the first time data on new product performance which can be used for comparison in the future. Environmental conditions in the context of SME can be suggested to include for further study in the future.

6.6.1.2 The Effects of Entrepreneur Orientation on New Product Performance

Entrepreneur-oriented firms are understood to use strategy-making processes, structures and behaviours that are characterised by innovativeness, proactiveness, and risk-taking.

The results of this research show that entrepreneur orientation does not have a significant direct relationship with new product performance. This finding was unexpected because the literature indicates that entrepreneur orientation is a key ingredient for firm success (Wang, CL 2008) and always positively associated with firm performance (Shirokova et al. 2016). Moreover, entrepreneur orientation presumes an active strategic posture with a focus on a firm's abilities to develop constant innovations, adopt proactiveness in firm actions and undertake risky ventures despite a high probability of losses (Stam & Elfring 2008). Such a contradiction in this research finding may be justified that the managers/owners do not embrace a high level of entrepreneur orientation and sticking to a conservative strategic posture.

Existing literature indicates mixed results in how entrepreneur orientation contributes to organizational performance. Hult, Snow and Kandemir (2003) found a strong relationship between entrepreneur orientation and organizational performance when they measured organization performance based on market share, growth, profitability and firm size. They also discovered that new ventures with strong entrepreneur orientation could perform better than those who do not adopt entrepreneur orientation. This research here is in a different context shows the result in a negative or insignificant relationship between entrepreneur orientation and new product performance.

SMEs are known for risk-taking behaviour, innovative and proactive practices, but perhaps not practised by the SMEs' owners/managers in a developing. A plausible explanation derived from these findings could be that SMEs, are restricted in the extent to which risky resource commitments can be made. SMEs generally have a limited resource-base; therefore, large resource commitments which may end in costly failure

may seriously affect the firm's profits or potentially jeopardize the firm's future. This explanation appears to be logical and further research may provide insight.

Another possible explanation for this finding is that maybe explained similarly. Given the size of SMEs and limited resource base, cannot perhaps shape the environment by introducing new products ahead of the competition. Efforts to achieve first-mover advantage are also likely to involve high degrees of risk – both technical and market risks. While SMEs have the will and foresight to take advantage of new opportunities, they may not possess the resources and capabilities to exploit them.

Nonetheless, an important message from past findings is that the direct effect of entrepreneur orientation on firm performance provides an incomplete picture of the relationships between those two, entrepreneur orientation - NPP and the strength and direction of this relationship varies with different configurations of the external environment variables. The results obtained in this research confirms those established in George (2011)'s study, where there were no significant correlations between entrepreneur orientation and performance. Frishammar and Åke Hörte (2007) also found that the different components of entrepreneurial orientation, neither risk-taking nor proactiveness shows any significant relationship with new product development performance. This finding here mirrors those of the previous studies that examined the relationships between entrepreneur orientation and NPP. This result may be explained by the fact that managers/owners do not pursuit of risk-taking, proactiveness, and innovativeness that could positively affects NPP echoing Lumpkin and Dess (1996) who emphasize that excessive risk-taking can lower performance in some context and more risk-taking can also lower performance when it is not aligned with increasing innovativeness and proactiveness (Lomberg et al. 2017).

6.6.1.3 The Effects of Technology Orientation on New Product Performance

Technology-oriented firms employ the latest technologies to produce new products or services, highly devote their resources to R&D and proactively integrate new technology more effectively than competitors. The results reported here in this

research show that technology orientation has a total positive impact on new product performance, and so confirm hypothesis (H1C) which states:

Technology orientation has a positive impact on new product performance.

According to the Kocak, Carsrud and Oflazoglu (2017) study on the effects of technology orientation on both innovation and firm performance, technology orientation leads to radical innovation and a firm can use its technical knowledge to build a new technical solution to answer and meet the new needs of its users (Gatignon & Xuereb 1997).

Hypothesis H1c shows a positive relationship between new product performance and technology orientation suggesting that greater technology orientation could improve new product performance.

6.7 Discussion - Effects of Firm Capabilities on New Product Performance

6.7.1 The Effects of Marketing Capabilities on New Product Performance

Marketing capabilities refer to the competencies that allow organizations to predict and adapt customer changes by creating and sustaining relationships with customers and channel members (Day, George S 1994; Song, M et al. 2005) and involve the attention paid to the needs of customers, pricing and advertising skills, commitment to customer service, and the integration of marketing activities (Di Benedetto, DeSarbo & Song 2008)

The results here do demonstrate that marketing capabilities have a significant positive effect on new product performance and support hypothesis (H2a) that a firm's marketing capabilities have a positive impact on new product performance. This result is consistent with that of Kim, N, Shin and Min (2016) and Najafi-Tavani, Sharifi and Najafi-Tavani (2016), who found a positive relationship between marketing capabilities and new product performance. Firms with strong marketing capabilities can play a leading role in developing a competitive advantage.

Other results of these findings show that marketing capabilities mediate the relationship between market orientation and new product performance, as well as the relationship between technology orientation and new product performance. It explains the relationship between the independent variable and the dependent variable. In this case, the mediator (marketing capabilities) is a mechanism by which market orientation and technology orientation produce changes on new product performance. When the effect of the mediator (marketing capabilities) is fully taken into account, the relationship between independent market and technology orientation maybe reduced.

These findings broadly support the work on mediating effects. Teece, Pisano and Shuen (1997), demonstrated that capabilities are dynamic when they allow the firm to implement new strategies to reflect changing market conditions by combining and transforming available resources in new and different ways. In this case, the market orientation is linked to the firm's new product performance and indicates that market orientation requires complementary firm capabilities, that is marketing capabilities if its value to the firm is to be fully utilized.

The following two hypotheses are supported:

H3a: A firm's marketing capabilities mediate the relationship between market orientation and new product performance; and

H3e: A firm's marketing capabilities mediate the relationship between technology orientation and new product performance.

In the case of Malaysian SMEs, possessing valuable, rare, inimitable and non-substitutable resources can be useful. Firms also require complementary capabilities to deploy available resources in ways that suit market conditions and in order to drive new product performance. The following subsection discusses the findings of technological capabilities in Malaysian SMEs.

6.7.2 The Effects of Technological Capabilities on New Product Performance

Technological capabilities enable an organization to solve technical problems, implement new technical processes and tools, and develop prototypes (Fowler et al. 2000). They involve technology development, product development, production processes, manufacturing procedures, and technology forecasts (Di Benedetto, DeSarbo & Song 2008).

A strong relationship is reported to exist between technological capabilities and new product performance though the result in this research indicates that technological capabilities do not have a significant positive relationship with new product performance. This finding is somewhat surprising given the fact that other research shows contradictory findings. The findings reported here suggest that firms have to undertake conscious investments to put technologies into productive use. New technologies have large tacit elements (i.e., information which is difficult to embody in hardware or written instructions), which can only be acquired through experience and investment in training, information search, and even R&D, all of which require a lot of investment where SMEs only have limited resources.

The findings in this research show that the effect of technological capabilities on new product performance is not significant, although positive and so hypothesis (H2b) is not supported.

It is also surprising that technological capabilities do not mediate the relationships between any dimensions of the strategic orientation and new product performance. These capabilities were suggested by Deutscher et al. (2016) to be a missing link in examining the said relationships.

This finding has been unable to demonstrate that technological capabilities mediate the relationships between the dimensions of strategic orientation (market, entrepreneur and technology orientation) and new product performance. Therefore, the following hypotheses are not supported:

H3b: A firm's technological capabilities mediate the relationship between market orientation and new product performance;

H3d: A firm's technological capabilities mediate the relationship between entrepreneur orientation and new product performance; and

H3f: A firm's technological capabilities mediate the relationship between technology orientation and new product performance.

The direct relationships between strategic orientation may partly explain the impact on new product performance rather than through the mediation of technological capabilities. This research suggests that the effective accumulation of technology in developing countries depends solely on access to new information, stable macroeconomic conditions, market-driven signals and the provision of human capital. In the Malaysian context, SMEs face specific challenges such as limited technology adoption and implementation, absence of human resources, lack of access to credit and competition from larger counterparts and globalization (Abdullah, MA 2019). The findings reported here provide valuable insights into the nature of technological activities in SMEs, the utility of different learning mechanisms and factors affecting firm-level capability building. The lack of financial capital is an important factor, and the lack of information on the appropriate technology to access due to limited budget that may become an impediment to improve new product performance.

6.8 Summary

This chapter described the preliminary tests undertaken before the test of key hypotheses and the measurement of the model in terms of unidimensionality, reliability and validity, and the goodness-of-fit indices (absolute, incremental and parsimonious goodness-of-fit indices).

Marketing capabilities was found to have a positive and significant impact on new product performance. Technology orientation has a direct impact on new product performance whereas the market orientation did not have a direct impact on new

product performance, and entrepreneur orientation contributed negatively towards explaining new product performance. The findings support that marketing capabilities mediate the relationship between marketing capabilities and new product performance, and also between technological capabilities and new product performance relationship. Therefore, the managers/owners of Malaysian SMEs should take into account all of the suggestions and views discussed in Section 6.6 and 6.7 as this will enhance their firms' new product performance.

The following chapter focuses on the moderating effects of firm ambidexterity and the relationship between firm capabilities and new product performance and will also determine whether a difference exists between the *Bumiputera* and non-*Bumiputera* firms through t-test analysis of the key concepts.

CHAPTER 7

DATA ANALYSIS, FINDINGS AND DISCUSSION PART 2

7.1 Introduction

The objectives of this chapter are to answer the fourth and fifth research questions established in Section 1.4. Firstly, this chapter presents and discusses the moderating effect of firm ambidexterity (exploration and exploitation) on the relationship between marketing and technological capabilities and new product performance, specifically to answer Research Question 4. Secondly, the difference between the *Bumiputera* and non-*Bumiputera* firms in key concepts of the proposed structural equation model, which is stated under Research Question 5 is then tested and discussed by conducting a series of *t*-tests. Below is an explanation of the moderating effect.

A moderator variable is a third variable that can alter or weaken the strength of the relationship between the independent and dependent variable(s) (Frazier, Tix & Barron 2004; Hopwood 2007; Wu, AD & Zumbo 2008). Moderation and statistical interaction have been explained in Chapter 5.

A moderation effect may be (a) enhancing, where the moderator increases the effect of the independent variable on the dependent variable; (b) buffering, where the moderator decreases the effect of the independent variable on the dependent variable; or (c) antagonistic, where the moderator reverses the effect of the independent variable on the dependent variable (Hayes, Andrew F. 2017).

Hierarchical multiple regression is used to assess the effects of the moderating variable in this research. In order to test the moderation effects, this research examines the interaction effect between firm capabilities and firm ambidexterity to test whether this interactive effect is significant in predicting new product performance.

According to the hypotheses (H4a to H4d), the effect of firm capabilities on new product performance is moderated by firm ambidexterity (exploitation and exploration). In this case, firm ambidexterity is considered as a moderator between the relationship

of firm capabilities and new product performance or in other words, the interaction between firm ambidexterity and firm capabilities can influence new product performance.

7.2 The Moderating Effects of Firm Capabilities (ambidexterity) on New Product Performance

This section presents and discusses the moderating effects of the firm's ambidexterity (exploitation and exploration) on the relationships between the firm's capabilities, namely, the firm's marketing capabilities and the firm's technological capabilities and its new product performance.

7.2.1 The Moderating Effect of Marketing Capabilities Exploration

This section discusses the interaction of a firm's marketing capabilities and exploration moderates the relationship between a firm's marketing capabilities and new product performance in the presence of the marketing capabilities exploration.

To test the hypotheses on the relationship between the firm's capabilities and new product performance, hierarchical multiple regression analyses were conducted. This technique enables a dependent variable to be predicted from multiple independent variables. The analyses assessed the variation explained by the addition of an interaction term between marketing capabilities and marketing capabilities exploration to the relationship between marketing capabilities and new product performance.

Hierarchical multiple regression was run to test the moderation effect of the firm's marketing capabilities exploration on the relationship between marketing capabilities and new product performance (H4a). Model 1 of the moderation effect of the firm's marketing capabilities exploration is visualized in Figure 7.1.

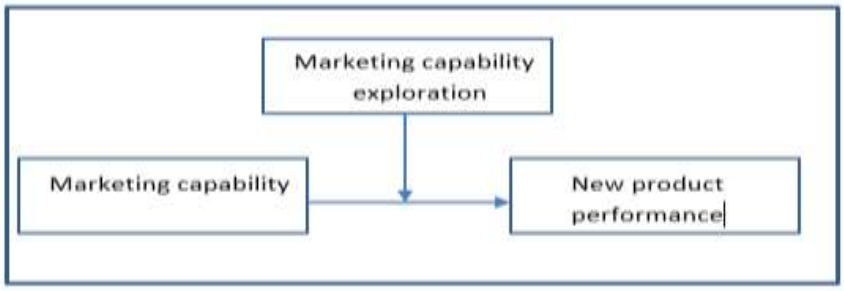


Figure 7.1: Model 1

Two variables were included in the extended linear regression: marketing capabilities and marketing capabilities exploration. These two variables accounted for a significant amount of variance in new product performance, R^2 = 17.0%, F (3,155) = 8.579, p = 0.000. These statistical parameters show the model is significant. However, marketing capabilities is not significant, p = .233 and marketing capabilities (exploration) p = .346.

Next, the interaction term between marketing capabilities and marketing capabilities exploration was added to the regression model, which accounted for the variance in new product performance, R^2 = 0.3%, F(1,155) = 0.367, p = .545. The interaction effect of marketing capabilities and the marketing capabilities exploration on new product performance is not significant, p = .545. It can be concluded that there is no moderation effect of the firm's marketing capabilities exploration on the relationship between the firm's marketing capabilities and new product performance. This finding suggests that the hypothesis is not supported.

7.2.2 The Moderating Effect of Technological Capabilities Exploration

This section discusses the test conducted to determine whether technological capabilities exploration moderates the relationship between a firm's technological capabilities and new product performance (H4b). The model is depicted in Figure 7.2.

The outcome indicated R^2 = 14.3%, F(3,153) = 5.745, p = 0.001. Next, the interaction term between technological capability and technological capability exploration was added to the regression model, which accounted for a significant proportion of the

variance in new product performance, R^2 = 3.4%, F(3,153) = 4.129, p = .044. The result shows an effect of moderation of technological capability exploration between technological capability and new product performance and so supports the hypothesis.

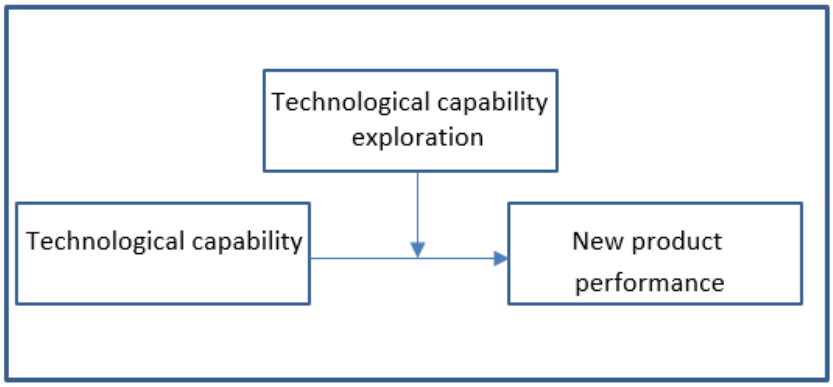


Figure 7.2: Model 2

A graph was also plotted using the output data from the *PROCESS* and is shown in Figure 7.3.

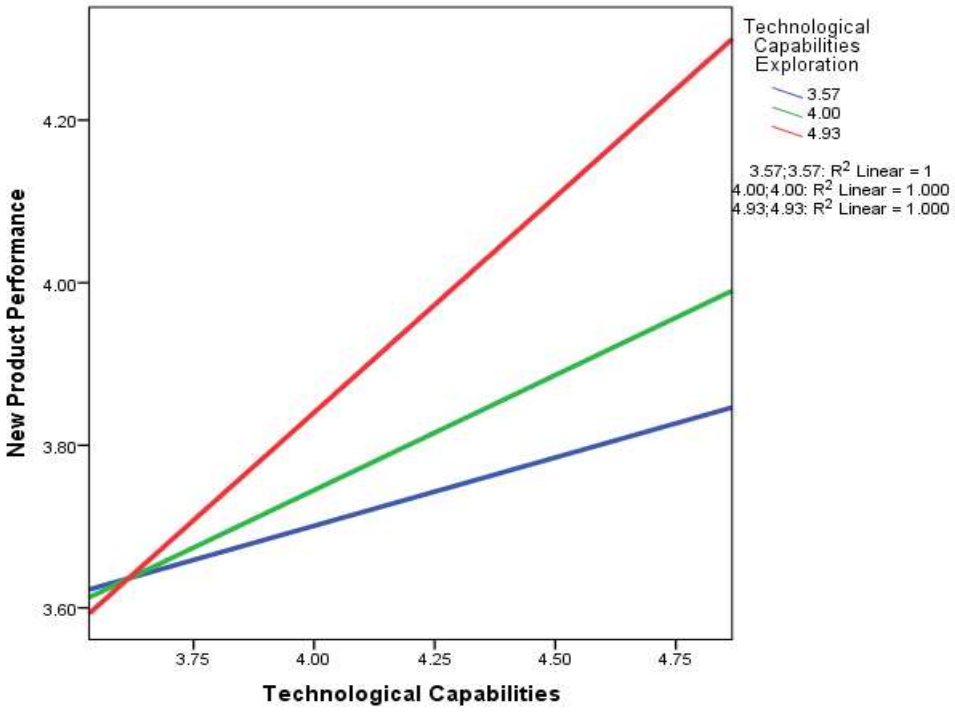


Figure 7.3: Impact of Technological Capabilities on New Product Performance under the Influence of Technological Capabilities (Exploration)

The result obtained above is interpreted as follows:

1) When technological capabilities exploration is low, there is a non-significant relationship between technological capabilities and new product performance, 95% CI [-0.046, 0.382], $t = 1.551$, $p = 0.123$.
2) At the average value of technological capabilities exploration, there is a significant relationship between technological capabilities and new product performance, 95% CI [0.038, 0.527], $t = 2.286$, $p = 0.024$.
3) When the technological capabilities exploration is high, the significant positive relationship becomes stronger between technological capabilities and new product performance, 95% CI [0.097, 0.964], $t = 2.419$, $p = 0.017$.

Figure 7.3 shows an enhancing effect where technological capabilities and technological capabilities exploration increased, new product performance of the firm increased. This result provides support to the hypothesis that technological capabilities exploration moderates the relationship between the firm's technological capabilities and new product performance.

When the firm is involved in optimization of the technological capabilities exploration, the impact of technological capabilities on new product performance is higher. If the firm's technological capabilities exploration is low, the impact of technological capabilities on new product performance is lower. It can be concluded that it is better to utilize technological capabilities at higher levels of technological capabilities exploration, as a significant positive effect is indicated at this level between the relationship of technological capabilities and new product performance.

According to Terziovski (2010), developing new products is important for SMEs and particularly if an SME wants to respond to dynamic market needs. They need to develop new products that are increasingly nested in new technologies (Hsieh & Tsai

2007). Firms with well-developed technological capabilities tend to be high performing (Lavie, Kang & Rosenkopf 2011). In the Malaysian SMEs context, innovation is necessary to safeguard the survival of these firms and enable them to compete among themselves and with their larger counterparts. SMEs need to scan the environment and explore technology. New product performance is driven by technology, particularly the exploration of technological capabilities. It can, therefore, be assumed that Malaysian SMEs must acquire manufacturing technologies and skills that are entirely new to their firms if they are to develop new products and improve their firms' new product performance. To the extent of our knowledge, this result is a new finding.

7.2.3 The Moderating Effect of Marketing Capabilities Exploitation

To test hypothesis H4c and the relationship between the firm's capabilities and new product performance, hierarchical multiple regression analyses were also conducted. The objective was to assess the increase in variation explained by the addition of an interaction term between marketing capability and marketing capability exploitation to the relationship between marketing capability and new product performance, and the statistical significance of the interaction coefficient in the extended regression model.

First, two variables were included as independent variables in the regression equation of new product performance: marketing capabilities and marketing capabilities exploitation. These two variables accounted for a significant amount of variance in new product performance, $R^2 = 17.2\%$, $F(3,159) = 10.989$, $p = 0.000$, which indicates that the model is significant. The effect of marketing capabilities ($p = .006$) has a positive effect on new product performance. The marketing capabilities (exploitation) result is also significant, $p = .023$ and also has a positive effect on new product performance.

Next, the interaction term between marketing capabilities and marketing capabilities exploitation was added to the regression model, accounting for a significant proportion of the variance in new product performance, $R^2 = 3.2\%$, $F(1,157) = 4.844$, $p = .029$. The interaction effect of marketing capabilities and the exploitation of marketing

capabilities is also significant, p = .029 but unexpectedly has a negative effect on new product performance. These results were gathered from the hierarchical analysis using SPSS, and the moderator effect was checked using *PROCESS* 3.0 plugged in SPSS. The results explain how the firm's capabilities affect new product performance in the presence of the firm's ambidexterity and specifically how this impact of a firm's capabilities on its new product performance, is influenced by the type of ambidexterity of the firm (exploitation or exploration). Model 3 of the moderation effect of the firm's marketing capabilities exploitation is visualized in Figure 7.4.

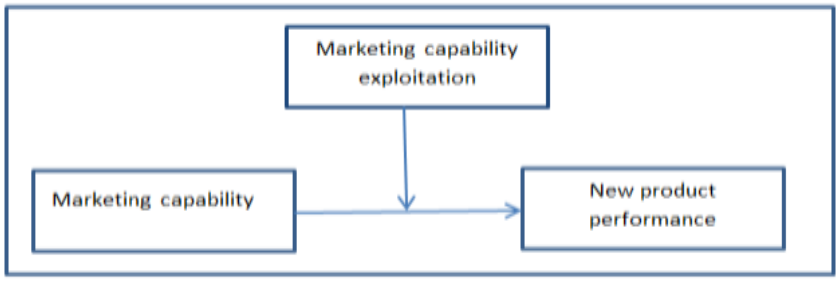


Figure 7.4: Model 3

Figure 7.5 plots the moderation effect of marketing capabilities and marketing capabilities exploitation based on the standard deviation. The relationship between marketing capabilities and new product performance becomes steeper with low marketing exploitation, and flatter with high marketing capabilities exploitation.

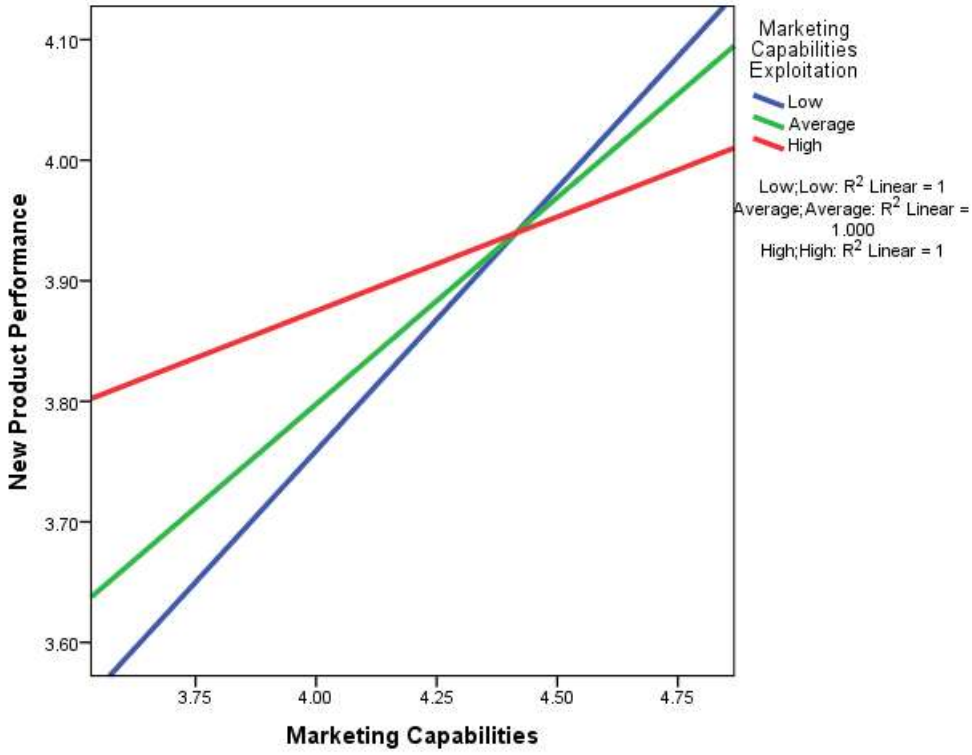


Figure 7.5: Impact of Marketing Capabilities on New Product Performance under the Influence of Marketing Capabilities (Exploitation)

The result for Model 3 can be interpreted as follows:

1) When marketing capabilities exploitation is low, there is a significant positive relationship between marketing capabilities and new product performance, 95% CI [0.242, 0.631], t = 4.43, p = 0.000.
2) At the average value of marketing capabilities exploitation, there is also a significant positive relationship between marketing capabilities and new product performance, 95% CI [0.145, 0.541], t = 3.42, p = 0.001.

3) When the marketing capabilities exploitation is high, there is a significant relationship between marketing capabilities and new product performance, 95% CI [-0.134, 0.446], t = -2.201, p = 0.029.

Figure 7.5 shows an enhancing effect, namely, as marketing capabilities exploitation decreases, new product performance increases. At higher marketing capabilities exploitation, new product performance decreases which means, at low and average marketing capabilities exploitation, marketing capabilities have a greater impact on new product performance than at higher marketing capabilities exploitation.

This result did not support the hypothesis that marketing capabilities exploitation positively moderates the relationship between marketing capabilities and new product performance. Rather, the relationship is moderated in a negative way. Even the evidence within marketing literature has shown that marketing capabilities are important drivers of firm performance, but very little is known about how firms improve their marketing capabilities, either through exploitation or exploration. This research shows that such ambidexterity (marketing capabilities exploitation) is not a source of improved marketing capabilities, and it is not ultimately impacting new product performance.

7.2.4 The Moderating Effect of Technological Capabilities Exploitation

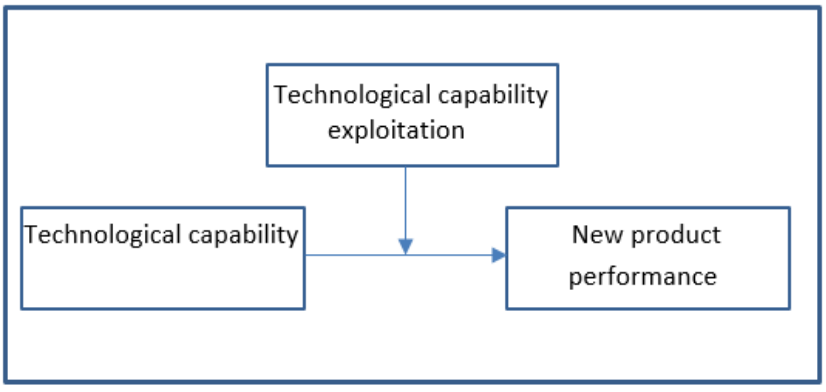


Figure 7.6: Model 4

To test if the firm's technological capabilities exploitation moderates the relationship between a firm's technological capabilities and new product performance (H4d) as depicted in Figure 7.6, two variables were included in an extended regression: technological capability and technological capability exploitation. These variables accounted for a significant amount of variance in new product performance, $R^2 = 9.0\%$, $F(3,157) = 3.414$, $p = 0.019$. The results show that the model is significant. Technological capabilities are not significant, $p = .602$ and technological capabilities (exploitation) $p = .520$.

Next, the interaction term between technological capabilities and technological capabilities exploitation was added to the regression model, which accounted for the variance in new product performance, $R^2 = 0.7\%$, $F(1,157) = 0.698$, $p = .405$. The interaction effect of technological capabilities and the technological capabilities exploitation is not significant, $p = .405$ on new product performance. It can be concluded that there is no moderation effect of the firm's technological capabilities exploitation on the relationship between the firm's technological capabilities and new product performance making the hypothesis not supported. Table 7.1 lists the summary of moderation analysis results.

Table 7.1: Summary of moderating effects of firm ambidexterity (exploration and exploitation) on the relationships between the firm's capabilities and new product performance.

	Model 1	**Model 2**	**Model 3**	**Model 4**
Marketing capabilities	0.543			
	(0.233)			
Marketing capabilities exploration	0.510			
	(0.346)			
Marketing capabilities X Marketing	-0.077			
capabilities exploration	(0.545)			
Technological capabilities		-0.469		
		(0.104)		
Technological capabilities exploration		0.151		
		(0.131)		
Technological capabilities X		**0.157***		
Technological Capabilities exploration		(0.044)		
Marketing capabilities			1.838	
			(0.006)	
Marketing capabilities exploitation			1.651	
			(0.023)	
Marketing capabilities X Marketing			**-0.374***	
capabilities exploitation			(0.029)	
Technological capabilities				-0.377
				(0.602)

Technological capabilities exploitation	-0.496
	(0.520)
Technological capabilities X	0.154
Technological capabilities exploitation	(0.405)

	Model 1	Model 2	Model 3	Model 4
R^2	17.0%	14.3%	17.2%	9.0%
Delta R^2 (Moderation effect)	0.3%	3.4%	3.2%	0.7%
	(0.545)	(0.044)	(0.029)	(0.405)

7.3 Discussion

The research on firm ambidexterity comes from an increasing variety of research domains is in the process of developing into a new research paradigm in organizational theory where several issues fundamental to this debate remain controversial (Raisch et al. 2009). Therefore, the framework developed as a result of this research includes the moderating effects of firm ambidexterity on firm capabilities and the outcomes of new product performance. The results of these moderating effects were presented in Section 7.2.

7.3.1 The Moderating Effects of Marketing Capabilities Exploitation

Marketing capabilities capture the complex combination of knowledge, processes, ways of working, tools and best practices that make a difference in marketing new products such as strategic marketing (strategic segmentation, strategic positioning and strategic targeting), and marketing mix (product, promotion, price and place). March (1991) defines exploitation as “the refinement and extension of existing competencies, technologies, and paradigms exhibiting returns that are positive, proximate, and predictable” (p.85). In this research, exploitation capabilities are considered to be the firm’s ability to using its existing resources and procedures for its new product development.

The findings from this research indicate that there is a significant effect on new product performance only when there is low and average marketing capability exploitation. At a higher level of marketing capabilities exploitation, new product performance

decreases. In this case, superior new product performance depends on leveraging marketing capabilities exploitation and deploying these through the firm's marketing capabilities. Although exploitation capabilities arise from small changes in current marketing capabilities and exhibit little deviation from the current market experience of the firms to satisfy the needs of existing customers, the managers of these firms should not neglect the firm's existing resources to achieve new abilities. This finding echoes a study by Voss and Voss (2013) that market exploitation emphasizes marketing programs designed to retain and increase purchases by current customers.

Although several researchers suggested that firms must engage in the formation and development of exploitation and exploration capabilities in order to sustain long-term success (March 1991; Yalcinkaya, Calantone & Griffith 2007), the contrary has also been shown in other literature. Since most SMEs have limited resources, studies that empirically examine specific marketing capabilities can be undertaken to aid managers in this field. Scholars have also pointed out the tensions that firms encounter when pursuing both types of capabilities simultaneously (Benner & Tushman 2003; Dougherty 1992). As such, the ability to jointly pursue exploitation and exploration in SMEs depends on the knowledge held by managers.

Even though SMEs face similar knowledge-processing demands as those faced by their larger counterparts, SMEs differ significantly in the impediments that they face in dealing with a firm's strategic selection process and a firms' new product performance (Dutton & Jackson 1987). In this case, the ability of a firm's owners or managers to guide in a manner that promotes an ambidextrous orientation is not a given.

7.3.2 The Moderating Effects of Technological Capabilities Exploration

Levinthal and March (1993) describe exploration as "the pursuit of knowledge, of things that might come to be known". In this research, exploration capabilities are considered to be "the firm's ability to adopt new processes, products, and services that are unique from those used in the past". Radical innovations which are designed to

meet the needs of emergent customers are known as explorative (Raisch et al. 2009), switching from existing products or concepts to completely new ones.

The findings show that technological capabilities exploration has a moderating role on the relationship between technological capabilities and new product performance. In the case of technological capabilities exploration, the fundamental capabilities changes in the firm's current technological capabilities are more noticeable than those of technological capabilities exploitation. According to Chandy and Tellis (1998), these changing actions typically address the needs of emerging customers and offer substantial new benefits to customers.

The findings from this research have shed light on practices which managers of Malaysian SMEs can implement, one at a time. The synchronization of exploitation and exploration are not within the scope of this research. In general, therefore, the fact that previous studies in mainly Western countries and larger firms differ in terms of available resources and size of the firms. Contrary to prior findings, Venkatraman, Lee and Iyer (2007) observed that temporal cycling between exploitation and exploration has a positive effect on new product performance.

In order for a firm to become ambidextrous, studies have pointed the importance of several criteria including: worker training and trust in relationships with management (Adler, Goldoftas & Levine 1999); identifying and decentralizing structure, having supportive leaders and flexible managers (Tushman & O'Reilly III 1996); focusing on building a shared vision, recruitment and selection, training; and career path management of executives as ways to stimulate a company to be globally integrated and locally responsive at the same time (Bartlett & Ghoshal 2002). Managers are expected to balance the hard elements (discipline and stretch) and the soft elements (support and trust) in their firm's context to facilitate contextual ambidexterity and to make choices that favour one activity over the other (Barney, J 1991; Porter 1985).

SMEs tend to be overlooked by management scholars within the context of research into ambidexterity, normally because data about them are not readily available.

Instead, the extant literature on firm capabilities ambidexterity has tended to focus on larger firms, leaving a gap in our overall understanding. It is recommended that future investigations undertake more research on SMEs with regard to their capabilities ambidexterity.

7.4 Summary

This chapter presented the assessment of moderation effects of firm ambidexterity in the relationship between a firm's capabilities and new product performance. A series of *t*-tests identified the differences between the two independent groups studied: *Bumiputera* and non-*Bumiputera* firms, which can be summarized as follows:

- A moderation effect of a firm's technological capabilities exploration was found between the relationship of technological capabilities and new product performance. At a high level of the firm's technological capabilities exploration, there is a significant positive relationship between technological capabilities and new product performance.
- There is a moderation effect of marketing capabilities exploitation on the relationship between marketing capabilities and new product performance but in reverse. This finding means that at a low and average level of a firm's marketing capabilities exploitation, marketing capabilities have a better impact on new product performance than at a higher level of marketing capabilities exploitation.
- There are no moderation effects for the two hypotheses H4a and H4d: (1) marketing capabilities exploration do not moderate the relationship between marketing capabilities and new product performance, and (2) technological capabilities exploitation do not moderate the relationships between technological capabilities and new product performance.
- It was surprising that the *Bumiputera* group means did not differ significantly from those of the non-*Bumiputera* group in terms of strategic orientations and firm capabilities except for new product performance

CHAPTER 8

CONCLUSIONS, IMPLICATIONS AND FUTURE RESEARCH

8.1 Introduction

The purpose of this chapter is to contemplate the findings of this research and to present its implications for theory and practice. This chapter is divided into five sections, presenting the conclusions and contributions from the research findings as well as the limitations of this thesis. Following this section, the research questions are readdressed based on the findings derived in Chapters 6 and 7. The contributions from the research findings, including theoretical, methodological and managerial contributions are then discussed, followed by a discussion of the limitations of this thesis and recommended future research directions. Finally, a summary of this final chapter is provided.

Several conclusions can be drawn based on the findings presented and discussed in Chapter 6 and 7. In doing so, the research questions set up at the beginning of this thesis and presented in Chapter 1 are revisited and readdressed in light of the analytical results.

8.1.1 Research Question 1

How do the strategic orientations of a firm impact new product performance in Malaysian manufacturing SMEs?

Research Question 1 was developed to investigate the dimensions of strategic orientation and their impact on new product performance. Research Question 1 was addressed by hypothesis H1a, H1b and H1c.

It can be concluded that: (1) technology orientation has a positive direct and total positive impact on new product performance, technology orientation emerged as a reliable predictor of new product performance in the Malaysian SMEs. This supports the argument in the literature that the technology orientation in Malaysian SMEs is important. Consequently, it is suggested that the SMEs in Malaysia need to focus on

this important dimension of technology orientation if they wish to have better new product performance. Technology orientation has been recognized as one of the strategic resources for sustaining competitiveness among firms regardless of their size; (2) this research has identified that market orientation and entrepreneur orientation do not have a direct positive impact on new product performance but this does not mean that these dimensions can be neglected; and (3) Malaysian SMEs have entered an age of relative maturity, where there is a need to focus and identify the effectiveness of business strategies taken by SMEs.

8.1.2 Research Question 2

How do the marketing and technological capabilities of SMEs impact new product performance?

The second aim of this research was to investigate the effect of firm capabilities on new product performance in Malaysian SME manufacturing firms. Research Question 2 was developed and addressed by testing hypotheses H2a and H2b.

The results of this research showed that marketing capabilities do have a direct positive impact on new product performance. The most obvious finding to emerge from this research is that technological capabilities do not have a direct positive impact on new product performance.

Marketing capabilities serve to achieve better new product performance and firms that utilized their marketing capabilities do better than their competitors (Eisenhardt & Martin 2000), a view confirmed by the research presented here that Malaysian SMEs, specifically in the manufacturing firms employing marketing capabilities are viewed in the literature as important market-related processes by which firms can deploy superior market understanding to generate economic rents (Madhavan & Grover 1998). Based on these findings and supported by literature, marketing capabilities are an important factor that influences a firm's new product performance. It is suggested that a firm's ability to deploy resources through its organizational capabilities is more important than the amount of resources itself driving new product performance. The

managers/owners to increase the value of their firm's products and services and differentiate them from those of its competitors. Marketing capabilities of a firm can be achieved by marketing activities (i.e., phone call, advertisement, product placement, email) and new branding campaigns that may attract or poach new customers from competitors. The evidence from this research proposes that building links between a firm and its customers through marketing activities, enable the firm to compete better by predicting changes in customer preferences.

8.1.3 Research Question 3

Do firms' capabilities mediate the relationship between strategic orientations and new product performance?

Research Question 3 was addressed by testing hypotheses H3a to H3f which proposed a mediation effect by firm capabilities (marketing capabilities and technological capabilities) on the relationships between strategic orientations (market orientation, entrepreneur orientation and technology orientation) and new product performance. That is, to test whether firm capabilities can be a potential mechanism by which the strategic orientation can impact new product performance. For instance, if there is a positive relationship between strategic orientation and new product performance, this relationship may be explained by firm capabilities, which is the mediating variable.

The results of this research showed that marketing capabilities mediate the relationships between market orientation and new product performance. This finding reveals that market orientation does not have a direct effect on new product performance. However, a full mediation effect was established for the relationship between market orientation and new product performance through marketing capabilities as the mediator. These findings indicate that if firms focus only on market orientation, this orientation will have no impact on new product performance. Subsequently, the managers/owners of firms must carefully allocate resources in a way that is most beneficial for their firms. Therefore, the achievement of better new

product performance in terms of market orientation is probable through marketing capabilities, highlighting the significance of the firm's capabilities. The challenge for managers/owners of Malaysian SMEs are how to deploy resources into capabilities to create more value and maintain sustainable competitive advantages in a competitive market.

Another finding to emerge from this research is that marketing capabilities also mediate the relationships between technology orientation and new product performance. Although technology orientation was found to have a direct positive impact on new product performance, this finding shows that marketing capabilities as a mediator can increase new product performance of firms. Managers/owners of the firms may not exclusively emphasize technology orientation. They can deploy their firms' technology resources by acquiring new and advanced technologies and developing new processes, products and services through better understanding the needs and wants of customers and maintaining good customer relationships. This action will increase the chance of enjoying sustainable new product performance.

8.1.4 Research Question 4

Does a firm's ambidexterity moderate the relationship between the capabilities of the firms and new product performance?

Research Question 4 was developed to investigate the moderating effect of firms' ambidexterity on the relationships between the firms' capabilities and their new product performance. Hypotheses H4a to H4d addressed this research question. The introduction of a moderator variable between the predictor and outcome variable is to know whether it changes the direction or magnitude of the relationships. The effect of the moderator variable could be an enhancing, buffering, or reverse effect of the predictor on the outcome. In this case, the moderator variables are firm ambidexterity on the relationships between firm capabilities and new product performance.

One of the most important findings to emerge from this research is that when the technological capabilities exploration is high, there is a significant positive relationship

between a firm's technological capabilities and its new product performance. This research confirms that when a firm optimizes its technological capabilities exploration (i.e., acquiring manufacturing technologies and skills and acquiring managerial and organizational skills that are entirely new to the firm, learning product development skills important for innovation, and learning new skills in funding new technology and training R&D personnel) will lead to better new product performance of a firm.

Managerial effort should be focused on the integration of technology orientation and technological capabilities exploration, because technology orientation impact on new product performance is greater with the combination of technological capabilities exploration. As such, the model developed in Chapter 4 can become a reference to owners and managers of manufacturing firms in the Malaysian SME sector to formulate appropriate strategies to achieve better new product performance. These findings also provide important insights into the role of technological capabilities exploration.

To conclude, this section that discussing Research Question 1 to Research Question 4, a summary of the results of those hypothesized relationships can be referred to Table 6.10 and Table 7.1. The next section discussed the Research Question 5 on the similarities and differences between Bumiputera and non-Bumiputera firms.

8.1.5 Research Question 5

What are the similarities and differences in factors influencing new product performance between the Bumiputera (Malay) and non-Bumiputera firms in Malaysia?

Bumiputera firms are often said to be left behind in achieving success in economic development. Several agencies assist Bumiputera to enter the business sector in Malaysia. The Bumiputera or the indigenous is often considered marginalized and lags in all aspects compared to the non-Bumiputera. Findings from other studies have shown that many factors can affect the success of Bumiputera SMEs such as lack of skills in managing resources, lack of knowledge and skills needed in business, poor financial management, weaknesses in marketing, difficulties to get financial support

from financial institutions due to problems related to finance and accounting that cause financial institutions to be reluctant to provide loans, and lack of cooperation networks among entrepreneurs. Research Question 5 was developed to determine whether there are similarities or differences between these two groups in terms of strategic orientations, firm capabilities, firm ambidexterity and new product performance.

Findings from a series of t-tests of two independent groups show that only new product performance was found to have a significant difference between these two independent groups. No difference was found in other constructs and the relationship between these groups, including their strategic orientations, capabilities and ambidexterity.

It is difficult to explain these results, but there are three factors worth considering. Firstly, it is possibly that Bumiputera firms have begun to use strategic orientation after they attended workshops conducted by the government. They may have built an awareness of strategies needed to be in line with non-Bumiputera firms. Secondly, Bumiputera firms may have developed strategic plans which align with the government's strategy to parallel the non-Bumiputera firms. Finally, new product performance was found to have a significant difference between these two (Bumiputera and non-Bumiputera) groups, perhaps because of other mediating or moderating variables. That is the mediating or moderating variables such as financial assistance from the government, marketing training guidance, and learning orientation in terms of boosting Bumiputera firms' new product performance could be investigated in the future. The overarching aim of this research was successfully achieved.

8.2 Contributions and Implications

8.2.1 Theoretical Contributions

This research extended a model of new product performance, underpinned by the Resource-based View (RBV). This research presents new knowledge of the theory by ascertaining how the strategic orientations and firm capabilities can affect new product performance in the context of Malaysian SMEs. The theoretical framework of new

product performance developed in Chapter 4 (refer Figure 4.1) can be used for a Malaysian firm's new product performance reference model in the future with further refinement. Future researchers can identify other factors that could contribute to new product performance in the Malaysian manufacturing SMEs in addition to those factors investigated here.

This research has extended the knowledge, and findings empirically of factors that directly and indirectly impact new product performance. Future researchers can develop and refine the model to be tested in a different setting so as to highlight new findings.

It has been proven in both marketing and strategy literature stated that each strategic orientation dimension (market orientation, entrepreneur orientation and technology orientation) can improve new product performance. Although new product performance studies have also been conducted in Malaysia as a research setting, these have only investigated a single dimension of strategic orientation. For example, Mokhtar, Yusoff and Ahmad (2014) focused on only market orientation and its influence on Malaysian SME performance. Mahmood and Hanafi (2013) emphasized the relationship between entrepreneur orientation and performance of women-owned SMEs in Malaysia, while Idar, Yusoff and Mahmood (2012) focused only on the direct relationship between market orientation and the mediating effect of market orientation on the relationship between strategic planning practice and SME performance in Malaysia.

The research presented here in this thesis presents a model that simultaneously combines the three strategic orientation dimensions for investigating the impact on new product performance. This research contributes to the marketing and strategy literature on new product performance by: (1) considering a combination of strategic orientation dimensions (market orientation, entrepreneur orientation and technology orientation) (2) evaluating the impact of firm capabilities on new product performance, (3) viewing firm capabilities as the mediators between the relationships of strategic

orientations and new product performance, and (4) examining firm ambidexterity as a moderating variable between the relationships of firm capabilities and new product performance.

To the best of our knowledge, these efforts have not been theoretically and empirically investigated and the findings from this research extend the knowledge regarding impact of technology orientation and marketing capabilities in the context of SMEs. Strong technology orientation and marketing capabilities appear to increase new product performance. Technology-oriented Malaysian SMEs seems to increase the possibilities of firms producing new solutions for customers through the engagement of rapid integration of new technologies, using sophisticated technology in new product development, proactive development of new technologies and generating new ideas.

Market orientation has an impact on new product performance with marketing capabilities as the mediator, and the combination of technological capabilities and technological capabilities exploration show a greater impact on new product performance.

This research supports to the concept that firms may not be able to sustain a competitive advantage by merely owing valuable, rare, inimitable and non-substitutable resources. Instead, firms need to utilize firm capabilities to generate a long-lasting performance as the external environment constantly changes.

8.2.2 Methodology Contributions

This thesis has merged several significant methodological contributions and has used a quantitative research methodology. In order to address the research questions, data analysis used advanced statistical techniques. Research that has employed rigorous statistical methods is limited in investigating the impact of strategic orientations and firm capabilities on new product performance, particularly in the context of SME innovation. The vast majority of earlier studies in this area have applied either descriptive statistics or primarily regression analyses to their studies (Deshpande, Farley & Webster Jr 1993; Frishammar & Åke Hörte 2007; Gatignon & Xuereb 1997).

By using structural equation modelling (SEM), this research demonstrates the impact of strategic orientations and firm capabilities simultaneously on new product performance as a dependent variable. Also, SEM provides a holistic test to evaluate the fitness of the model and individual parameter estimate tests at the same time, thereby reducing estimation errors (Hair, Joe F, Ringle & Sarstedt 2011).

A major advantage of using Amos-SEM is that it tests hypotheses that are more precise and is easier than conventional statistical techniques (Byrne 2010; Hair, Joseph F & Black 1998; Tabachnick, B & Fidell 2013). The specification of the model developed in this research has produced a comprehensive view of the elements impacting new product performance and can be a reference for future research in terms of rigorous statistical.

Another significant contribution of this research is the development and validation of the concept measurement instrument. A pooled CFA was implemented to evaluate a measurement model validation and model fit, with all dimensions run together simultaneously. This method would not have been possible if the dimensions were analyzed using conventional statistical techniques (i.e. a series of multiple regressions). The development and validation method was adopted as an extensive multi-step approach, as proposed by Shah and Ward (2007). This evaluation method was selected to achieve a more comprehensive modelling of multivariate interrelations and enable a more accurate analysis. The findings, therefore, provide new insights into the body of knowledge. Likewise, the validated scale offers an opportunity for other researchers, either academic or practitioner, to evaluate this research using a different theoretical domain.

8.2.3 Managerial Contributions

The findings from this research can benefit SMEs in Malaysia from a managerial perspective, in particular, *Bumiputera* and non-*Bumiputera* manufacturing firms. Several suggestions challenge managers and owners to channel their resources and capabilities (strategic orientations and firm capabilities) to improve the firm's new

product performance. In order to do this, the use of the premise that the integration of new and existing market knowledge within the firm enables not only marketing capabilities development but also improvement. Thus, superior new product performance is dependent on increasing market knowledge stocks and deploying those stocks through the firm's marketing capabilities.

The evidence from this research also suggests that the level of a firm's capability is influenced by three key resources, namely, market orientation, entrepreneur orientation and technology orientation. Technology orientation and marketing capabilities have been identified as critical factors that need to be focused on by firms and their managers and owners if they wish to succeed in their new product performance. As such, the managers/owners need to focus on key trends of markets, both existing and emerging and have a good understanding of their customer needs and maintain customer relationships. They should find and work with lead users to improve product development as well as to be well-schooled in technology, and proactive in developing new technologies and generating new ideas. Having identified that technology orientation and marketing capabilities improve new product performance, managers/owners may be able to establish and implement particular strategic orientation and firm capabilities as discussed above.

The findings reported in this research also provide empirical evidence for management to incorporate into their decision-making. This validated framework can be used as a reference to guide future managers and owners towards acquiring improved knowledge and understanding the implementation of strategic orientations and firm capabilities, ensuring more successful new product performances.

The research adds to the growing body of research that indicates marketing capabilities mediate the relationship between market orientation and new product performance and also between the relationship between technology orientation and new product performance. Managers and owners interested in improving their new product performance could better deploy their resources and firm capabilities, thus

leading to a higher new product performance success rate. For instance, market orientation requires complementing market-relating organizational capabilities to enable firms to respond to the market intelligence they generate. Therefore, managers/owners must play a role in transforming that market intelligence generated. Not only that, they can integrate new technologies in transforming into maintaining good relationships with their customers as well as sharing trust and goals with their strategic partners.

This research appears to be the first to investigate the moderation effect of firm ambidexterity between the relationship of firm capabilities and new product performance. One of the most significant findings to emerge from this research is that technological capabilities exploration does moderate the relationship between technological capabilities and new product performance. When firms utilized technological capabilities exploration at a higher level, there is a favourable outcome on the relationships between technological capabilities and new product performance. SMEs managers/owners could explore the use of unfamiliar technologies and creation of products with unknown demand to achieve favourable new product performance outcomes. This exploration could provide useful insights into technology development for managers and owners of SMEs, as it could create a new focus for rendering firms competitive and ensuring survival in the intensively competitive market environment.

8.3 Thesis Limitations and Recommendations for Future Research

This research contributes to the literature in terms of new product performance, there is a need to acknowledge four limitations. Firstly, data was collected from the manufacturing industry in a developing economy and focused on SMEs only. These firms are subject to the same level of environmental uncertainty that the sector faces in the industry and may limit the generalizability of the results to other industry sectors or countries. It may not be suitable to use the developed model to investigate the impact of strategic orientations and firm capabilities in all industrial sectors and other

developing countries. Therefore, future study could be conducted in other countries to ascertain whether the findings are relevant to other settings.

Secondly, the data in this research was collected using a cross-sectional approach, a structured questionnaire from which data on both independent and dependent variables was gathered simultaneously at a given point in time. The data indicates that the perceptions of strategic orientation, firm capability, firm ambidexterity, new product development process and new product performance are gathered at a single point in time and under specific conditions, but their relationship can change over time. In the context of the research design, the cross-sectional nature of the data proposes that true causal relationships existing between the research construct cannot be inferred. With longitudinal data, causality can be more clearly established. A better understanding of the causal relationships between the construct examined could be achieved through the adoption of longitudinal research design (Dean Jr & Sharfman 1996). Therefore, a longitudinal setting is recommended to investigate the relationship between strategic orientations and firms capabilities on new product performance.

Thirdly, the sample for this research was taken from the database provided by the Malaysian Investment Development Authority (MIDA), and therefore, excluded firms not listed in the database. Generalizations from the findings of this research cannot be applied to all manufacturing firms in Malaysia

Finally, the results from the path analysis do not confirm how the exogenous variables influence the endogenous variables as a quantitative study. Brannen (2009) suggests that the path analysis can reveal the significant relationships between exogenous and endogenous variables but is insufficient to provide subjective information that may need to be addressed by a qualitative method.

8.4 Recommendations for Future Research

This research can also be extended to a mixed-method study that includes both quantitative and qualitative methods to examine ‘what’ and ‘how’ questions about strategic orientations and firm capability effects new product performance. The mixed-

method approach would enhance the interpretation of the significant research findings. This method would also add to the body of knowledge of how strategic orientations and firm capabilities function in promoting new product performance in dynamic business environments.

Future researchers are recommended to use other data collection methods, such as in-depth interviews with the managers or owners of SMEs in order to obtain more accurate information about SME issues and challenges.

Future researchers could examine the environmental factors and control variables such as a high-risk and resource-consuming activities and their effect on the hypothesized relationships.

Overall, strategic orientations and firm capabilities are important not only to large firms but also viewed by SMEs as a vital way of adding value to customers and differentiating their firms and their products or services from competitors in the pursuit of superior new product performance and sustaining a competitive advantage. This research will bring insights for the managers, owners or the management of Malaysian SMEs to deploy a combination of crucial resources and capabilities for enhancing new product performance.

8.5 Summary

This chapter has concluded and briefly addressed the outcomes of this research. The findings on the development of the new product performance model, theoretical implications, methodological implications and managerial implications were discussed. The research questions were also readdressed to compare the assumptions with the findings presented in Chapters 6 and 7. The findings of this research have several significant implications for future practice. Nonetheless, this research also acknowledges some limitations that provide potential opportunities for future research.

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Appendix 1 – Notice of Ethics Approval

RMIT UNIVERSITY

Deputy Pro Vice-Chancellor
(Research & Innovation)
College of Business

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Notice of Approval

Date:	28 March 2017
Project number:	20660
Project title:	*Product Innovation in the Malaysian Cosmetic Industry: Does ambidexterity moderate the relationship between firms' capabilities and new product performance?*
Risk classification:	Low Risk
Chief Investigator: Student Investigator:	Dr Charlie Huang Noor Afzainiza Afendi
Project Approved:	**From: 27 March 2017 To: 29 February 2020**

Terms of approval:

Responsibilities of the principal investigator

It is the responsibility of the principal investigator to ensure that all other investigators and staff on a project are aware of the terms of approval and to ensure that the project is conducted as approved by BCHEAN. Approval is only valid while the investigator holds a position at RMIT University.

1. *Amendments*
   Approval must be sought from BCHEAN to amend any aspect of a project including approved documents. To apply for an amendment submit a request for amendment form to the BCHEAN secretary. This form is available on the Human Research Ethics Committee (HREC) website. Amendments must not be implemented without first gaining approval from BCHEAN.
2. *Adverse events*
   You should notify BCHEAN immediately of any serious or unexpected adverse effects on participants or unforeseen events affecting the ethical acceptability of the project.
3. *Participant Information and Consent Form (PICF)*
   The PICF must be distributed to all research participants, where relevant, and the consent form is to be retained and stored by the investigator. The PICF must contain the RMIT University logo and a complaints clause including the above project number.
4. *Annual reports*
   Continued approval of this project is dependent on the submission of an annual report.
5. *Final report*
   A final report must be provided at the conclusion of the project. BCHEAN must be notified if the project is discontinued before the expected date of completion.
6. *Monitoring*
   Projects may be subject to an audit or any other form of monitoring by BCHEAN at any time.
7. *Retention and storage of data*
   The investigator is responsible for the storage and retention of original data pertaining to a project for a minimum period of five years.

Regards,

Associate Professor Penny Weller
Chairperson
RMIT BCHEAN

Appendix 2 – Questionnaire for Main Survey

Has your organisation developed a new product since 2014?
☐ Yes ☐ No (If NO, please proceed to PART SIX)

Please answer the following questions in PARTS ONE, TWO AND THREE based on your organisation.

PART ONE: STRATEGIC ORIENTATION

Please indicate how much you agree or disagree with each of the following statements.

Statements	1- strongly disagree; 2- disagree; 3- neither agree nor disagree; 4- agree; 5- strongly agree; N/A- not applicable					
	1	2	3	4	5	N/A
Market orientation						
1. We meet customers at least once a year to find out what products/ services they will need in the future.	☐	☐	☐	☐	☐	☐
2. We do a lot of in-house market research.	☐	☐	☐	☐	☐	☐
3. We have interdepartmental meetings at least once a quarter to discuss market trends and development.	☐	☐	☐	☐	☐	☐
4. Market personnel spend time discussing customers' future needs with our functional departments.	☐	☐	☐	☐	☐	☐
5. It takes us forever to decide how to respond to competitor price changes.	☐	☐	☐	☐	☐	☐
6. We tend to ignore changes in our customers' product/service needs.	☐	☐	☐	☐	☐	☐
Entrepreneur orientation						
1. We act boldly in order to achieve objectives.	☐	☐	☐	☐	☐	☐
2. We typically adopt a very competitive posture.	☐	☐	☐	☐	☐	☐
3. We invest heavily in marketing.	☐	☐	☐	☐	☐	☐
4. We spend large amounts of money on developing new products/services.	☐	☐	☐	☐	☐	☐
5. We give special attention to research and development.	☐	☐	☐	☐	☐	☐
6. We consider new idea/approach as very important.	☐	☐	☐	☐	☐	☐
Technology orientation						
1. We use sophisticated technology in our new product development.	☐	☐	☐	☐	☐	☐
2. We use rapid integration of new technologies.	☐	☐	☐	☐	☐	☐
3. We are proactive in developing new technologies.	☐	☐	☐	☐	☐	☐
4. We are proactive in generating new ideas.	☐	☐	☐	☐	☐	☐

PART TWO: FIRM CAPABILITIES

Please indicate how much you agree or disagree with each of the following statements.

Statements	1- much worse; 2- somewhat worse; 3- about the same; 4- somewhat better; 5- much better; N/A- not applicable					
Compared to your major competitors, how would you rate your firm's capabilities?	1	2	3	4	5	N/A
Marketing capability						
1. We are good at understanding customer needs.	☐	☐	☐	☐	☐	☐
2. We are good at creating customer relationships.	☐	☐	☐	☐	☐	☐
3. We are good at maintaining customer relationships.	☐	☐	☐	☐	☐	☐
4. We are good at sharing trust and goals with strategic partners.	☐	☐	☐	☐	☐	☐
Technological capability						
5. We are acquiring important technology information.	☐	☐	☐	☐	☐	☐
6. We are identifying new technology opportunities.	☐	☐	☐	☐	☐	☐
7. We are responding to technology changes.	☐	☐	☐	☐	☐	☐
8. We are mastering state-of-the-art technologies.	☐	☐	☐	☐	☐	☐

PART THREE: AMBIDEXTERITY

Please indicate how much you agree or disagree with each of the following statements.

Statements	1- strongly disagree; 2- disagree, 3– neither agree nor disagree; 4– agree; 5- strongly agree; N/A- not applicable
In the new product development processes, the product development team are;	**1 2 3 4 5 N/A**
Marketing capability (Exploitation)	
1. Consistently re-examining information from previous projects and/or studies to modify existing marketing processes.	☐☐☐☐☐☐
2. Routinely adapting existing ideas when developing new marketing processes.	☐☐☐☐☐☐
3. Incrementally and routinely improving our existing marketing procedures.	☐☐☐☐☐☐
4. Focusing changes in marketing procedures on improving efficiency.	☐☐☐☐☐☐
Marketing capability (Exploration)	
5. Continually developing new marketing procedures that are very different from others developed in the past.	☐☐☐☐☐☐
6. Routinely introducing new marketing procedures which are daring, risky, or bold.	☐☐☐☐☐☐
7. Consistently using market knowledge to develop new marketing processes which deliver different outputs from existing processes.	☐☐☐☐☐☐
8. Using marketing knowledge to "break the mould" and create new marketing processes not used before.	☐☐☐☐☐☐
Technological capability (Exploitation)	
1. Upgrading current knowledge for familiar products.	☐☐☐☐☐☐
2. Investing in exploiting mature technologies that improve the productivity of current innovation operations.	☐☐☐☐☐☐
3. Enhancing abilities in searching for solutions to customers problems that are near to existing solutions.	☐☐☐☐☐☐
4. Upgrading skills in product development processes in which the firm already possesses rich experience.	☐☐☐☐☐☐
Technological capability (Exploration)	
5. Acquiring manufacturing technologies and skills entirely new to the firm.	☐☐☐☐☐☐
6. Learning product development skills and processes entirely new to the industry.	☐☐☐☐☐☐
7. Acquiring entirely new managerial and organizational skills that are important for innovation.	☐☐☐☐☐☐
8. Learning totally new skills in funding new technology and training R&D personnel.	☐☐☐☐☐☐

Please consider the latest new product project developed in your organisation over the past three years (2014-2017) and answer the following questions in PARTS FOUR AND PART FIVE.

PART FOUR: NEW PRODUCT DEVELOPMENT PROCESS

1. Does your firm have a procedure for new product development?
☐ No ☐ Informal ☐ Formal

2. The following are typical steps in a new product development process. During the development of this new product, how well was each of the following activities undertaken?

Steps	Very poorly done	Average	Well Done	Excellently done	Not applicable
Idea generation	☐	☐	☐	☐	☐
Initial idea screening	☐	☐	☐	☐	☐
Preliminary market analysis	☐	☐	☐	☐	☐
Preliminary technical analysis	☐	☐	☐	☐	☐
Preliminary production analysis	☐	☐	☐	☐	☐
Preliminary financial analysis	☐	☐	☐	☐	☐
Market study	☐	☐	☐	☐	☐
Product development	☐	☐	☐	☐	☐
Consumer product testing	☐	☐	☐	☐	☐
Market testing	☐	☐	☐	☐	☐
Pre-commercialisation financial analysis	☐	☐	☐	☐	☐
Commercialisation	☐	☐	☐	☐	☐

3. How would you categorise the new product developed?
☐ Industrial products ☐ Consumer product
☐ Manufactured material ☐ Food and Beverages
☐ Transportation products ☐ Others, please specify _____

4. What is your product's main target market?
☐ Local market ☐ Regional market ☐ National market ☐ International market

PART FIVE: NEW PRODUCT PERFORMANCE

Please answer these questions for the **most recent** new product development project that you completed in your organisation since 2014.

1. When was this new product launched into the market?
☐ 2014 ☐ 2015 ☐ 2016 ☐ Not yet launched

2. Does your company measure the success or failure of this new product?
☐ Yes ☐ No ☐ Do not know

3. How would you classify the degree of innovativeness of the product?
☐ New to the world ☐ Improvement in/Revisions to existing product
☐ New to the company ☐ Repositioning
☐ Additions to existing product lines ☐ Cost Reductions

4. The following statements are measures of new product performance. What measures does your company use and how do you rate this new product's performance against other products that you developed?

Measures	Well below average	Below average	Average	Above average	Well above average	Do not measure
Customer satisfaction	☐	☐	☐	☐	☐	☐
Revenue goal	☐	☐	☐	☐	☐	☐
Profitability goal	☐	☐	☐	☐	☐	☐
Launch on time	☐	☐	☐	☐	☐	☐
Quality guideline	☐	☐	☐	☐	☐	☐
Performance specification	☐	☐	☐	☐	☐	☐

5. Overall, how do you rate this new product's performance?
Very unsuccessful ☐ ☐ ☐ ☐ ☐ Very successful
Moderately successful

6. Overall, with this new product, we are:
Very unsatisfied ☐ ☐ ☐ ☐ ☐ Very satisfied
Moderately satisfied

7. Overall, how do you rate the **competition** for this new product?
Very unsuccessful ☐ ☐ ☐ ☐ ☐ Very successful
Moderately successful

8. Overall, how would rate the market size for this new product?
Very small ☐ ☐ ☐ ☐ ☐ Very large
Moderate

PART SIX: BACKGROUND INFORMATION

1. What industry is your organisation in?_____

2. In which year was your business established? ☐☐☐☐

3. Please indicate the majority of ownership of your organisation
☐ Bumiputera ☐ Chinese ☐ Indian ☐ Others

4. How many full-time equivalent staff are employed in your company?
☐ Less than 5 ☐ 5 to 74 ☐ 75 to 200 ☐ 200+

5. Please indicate your firm's turnover (in Ringgit Malaysia) for the previous financial year (2016):
☐ Prefer not to answer ☐ <RM300,000 ☐ RM300,000-RM15million
☐ RM15million - RM50million ☐ >RM50million

6. Your age (Years):	< 25	25-30	31-40	41-50	51-60	61 +
	☐	☐	☐	☐	☐	☐

7. Please indicate your highest educational level:
☐ Secondary education ☐ Bachelor Degree
☐ Certificate ☐ Masters Degree
☐ Diploma ☐ Doctorate

8. Your position in the organisation:

☐ CEO/Director
☐ Project Manager
☐ Process Manager
☐ Team Leader
☐ Others, please specify _____

9. Your background is: ☐ Engineering ☐ Science ☐ Business ☐ Tradesperson ☐ Others

10. How many years have you been working in this industry?

☐ Less than 1 year
☐ 1 to 5 years
☐ 6 to 10 years
☐ More than 10 years

11. In which town is your business located?_____ Post code ☐☐☐☐☐

THANK YOU VERY MUCH FOR YOUR TIME AND CO-OPERATION

Please return the completed questionnaire in the pre-paid envelope provided by 30 August 2017.

Appendix 3 – Participation Information and Consent Form

School of Management

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INVITATION TO PARTICIPATE IN A RESEARCH PROJECT

Project Title*:* Product Innovation in the Malaysian Manufacturing Industry: Does ambidexterity moderate the relationship between firms' capabilities and new product performance?

Investigators:

Chief Investigator:

Dr Xueli (Charlie) Huang, charlie.huang@rmit.edu.au, +613 99251648

Dr Gerrit Anton De Waal, gerrit.dewaal@rmit.edu.au, +613 9925 5783

Principal Research Student:

Noor Afzainiza binti Afendi, afzainiza.afendi@rmit.edu.au, RMIT PhD Candidate

Dear Owner/Manager of Manufacturing Firm,

You are invited to participate in a research project being conducted by RMIT University. Please read this sheet carefully and be confident that you understand its contents before deciding whether to participate. If you have any questions about the project, please ask one of the investigators.

Who is involved in this research project? Why is it being conducted?

This research project is carried out by Noor Afzainiza Afendi (Principle researcher). She is being supervised by an academic at RMIT University, Australia: Dr Charlie Huang (Chief-Investigator).The principal researcher is sponsored by the Ministry of Education (Malaysia) and is an academician at Universiti Utara Malaysia. She is conducting this research as part of her degree program (Doctor of Philosophy). The study aims to investigate the impact of a firm's resources and capabilities on new product performance in the Malaysian manufacturing industry.

Why have you been approached?

You have been approached for this research because you have been identified as an owner or manager who can provide current insight utilisation of firm resources and capabilities towards new product performance.

What is the project about? What are the questions being addressed?

Specifically the research aims to:

1. To investigate the key influential firms' capabilities on new product performance in the Malaysian manufacturing industry.

2. To identify the moderating impact of firms' ambidexterity on the relationship between firms' capabilities and new product performance.

3. To know what are the similarities and differences in innovation performance and its influencing factors between Bumiputera and non-Bumiputera SMEs.

4. To add to the existing literature in the field of entrepreneurship, especially to the Bumiputera (Malay) involve in the Malaysian manufacturing industry.

If I agree to participate, what will I be required to do*?*

If you agree to participate, you are required to fill the questionnaire. It is estimated that the time required for filling this survey will be between 15-20 minutes. The questions are general with no sensitive or personal information. Participation in this research is voluntary, and your responses will remain confidential.

What are the possible risks or disadvantages?

There are no risks in participating in this project beyond the every day. Your participation in this project is voluntary and you are free to withdraw your participation at any time of the process.

What are the benefits associated with participation?

There may be no direct benefits to you as a participant as a result of your participation. But your participation will enable the researchers to provide important contributions to the development and implementation of current new product development practice in the Malaysian SMEs' owners/managers upon completion. Moreover, the researchers will be happy to share a summary of the project with you, if you are interested.

What will happen to the information I provide?

The data will be collected for a research report. Participants will not be identified in research reports or publications. The collected data will be locked in password protected computers and locked cabinets and kept for 5 years following completion of the project. The collected information can be disclosed only if (1) it is to protect you or others from harm, or (2) if a court order is produced or (3) you provide researchers with written permission.

The findings from this research project could be published in academic conference and journals, which usually are publically accessible, either online or through physical publication.

What are my rights as a participant?

- The right to withdraw from participation at any time
- The right to request that any recording cease
- The right to have any unprocessed data withdrawn and destroyed, provided it can be reliably identified, and provided that so doing does not increase the risk for the participant.
- The right to be de-identified in any photographs intended for public publication, before the point of publication
- The right to have any questions answered at any time.

Whom should I contact if I have any questions?

Please contact Noor Afzainiza Afendi in the first instance for any general queries about this research project. Dr Charlie Huang can also be contacted for any questions and their contact details are on the bottom of this sheet. You can also contact the RMIT University Human Research Ethics Committee.

Noor Afzainiza Afendi School of Management Building 88, RMIT University 440 Elizabeth Street Melbourne Vic 3000	Dr Charlie Huang School of Management Building 80, RMIT University 445 Swanston Street Melbourne Vic 3000

E: afzainiza.afendi@rmit.edu.au	E: charlie.huang@rmit.edu.au P: +61 3 9925 1648

Yours sincerely,

(Noor Afzainiza binti Afendi)

PhD Doctoral Candidate

School of Management

College of Business

RMIT University Australia

Any complaints about your participation in this project may be directed to the Executive Officer, RMIT Human Research Ethics Committee, Research & Innovation, RMIT, GPO Box 2476V, Melbourne, Victoria 3001, Australia. Details of the complaints procedure are available at: http://www.rmit.edu.au/rd/hrec_complaints

Consent Form

Title Industry:	**Product Innovation in the Malaysian Cosmetic**
	Does the ambidexterity moderate the relationship between firms' capabilities and new product performance?
Chief Investigator/Senior Supervisor	**Dr Charlie Huang**
Research Student	**Noor Afzainiza Afendi**

Acknowledgement by Participant

I have read and understood the Participant Information Sheet.

I understand the purposes, procedures and risks of the research described in the project.

I have had an opportunity to ask questions and I am satisfied with the answers I have received.

I freely agree to participate in this research project as described and understand that I am free to withdraw at any time during the project without affecting my relationship with RMIT.

I understand that I will be given a signed copy of this document to keep.

Name of Participant (please print) _____

Signature _____ Date _____

Declaration by Researcher†

I have given a verbal explanation of the research project, its procedures and risks and I believe that the participant has understood that explanation.

Name of Researcher† (please print) _____

Signature _____ Date _____

† An appropriately qualified member of the research team must provide the explanation of, and information concerning, the research project.

Note: All parties signing the consent section must date their own signature.

Appendix 5. 1: Participation Information Consent Form (Translated)

School of Management

GPO Box 2476

Melbourne VIC 3001

Tel +61 3 9925 5555

JEMPUTAN UNTUK MENYERTAI PROJEK PENYELIDIKAN

Tajuk Projek: Inovasi Produk dalam Industri Kosmetik Malaysia: Adakah Kedwicekatan Mempengaruhi Hubungan Antara Keupayaan Firma dan Prestasi Produk yang Baru?

Penyelia:

Dr Charlie Huang, charlie.huang@rmit.edu.au, +61399251648

Penyelidik:

Noor Afzainiza binti Afendi, afzainiza.afendi@rmit.edu.au, Calon PhD Universiti RMIT

Kepada Pemilik/Pengurus Firma Kosmetik,

Anda dijemput untuk mengambil bahagian dalam projek penyelidikan yang dijalankan oleh Universiti RMIT. Sila baca lembaran ini dengan teliti dan pastikan bahawa anda memahami kandungannya sebelum memutuskan sama ada untuk mengambil bahagian. Jika anda mempunyai sebarang soalan mengenai projek ini, sila berhubung dengan salah seorang daripada penyelidik.

Siapakah yang terlibat dalam projek penyelidikan ini? Mengapa ia dijalankan?

Projek penyelidikan ini dijalankan oleh Noor Afzainiza Afendi (penyelidik utama). Beliau sedang diselia oleh seorang ahli akademik kanan di Universiti RMIT, Australia: Dr Charlie Huang (Ketua Penyelidik) . Penyelidik utama ditaja oleh Kementerian Pendidikan (Malaysia) dan beliau adalah seorang ahli akademik di Universiti Utara Malaysia. Beliau menjalankan penyelidikan ini sebagai sebahagian daripada program ijazah (Doktor Falsafah). Kajian ini bertujuan untuk mengkaji kesan sumber dan keupayaan firma kepada prestasi produk baru dalam industri kosmetik Malaysia.

Mengapa anda dipilih?

Anda telah dihubungi untuk kajian ini kerana anda telah dikenal pasti sebagai pemilik atau pengurus yang boleh memberi gambaran tentang penggunaan sumber semasa yang kukuh dan keupayaan ke arah prestasi produk baru.

Projek ini mengenai apa? Apakah persoalan yang ditimbulkan?

Secara khususnya kajian ini dijalankan adalah bertujuan untuk:

1. Mengkaji apakah kunci keupayaan firma yang mempengaruhi prestasi produk baru dalam industri kosmetik Malaysia.
2. Mengenalpasti kesan hubungan kedwicekatan keupayaan firma dan prestasi produk baru.
3. Untuk mengetahui apakah faktor-faktor persamaan dan perbezaan yang mempengaruhi prestasi inovasi antara PKS Bumiputera dan bukan Bumiputera.
4. Menyumbang kepada kajian sedia ada dalam bidang keusahawan terutamanya kepada Bumiputera (Melayu) yang terlibat dalam industri kosmetik Malaysia.

Jika saya bersetuju untuk mengambil bahagian , apakah yang perlu saya lakukan?

Jika anda bersetuju untuk mengambil bahagian, anda dikehendaki untuk mengisi borang kaji selidik yang disertakan. Adalah dianggarkan bahawa masa yang diperlukan untuk mengisi kaji selidik ini ialah antara 15-20 minit. Soalan-soalan adalah umum dan tidak mempunyai maklumat sensitif atau peribadi. Penyertaan dalam kajian ini adalah secara sukarela dan maklum balas anda akan kekal sulit.

Apakah keburukan atau risiko yang mungkin berlaku?

Tiada risiko bagi responden untuk mengambil bahagian dalam kaji selidik ini. Penyertaan anda dalam projek ini adalah secara sukarela dan anda bebas untuk menarik balik penyertaan anda pada bila-bila masa.

Apakah faedah yang diperolehi para peserta dengan penyertaan ini?

Mungkin anda tidak mendapat faedah secara langsung sebagai individu dengan menyertai projek ini. Walau bagaimanapun apabila selesai, penyertaan anda akan membolehkan penyelidik untuk memberi sumbangan penting kepada pembangunan dan pelaksanaan amalan pembangunan produk baru kepada pemilik/pengurus PKS Malaysia dalam bidang kosmetik khususnya. Selain itu, penyelidik amat berbesar hati berkongsi ringkasan projek dengan anda jika anda berminat.

Apa yang akan berlaku kepada maklumat yang anda berikan?

Data ini akan dikumpul untuk laporan penyelidikan. Peserta tidak akan dikenal pasti dalam laporan penyelidikan atau penerbitan. Data yang dikumpul akan disimpan dalam komputer yang dilindungi kata laluan dan dalam kabinet berkunci dan disimpan selama 5 tahun selepas projek tamat. Maklumat yang dikumpul boleh didedahkan jika (1) ia adalah untuk melindungi anda atau orang lain daripada bahaya, atau (2) jika sesuatu perintah mahkamah dihasilkan atau (3) anda menyediakan penyelidik dengan kebenaran bertulis.

Hasil maklumat daripada projek penyelidikan ini boleh disiarkan dalam persidangan dan jurnal akademik, yang biasanya boleh diakses oleh umum, sama ada dalam talian atau melalui penerbitan fizikal.

Apakah hak saya sebagai peserta?

- Berhak untuk menarik diri daripada penyertaan pada bila-bila masa
- Berhak untuk meminta rakaman dihentikan
- Berhak untuk memiliki apa-apa data yang belum diproses dikeluarkan dan dimusnahkan, dengan syarat ia boleh dikira dengan pasti, dan dengan syarat bahawa berbuat demikian tidak meningkatkan risiko untuk peserta.

- Berhak untuk dikenal pasti dalam mana-mana gambar yang dimaksudkan untuk penerbitan awam , sebelum penerbitan
- Berhak untuk mempunyai pertanyaan dijawab pada bila-bila

Siapa yang perlu saya hubungi jika saya mempunyai apa-apa soalan?

Sila hubungi Noor Afzainiza Afendi untuk sebarang pertanyaan umum mengenai projek penyelidikan ini. Dr Charlie Huang juga boleh dihubungi untuk sebarang pertanyaan dan butiran mereka di bahagian bawah lembaran ini. Anda juga boleh menghubungi Jawatankuasa Etika Penyelidikan Manusia Universiti RMIT.

Noor Afzainiza Afendi School of Management Building 88, RMIT University 440 Elizabeth Street Melbourne Vic 3000 E: afzainiza.afendi@rmit.edu.au	Dr Charlie Huang School of Management Building 80, RMIT University 445 Swanston Street Melbourne Vic 3000 E: charlie.huang@rmit.edu.au P: +61 3 9925 1648

Yang Benar,

(Noor Afzainiza binti Afendi)

Calon Ijazah Kedoktoran, PhD

Sekolah Pengurusan

Kolej Perniagaan

Universiti RMIT, Australia

Sebarang aduan mengenai penyertaan anda dalam projek ini boleh diajukan kepada Executive Officer, RMIT Human Research Ethics Committee, Research & Innovation, RMIT, GPO Box 2476V, Melbourne, Victoria 3001, Australia. Butiran tatacara aduan boleh didapati di: http://www.rmit.edu.au/rd/hrec_complaints

Borang Persetujuan

Tajuk	**Inovasi Produk dalam Industri Kosmetik Malaysia: Adakah kedwicekatan mempengaruhi hubungan antara keupayaan firma dan prestasi produk baru?**
Ketua Penyelidik	**Dr Charlie Huang**
Pelajar Penyelidikan	**Noor Afzainiza Afendi**

Pengakuan oleh Peserta

Saya telah membaca dan memahami Lembaran Maklumat Peserta.

Saya memahami tujuan, prosedur dan risiko penyelidikan yang diterangkan dalam projek itu.

Saya diberi peluang untuk bertanya soalan dan saya berpuas hati dengan jawapan yang saya terima.

Saya bersetuju untuk mengambil bahagian dalam projek ini seperti yang diterangkan dan memahami bahawa saya bebas untuk menarik diri pada bila-bila masa dalam projek ini tanpa menjejaskan hubungan saya dengan RMIT.

Saya faham bahawa saya akan diberikan dokumen salinan yang ditandatangai sebagai simpanan.

Nama Peserta (huruf besar) _____

Tandatangan _____ Tarikh _____

Pengakuan oleh Penyelidik[†]

Saya telah memberikan penjelasan lisan berkenaan projek penyelidikan, prosedur dan risikonya dan saya percaya bahawa peserta telah memahami penjelasan tersebut.

Nama Penyelidik[†] (huruf besar) _____

Tandatangan _____ Tarikh _____

[†] Seorang ahli penyelidik yang layak perlu memberikan penjelasan dan maklumat berkenaan projek penyelidikan

Nota: Semua pihak perlu menandatangani seksyen kebenaran.

Appendix 4 – Tables for Chapter 5 and 6

Appendix 5. 2: Normality Test for Individual Constructs

Item (s)	N	Mean		Skewness		Kurtosis	
	Statistic	***Statistic***	***Std. Error***	***Statistic***	***Std. Error***	***Statistic***	***Std. Error***
MO1: We meet customers at least once a year to find out what products/services they will need in the future	205	4.3073	0.66288	**-0.639**	0.170	**0.265**	0.338
MO2: We do a lot of in-house market research	206	4.3689	0.61668	**-0.433**	0.169	**-0.649**	0.337
MO3: We have interdepartmental meetings at least once a quarter to discuss market trends and development	207	4.2415	0.59088	**-0.120**	0.169	**-0.462**	0.337
MO4: Market personnel spend time discussing customers' future needs with our functional department	206	4.1311	0.66795	**-0.652**	0.169	**1.149**	0.337
MO5R: It takes us forever to decide how to respond to competitor price changes	208	3.8510	1.15967	**-0.944**	0.169	**-0.025**	0.336
MO6R: We tend to ignore changes in our customers' product/service needs	208	4.3077	0.63057	**-0.584**	0.169	**0.553**	0.336
EO1: We act boldly in order to achieve objectives.	209	4.2392	0.75332	**-0.904**	0.168	**0.781**	0.335
EO2: We typically adopt a very competitive posture	209	4.1579	0.67862	**-0.391**	0.168	**-0.093**	0.335
EO3: We invest heavily in marketing	208	3.8558	0.87828	**-0.578**	0.169	**0.179**	0.336
EO4: We spend large amounts of money on developing new products/services	208	4.0288	0.77343	**-0.556**	0.169	**0.089**	0.336
EO5: We give special attention to research and development	206	4.3252	0.58104	**-0.191**	0.169	**-0.635**	0.337

EO6: We consider new idea/approach as very important	208	4.4087	0.57426	**-0.332**	0.169	**-0.764**	0.336
TO1: We use sophisticated technology in our new product development	207	4.1836	0.73413	**-0.526**	0.169	**-0.249**	0.337
TO2: We use rapid integration of new technologies.	208	4.1154	0.73304	**-0.629**	0.169	**0.410**	0.336
TO3: We are proactive in developing new technologies	203	4.1872	0.67077	**-0.536**	0.171	**0.454**	0.34
TO4: We are proactive in generating new ideas	204	4.1912	0.53242	**0.151**	0.170	**0.025**	0.339
MC1: We are good at understanding customer needs	209	4.3349	0.62232	**-0.378**	0.168	**-0.658**	0.335
MC2: We are good at creating customer relationships	209	4.3397	0.66824	**-0.518**	0.168	**-0.731**	0.335
MC3: We are good at maintaining customer relationships	209	4.3828	0.62549	**-0.499**	0.168	**-0.635**	0.335
MC4: We are good at sharing trust and goals with strategic partners	208	4.1971	0.56001	**0.028**	0.169	**-0.175**	0.336
TC1: We are acquiring important technology information	209	4.3062	0.59808	**-0.235**	0.168	**-0.608**	0.335
TC2: We are identifying new technology opportunities	209	4.3780	0.60104	**-0.391**	0.168	**-0.664**	0.335
TC3: We are responding to technology changes	205	4.3122	0.74102	**-1.012**	0.170	**0.98**	0.338
TC4: We are mastering state-of-the-art technologies	202	3.9406	0.61202	**-0.494**	0.171	**1.231**	0.341
MCExploit1: Consistently re-examining information from previous projects and/or studies to modify existing marketing processes.	203	4.0049	0.67851	**-0.294**	0.171	**0.067**	0.34
MCExploit2: Routinely adapting existing ideas when developing new marketing processes	203	4.1232	0.53548	**0.105**	0.171	**0.310**	0.34
MCExploit3: Incrementally and routinely improving our existing	204	4.0931	0.67038	**-0.605**	0.170	**1.022**	0.339

marketing procedures							
MCExploit4: Focusing changes in marketing procedures on improving efficiency.	203	4.1379	0.47792	**0.384**	0.171	**0.869**	0.34
MCExplore1: Continually developing new marketing procedures that are very different from others developed in the past.	202	4.1089	0.76491	**-0.524**	0.171	**-0.171**	0.341
MCEXplore2: Routinely introducing new marketing procedures which are daring, risky, or bold	200	3.8950	0.88197	**-0.281**	0.172	**-0.797**	0.342
MCExplore3: Consistently using market knowledge to develop new marketing processes which deliver different outputs from existing processes	202	4.0693	0.74989	**-0.400**	0.171	**-0.321**	0.341
MCExplore4: Using marketing knowledge to “break the mould” and create new marketing processes not used before	202	3.8515	0.75819	**-0.298**	0.171	**-0.172**	0.341
TCExploit1: Upgrading current knowledge for familiar products	209	4.3349	0.53058	**0.108**	0.168	**-0.826**	0.335
TCExploit2: Investing in exploiting mature technologies that improve the productivity of current innovation operations	209	4.2344	0.54381	**0.092**	0.168	**-0.258**	0.335
TCExploit3: Enhancing abilities in searching for solutions to customers problems that are near to existing solutions	209	4.1579	0.57089	**0.002**	0.168	**-0.123**	0.335
TCExploit4: Upgrading skills in product development processes in which the firm already possesses rich experience	209	4.2153	0.58553	**-0.076**	0.168	**-0.374**	0.335

TCExplore1: Acquiring manufacturing technologies and skills entirely new to the firm.	205	4.1561	0.77017	**-0.536**	0.170	**-0.361**	0.338
TCExplore2: Learning product development skills and processes entirely new to the industry	205	4.1756	0.79112	**-0.804**	0.170	**0.340**	0.338
TCExplore3: Acquiring entirely new managerial and organizational skills that are important for innovation	206	4.0680	0.77475	**-0.817**	0.169	**0.769**	0.337
TCExplore4: Learning totally new skills in funding new technology and training R&D personnel.	205	4.0488	0.86747	**-0.868**	0.170	**0.327**	0.338
NPP1: Customer satisfaction	205	4.0488	0.60029	**-0.292**	0.170	**0.821**	0.338
NPP2: Revenue goal	204	3.8922	0.70055	**-0.282**	0.170	**0.043**	0.339
NPP3: Profitability goal	199	3.8593	0.69653	**-0.165**	0.172	**-0.162**	0.343
NPP4: Launch on time	192	3.5781	0.92331	**-0.716**	0.175	**0.649**	0.349
NPP5: Quality guideline	200	3.8300	0.68809	**0.141**	0.172	**-0.698**	0.342
NPP6: Performance specification	199	3.9548	0.62196	**-0.097**	0.172	**-0.011**	0.343

Note: MO1-MO6R (Market Orientation), EO1-EO6 (Entrepreneur Orientation), TO1-TO4 (Technology Orientation), MC1-MC4 (Marketing Capabilities), TC1-TC4 (Technological Capabilities), MCExploit1-MCExploit4 (Marketing Capabilities Exploitation), MCExplore1-MCExplore4 (Marketing Capabilities Exploration), TCExploit1-TCExploit4 (Technological Capabilities Exploitation), TCExplore (Technological Capabilities Exploration), NPP1-NPP6 (New Product Performance).

Appendix 6. 1: Multicollinenarity Test for Strategic Orientation Variables: Marketing Capabilities as Dependent Variable

Construct(s)	Coefficients		Collinearity Statistics	
	B	**Std. Error**	**Tolerance**	**VIF**
(Constant)	1.266	0.311	-	-
Market Orientation	0.276	0.084	0.676	1.479
Entrepreneur Orientation	0.213	0.082	0.486	2.059
Technology Orientation	0.246	0.067	0.573	1.745

Dependent Variable: Marketing Capabilities

Appendix 6. 2: Multicollinenarity Test for Strategic Orientation Variables: Technological Capabilities as Dependent Variable

Constructs	Coefficients		Collinearity Statistics	
	B	**Std. Error**	**Tolerance**	**VIF**
(Constant)	1.373	0.313	-	-
Market Orientation	0.019	0.085	0.672	1.488
Entrepreneur Orientation	0.124	0.083	0.486	2.056
Technology Orientation	0.542	0.067	0.572	1.748

Dependent Variable: Technological Capabilities

Appendix 6. 3: Multicollinearity Test for Main Research Variables: New Product Performance as dependent Variable

Constructs	Coefficients		Collinearity Statistics	
	B	**Std. Error**	**Tolerance**	**VIF**
(Constant)	1.331	0.423	-	-
Market Orientation	0.355	0.116	0.657	1.522
Entrepreneur Orientation	0.183	0.112	0.486	2.057
Technology Orientation	0.066	0.09	0.59	1.695
Marketing Capabilities	0.358	0.097	0.684	1.462
Technological Capabilities	0.086	0.091	0.684	1.462

Dependent Variable: New Product Performance

Appendix 6. 4: Non-response Bias Test (Mean Difference)

Constructs	Time Frame	N	Mean	Std. Deviation	Std. Error Mean
Market Orientation	Early Response	50	4.177	0.454	0.064
	Late Response	50	4.199	0.424	0.062
Entrepreneur Orientation	Early Response	50	4.193	0.545	0.077
	Late Response	50	4.113	0.485	0.069
Technology Orientation	Early Response	50	4.180	0.657	0.093
	Late Response	50	4.135	0.523	0.074
Marketing Capabilities	Early Response	50	4.342	0.522	0.075
	Late Response	50	4.378	0.506	0.071
Technological Capabilities	Early Response	50	4.230	0.573	0.081
	Late Response	50	4.367	0.492	0.070
	Early Response	50	3.980	0.437	0.062

Marketing Capabilities Exploitation	Late Response	50	4.194	0.479	0.068
Marketing Capabilities Exploration	Early Response	50	4.016	0.752	0.108
	Late Response	50	3.839	0.653	0.094
Technological Capabilities Exploitation	Early Response	50	4.205	0.478	0.068
	Late Response	50	4.275	0.404	0.057
Technological Capabilities Exploration	Early Response	50	4.110	0.680	0.096
	Late Response	50	4.132	0.525	0.074
New Product Performance	Early Response	50	3.982	0.552	0.081
	Late Response	50	3.7000	0.516	0.082

Appendix 6. 5: T-test of Non-response Bias, Independent t-test Result

Constructs	Time Frame	N	Mean	Std. Deviation	Std. Error Mean
Market Orientation	Early Response	50	4.177	0.454	0.064
	Late Response	50	4.199	0.424	0.062
Entrepreneur Orientation	Early Response	50	4.193	0.545	0.077
	Late Response	50	4.113	0.485	0.069
Technology Orientation	Early Response	50	4.180	0.657	0.093
	Late Response	50	4.135	0.523	0.074
Marketing Capabilities	Early Response	50	4.342	0.522	0.075
	Late Response	50	4.378	0.506	0.071

Technological Capabilities	Early Response	50	4.230	0.573	0.081
	Late Response	50	4.367	0.492	0.070
Marketing Capabilities Exploitation	Early Response	50	3.980	0.437	0.062
	Late Response	50	4.194	0.479	0.068
Marketing Capabilities Exploration	Early Response	50	4.016	0.752	0.108
	Late Response	50	3.839	0.653	0.094
Technological Capabilities Exploitation	Early Response	50	4.205	0.478	0.068
	Late Response	50	4.275	0.404	0.057
Technological Capabilities Exploration	Early Response	50	4.110	0.680	0.096
	Late Response	50	4.132	0.525	0.074
New Product Performance	Early Response	50	3.982	0.552	0.081
	Late Response	50	3.7000	0.516	0.082

Appendix 6. 6: The Result from Unrotated Principal Component Analysis to Determine the Presence of Common Method Variance

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	14.51	31.543	31.543	14.51	31.543	31.543
2	3.913	8.506	40.049	3.913	8.506	40.049
3	3.204	6.966	47.014	3.204	6.966	47.014

4	2.418	5.257	52.272	2.418	5.257	52.272
5	2.149	4.672	56.944	2.149	4.672	56.944
6	1.881	4.089	61.033	1.881	4.089	61.033
7	1.568	3.409	64.442	1.568	3.409	64.442
8	1.463	3.181	67.622	1.463	3.181	67.622
9	1.359	2.955	70.577	1.359	2.955	70.577
10	1.288	2.800	73.377	1.288	2.800	73.377
11	1.141	2.480	75.857	1.141	2.480	75.857
12	0.982	2.135	77.992			
13	0.867	1.885	79.877			
14	0.762	1.656	81.533			

Extraction Method: Principal Component Analysis.

Appendix 6. 7: The Discriminant Validity of the Constructs

	EO	MC	MCi	MCr	MO	NPP	TC	TCi	TCr	TO
EO	0.767									
MC	0.443	0.641								
MCi	0.041	0.015	0.972							
MCr	0.057	0.013	0.866	0.947						
MO	-0.027	-0.071	0.399	0.296	0.848					
NPP	-0.025	-0.048	-0.031	0.142	-0.034	0.686				

TC	-0.143	-0.307	-0.010	-0.041	-0.024	-0.028	0.858			
TCi	0.354	0.576	-0.028	-0.045	0.026	-0.160	-0.267	0.860		
TCr	0.080	-0.038	-0.027	-0.032	-0.021	-0.034	-0.041	-0.015	0.981	
TO	-0.135	-0.329	0.053	0.034	0.044	-0.042	0.823	-0.259	-0.043	0.804