THE RELATIONSHIP OF STRATEGIC NETWORK PARTNER FIT CHARACTERISTICS, OPEN INNOVATION AND ORGANISATIONAL PERFORMANCE OF SMALL AND MEDIUM ENTERPRISES IN MALAYSIA

By

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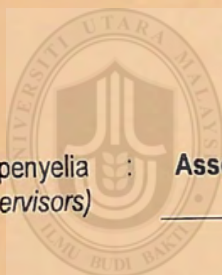
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ABSTRACT

Effectively planning for market turbulence and working with partners, as well as focusing on strategic network partner fit characteristics and open innovation are critical to small and medium enterprises success. However, this practice is lacking among Malaysian small and medium enterprises. Poor selection of partner qualities and delay in the implementation of open innovation influence firm's performance. Therefore, this research aims to investigate the impact of strategic network partner fit characteristics and open innovation on the performance of small and medium enterprises, and the moderating role of open innovation on the relationship between the strategic network partner fit characteristics and the performance. Inter-organisational relationships and resource-based theories underpinned the proposed model. Online questionnaires were distributed to 500 small and medium-sized owners or managers of multiple sub-sectors with 123 data were successfully collected. Data were analyzed using partial least squares-structural equation modeling via SmartPLS. This study found that strategic network partner fit characteristics and open innovation had a positive and significant impact on small and medium enterprises performance. In addition, open innovation moderates the relationship between strategic network partner fit characteristics and the performance of small and medium enterprises. This study helps to support small and medium enterprises in selecting the right network partners to reduce costs and minimize risks of local and international activities. Strengthened by inter-organisational relationship and resource-based theories, the model, open innovation (inbound and outbound) moderates the characteristics of strategic network partner fit (complementarity, compatibility and commitment) to enhance small and medium enterprises performance.

Keywords: Strategic Network, Partner Fit Characteristics, Open Innovation, Small and Medium-Sized Enterprises.

ABSTRAK

Perancangan yang berkesan untuk pergolakan pasaran, kerjasama dengan rakan kongsi serta memfokuskan pada ciri kesesuaian rakan kongsi rangkaian strategik dan inovasi terbuka adalah penting untuk kejayaan syarikat perusahaan kecil dan sederhana. Walau bagaimanapun, amalan ini kurang di kalangan syarikat perusahaan kecil dan sederhana di Malaysia. Pemilihan kualiti rakan kongsi yang lemah dan kelewatan dalam pelaksanaan inovasi terbuka boleh mempengaruhi prestasi sesebuah syarikat. Oleh itu, penyelidikan ini bertujuan untuk menyiasat kesan kesesuaian ciri rakan jaringan strategik dan inovasi terbuka prestasi syarikat perusahaan kecil dan sederhana, dan juga peranan penyederhana OI terhadap hubungan antara kesesuaian ciri rakan jaringan strategik dan prestasi perusahaan kecil dan sederhana. Teori hubungan antara organisasi dan berasaskan sumber menyokong model yang dicadangkan. Soal selidik dalam talian telah diedarkan kepada 500 pemilik/pengurus syarikat perusahaan bersaiz kecil dan sederrhana daripada pelbagai subsektor dan berjaya mengumpul sebanyak 123 data. Data dianalisa menggunakan pemodelan persamaan struktur kuasa dua terkecil separa *(PLS-SEM)* melalui *SmartPLS*. Kajian ini mendapati kesesuaian ciri rakan jaringan strategik dan inovasi terbuka mempunyai kesan positif dan signifikan terhadap prestasi syarikat perusahaan kecil dan sederhana. Di samping itu, inovasi terbuka menyederhanakan hubungan antara kesesuaian ciri rakan jaringan strategik dan prestasi syarikat perusahaan kecil dan sederhana. Kajian ini membantu menyokong syarikat perusahaan kecil dan sederhana dalam memilih rakan kongsi rangkaian yang betul untuk mengurangkan kos dan meminimumkan risiko aktiviti tempatan dan antarabangsa. Diperkukuh oleh teori hubungan antara organisasi dan berasaskan sumber, model, inovasi terbuka (masuk dan keluar) menyederhanakan ciri-ciri kesesuaian rakan kongsi rangkaian strategik (pelengkap, keserasian dan komitmen) untuk meningkatkan prestasi PKS.

Katakunci: Ciri Kesesuaian Rakan Jaringan Strategik, Inovasi Terbuka, Prestasi SMEs, Syarikat Perniagaan Kecil dan Sederhana

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ASEAN	The Association of Southeast Asian Nations
AVE	Average Extracted Variance
CB-SEM	Covariance Based-Structural Equation Model
CEOs	Chief Executive Officers
DV	Discriminant Validity
GDP	Gross Domestic Product
CMV	Common Method Variance
HTMT	Heterotrait-Monotrait
IO	Industrial Organisation
IOR	Inter Organisational Relationship
IORT	Inter Organisational Relationship Theory
IT	Information Technology
LISREL	Linear Structural Relations
MASTIC	Malaysian Science and Technology Information Centre
MCO	Movement Control Order
MDEC	Malaysian Digital Economic Corporation
MEDAC	Ministry of Entrepreneur Development and Cooperatives
MOSTI	Ministry of Science, Technology & Innovation
NED	National Entrepreneurs Directory
NSDC	National SME Development Council
NTBF	New Technology-Based Firms
OECD	Organization for Economic Co-operation and Development
OI	Open Innovation
P/E	Price Earnings Ratio
PLS-SEM	Partial Least Square-Structural Equation Model
R&D	Research and Development
RAND	Random Number Function
RBT	Resource-Based Theory
ROA	Return on Assets
ROI	Return on Investment
ROS	Return on Sales
SDG	Sustainable Development Goal
SEM	Structural Equation Model
SMEs	Small and Medium Enterprises
SME CORP	SME Corporation Malaysia
SMSE	Small and Medium-Sized Enterprise
SNPFC	Strategic Network Partner Fit Characteristics
SP	Performance of SMEs
SPSS	Statistical Package for Social Science
VIF	Variance Inflation Factor

CHAPTER 1

INTRODUCTION

1.1   Background of the Study

In today's global market turbulence, competition is getting tougher and more hazardous. Having to go through this environment, there have been an increasing number of organisations strategizing partnerships and collaborations to reduce risk and protect their competitive advantage. It is important for firms to find an edge to survive and remain constant, and innovation can provide that edge to enhance firms' productivity, growth, and profitability. Firms capable of continually innovating may be able to withstand their business and remain strong in the market. Tactically, firms work together with their business networks as well as resource collaborators to focus on innovation to create new products or services and sustain their business.

The present business landscape has become more complicated (Diez, 2000; Yoshino & Hesary, 2016; United Nations, 2020). The unpredictable global market draws attention to the importance of innovation to all small and medium enterprises (O'Regan, Ghobadian & Sims, 2006; Adam & Alarifi, 2021). For small and medium-sized enterprises (SMEs), network partners represent a corresponding reaction toward solving internal and external business risks that they face arising from the advanced use of technologies and market change. Hence, it has become vital for SMEs to ally with different organisations such as firms, research institutions, suppliers, and customers within an intense innovation network that would allow knowledge sharing and acquiring profits from complementary proficiencies (Bullinger, Auernhammer & Gomeringer 2004; Zhang & Chen, 2021).

In the past, business firms were seen to solve problems on their own and were reluctant to share information or knowledge among their business counterparts (Pommerening & Wawi, 2017) or competitors, but now firms could even collaborate with their competitors. When a firm is able to adapt and engage in collaboration with multiple organizations, means the company has to open up to accept the innovation process with others. Open innovation became acceptable to some organisations when they found that it was neither efficient nor effective to innovate products and services by themselves. Elisa (2012), Gauter (2013), and Osman et al. (2018) pointed out that strategic alliances and open innovation seem inseparable because both of these components of enterprising cooperation and networks help to increase a firm's resources and internal innovative activities.

Small and medium enterprises (SMEs) from all over the world including Malaysia, are facing a drastic market change that simultaneously affects both internal and external company operations. World Economic Forum (2021) forecasted the top challenges faced by small firms include talent acquisition, maintaining and growing business, difficulty in accessing funding, changing regulations, and difficulty to maintain clear culture. The Chairman of the Malaysian Digital Economic Corporation (MDEC), Dr Rais Hussin (Hussin, 2020) added scarceness of business connections, limited technology awareness, inadequate availability of funding, poor education and training, and limited internet presence of digitalization. While, Abdul Rahman, Yaacob, and Mat Radzi, (2016) include government procedures, poor management competencies, marketing difficulties, cultural obstacles and weighty regulations, poor knowledge and competencies in organizations as well as unsuccessful skills development among workers.

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With the unpredictable challenges of a new business situation, the appearance of collaboration and partnership strategies with other organizations tend to be widespread and become important for firms to stay inclusive in the market. Under the business norm, firms' network varies in the form of collaboration and inter-organisational commitment which include joint ventures, licencing agreements, subcontracting, joint R&D, strategic linkages, and joint marketing activities (Sohrabi et al., 2021; Henderson et al.,2014; Groen, 2005).

Firms that are practising alliances network may be able to acquire more resources than the capabilities they own (Thorelli, 1986). Besides benefiting profit complementary competencies (Zeng, Xie & Tam, 2010; Bullinger et al.,2004). However, if a firm decides to partake in strategic cooperation from its network, the next serious step is choosing the right partner (Hitt, Tyler, Hardee & Park, 1995; Ahmad Abuzaid, 2014; Hossain, 2015; Dhurkari & Nandakumar, 2015; Jalali, 2017). There were propositions by some scholars that strategic alliances fail due to the unsuitable characteristics of partners (Elmuti & Kathawala, 2001; Ahmad Abuzaid, 2014) and affect business performance (Supriyadi & Ratna Ekawati, 2014). Several instruments adopted for the partner characteristics study include goal, complementarity, resource complementarity, trust (Pullen, Groen, Fisscher, & De Weerd-Nederhof, 2012), compatibility, commitment, capability, control, trust (Pansiri, 2008), interdependence and cultural compatibility (Chen, Liu & Hsieh, 2009). Following the behaviour of these studies, several researchers have started to explore to determine techniques enabling firms to select appropriate partners. However, that was not the focus of this dissertation. This research concentrated on the relationship between the strategic network partner fit characteristics, open innovation and performance of SMEs.

Over the years, academicians and practitioners have gradually acknowledged that firms need cooperation and exchange knowledge with partners to achieve business growth. The challenges would be heavier for resource-intensive enterprises, where they require a substantial number of investments to build new products and services. Firms benefit from connections with other agents but would incur costs for forming links. One of the solutions to alleviate expenses and remain competitive is to accept open innovation practices. Companies with lower open innovation practices may affect their performance and competitiveness within local or international markets (Hameed et al., 2018)

There could be many advantages through open innovation (OI), such as benefitting resources from external expertise, reduction of the processing time to enter the market and lower business unsuccessful rates. However, the benefits of OI would probably have not been aware by SME owners because there is still a big gap of firms not utilizing the OI model. For instance, from 2009 to 2011, a longitudinal study by the National Survey of Innovation (2012) under the Ministry of Science Technology and Innovation (MOSTI) Malaysia found about 80% of new and improved products produced by manufacturing and services companies practising closed innovation. Hossain (2015) reflected on research by Organization for Economic Co-operation and Development (OECD) and discovered only 5-20% of SMEs are practising the OI method. On another note, Tehseen et al. (2017), a constant report by OECD, found more than 60% of firms from the wholesale and retail sectors do not relate themselves to innovation.

So far, research on firms being unsuccessful in their OI business activity has been scarce except for one recent study by Greco et al. (2022). Greco et al. (2022) qualitative method found that their interviewees were among 27 managers and owners of the manufacturing sector in Italy and were hesitant to identify failure cases. It explains why they have been a scarcity of such topic research. However, the achievement of firms practising OI is directly related to choosing appropriate partners. Correct partners may contribute to the achievement of the firm's goal. Open innovation benefits organisations through the creation of synergic interaction between the internal and external resource of knowledge resources (Randhawa, 2017).

Open innovation is nothing new. Many companies have practised the OI business model for several decades. It has been the work of Chesbrough (2003; 2007) putting together open innovation theory from several concepts developed in the 1980s and 1990s, particularly the complementary assets (Teece, 1986). Since then, it has become a topic of research interest by scholars. The subject has been getting increasing attention, not only in journals of strategy, general management and organisational behaviour (Gassmann, Enkel & Chesbrough, 2010) but also in other fields, including economics, psychology, culture and sociology (Huizingh, 2011).

Distinctly, the number of empirical studies concerning the relationship between strategic network partner fit characteristics, open innovation and performance of SMEs within the Malaysian context has remained limited (Osman et al. 2018). Malaysian small and medium enterprises (SMEs) consist of two principal sectors of the economy, manufacturing and services (and other sectors). SME Corporation Malaysia (SME

Corp) defines SMEs from the perspective of manufacturing and services and other sectors as below:

i.   Manufacturing: Either revenue not greater than RM50 million OR there are no more than 200 full-time personnel

ii.   Services: Either revenue not greater than RM20 million or there are no more than 75 full-time personnel

iii.   Microenterprise business earns revenue below RM300,000.00 OR full-time workers of fewer than five.

The overall percentage of total business establishment of small and medium enterprises in Malaysia for the year 2020 was 92.7% (SME Annual Report 2020). Considering 100% total, SMEs. Micro business in Malaysia prescribes 77 %, 20 % small, and the remaining 3 % is medium enterprises (Hashim, 2015). SMEs provide 37.1% towards the national income and generated 66% towards employment in 2017. The percentage establishment of SMEs around the world is high. Despite the large business establishment, the failure rate of firms for the first five years is still disturbingly high (Ahmad & Seet, 2009). Moreover, recent research showed almost 40% of start-up businesses worldwide experience failure in the first two years of operation (Hashim, Raza, & Minai, 2019).

Organisational success can be distinguished by looking at how well the organisation performs. (Sethibe & Steyn, 2016; Mahmudova & Kovacs, 2018). In addition, many studies have also proven that organisational performance is influenced by innovation (Likar, Kopa, & Fatur 2014; Yen 2013). Mahmudova and Kovacs (2018), Sethibe and Steyn (2016), and Chong (2008), in their study, classified organisational performance

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into financial and non-financial organisation performance. Accordingly, it is inadequate to measure organisational performance using a single factor. This has also been agreed upon by Herman and Renz (2004). The performance measurement technique is not "one size fits all." Generally, the method depends on each and every company's goals. A firm may measure its performance based on financial elements alone or a hybrid of financial and non-financial elements. An example of the financial element is the return on investment, while non-financial performance is organisational effectiveness.

The next section focuses on issues arising in the selection of network partners related to SMSEs in Malaysia, strategizing for superior performance.

1.2   Problem Statement

Operations within an organisation have an impact on organisational performance. In facing volatile market development situations, companies must plan their operations well to react to any business challenges for survival. As such, it is crucial for companies to embark on strategies and maintain their performance in order to survive.

The environment in which most SMEs enter or remain in the market has changed dramatically. Small and medium enterprises from all over the world, including Malaysia, are bound to face internal and external challenges. Internal constraints (Hussin, 2020; Abdul Rahman, Yaacob & Mat Radzi, 2016; Cravens, 1997) such as scarceness of business connections, limited technology awareness, inadequate accessibility to funding, poor education and training, and restricted internet presence of digitalisation. On the contrary, external challenges predicted by Craven in 1997

include a lack of resources, increased competition, more refined service and quality demanded by customers, aggressive channels of distribution, empowering customers in business, increasing internationalisation market and competition, and aggressive and unpredictable market change.

Business firms' promptness to handle the opportunity, resources, and capabilities of alliance networks has recently become an issue. Firms normally disregard the possibility of getting unfavourable results, which arise from poor selection of partners (Hamel, 1991; Lambe & Spekman, 1997). Many researchers have recently expressed concern about the high rate of "unsuccess" and/or the unpredictability of strategic partners' coalitions. Smart partner selection is critical to business success, according to Dyer, Kale, and Singh (2001), Hamel, Doz, and Prahalad (1989), and Lambe and Spekman (1997). Strategy in selecting partners requires not only thoroughly investigating the list of suitable allies but also choosing the one with the most capabilities or resources.

Pommerening and Al-Wawi (2017) found in their study that SMEs do not use any specific or pre-written strategies when selecting partners. Knowing what the manager wants in a partner and recognising the appropriate traits of partners who can match the intended business or project are critical skills required. An inappropriate characteristic of partners may cause the business to fail and would lead to the company's poor performance (Supriyadi & Ratna Ekawati, 2014). Many studies have been conducted to examine partner attractiveness, but little research has been done to define a set of partner characteristics for specific coalitions (Jalali, 2017). Generally, many studies focus on one specific characteristic that is important and related to partner selection

that is "trust" (Saxton, 1997; Hitt et al., 2000; Beckman, Haunschild, & Phillips, 2004). Other common measurements for partner characteristics found in many works of literature, in addition to "trust," were complementarity and compatibility. According to Casals (2011), complementarity and compatibility are important to promote business success. Shah and Swaminathan (2008) identified trust, complementarity, commitment, and value as factors that influence alliance performance.

Almost all research on strategic alliances has used different partner characteristics that are inconsistently linked with firm performance success. Due to the methodological knowledge gap of variables in partner characteristics, this study replicated Ahmad Abuzaid's (2014) used compatibility, complementarity, and commitment as the dimensions for strategic network partner fit characteristics. Even though there are long lists of partners fit characteristics, the researcher chose these dimensions as they have been regularly and consistently used with combinations of other traits in the study concerning alliance characteristics. These dimensions (complementarity, compatibility, and commitment), as critically debated by Pommerening and Al-Wawi (2017), Jalali (2017), Ahmad Abuzaid (2014), Casals (2011), and Shah and Swaminathan (2008), are recognised as crucial for the selection of business partners. Moreover, this area of research is scarcely investigated in Malaysia.

Inter-firm and cross-sectoral networks have emerged as a critical strategy for firms seeking to accelerate the flow of information, capabilities, resources, and trusts in order to capture and disseminate innovation. Moreover, for firms to achieve and sustain innovation, an open innovation (OI) model using a broad range of external actors and sources can be applied (Laursen & Salter, 2006). Despite its beneficial

importance, the OECD (2008) indicates that only 5-20% of SMEs are actively engaged in OI activities. In Malaysia, small and medium enterprises were quantified by Kaufmann and Tödtling (2002) as having collaboration problems with technical institutes as well as poor attention to research and development that caused a reduction in their innovation activities. According to the 2012 National Survey of Innovation, the percentage of developers in manufacturing and services who use open innovation on new products or services is much lower than the percentage who use closed innovation. Malaysian SMEs are still striving to adopt open innovation (Hameed et al. 2018).

In spite of the increasing significance of business collaboration, there is insufficient research that examines the key characteristics of choosing the right partners for open innovation (OI) success (Solesvik & Westhead, 2010; De Groote & Bachmann, 2020). Segers (2013) emphasised that the OI approach provides new trends and opportunities for all sizes of firms. Open innovation has also proven to be a critical strategic component in increasing firm production and commercialization, but there is still a scarcity of research on OI in SMEs (Bianchi et al., 2010). According to Hossain and Kauranen (2016), OI is practised, but whether it has a positive or negative relationship with various variables is unknown.

Innovation cooperation, which is becoming necessary for SMEs, is understudied in developing countries. (Jalali, 2017; Yousaf & Majid, 2016; Zeng, Xie, & Tam, 2010), such as Malaysia. If a company has partnered with resources that are appropriate to compel innovation, complement its own, and are sufficient, cooperation will become

more competent and successful (Nieto & Santamaria, 2007). As a result, this research can be used to supplement the literature in the context of the Malaysian scenario.

The methodological knowledge gaps were also a concern in deciding whether this dissertation should be carried out. Several research collections were portrayed in Table 2.4 of Chapter 2, covering investigations by Jalali (2017), Ahmad Abuzaid (2014), Thorgren et al. (2010), Chen et al. (2009), Mitsuhashi and Greeve (2008), Zaman and Mavondo (2004), and Sarkar et al. (2001). The identified gaps were as follows:

a)   The selection of partner-fit characteristics for each study is somewhat subjective and based on various combinations. Complementarity and compatibility were two (2) identical dimensions frequently related in the area of study. Except for Ahmad Abuzaid (2014), no other authors applied the commitment variable in their study. As an initial empirical investigation in Malaysia, these variables were used to represent the independent variables (IV). The commitment dimension was chosen as another dimension for the selection of business partner fit characteristics due to its importance, highlighted by Shah and Swaminathan (2008) after examining 40 studies. Its significance was also supported by Forbes (2018) in their article as one of the "Eight Important Elements of Successful Business Partnerships."

b)   The research sample for each past study was confined to a specific sector of industry. For example, pharmaceutical companies, wood industries, top tour agencies, the construction contracting industry, and shipping liners. This dissertation instead did not specify any particular industry but

involved enterprises of small and medium-sized (SMSE) across sectors as the target samples. The focused sample is characterised by inter-firm collaboration, embodied in the flexible network model introduced by Cravens (1997), Achrol (1991), and Webster (1992). Firm networks are made up of horizontal and vertical connections with suppliers, clients, rivals, and other organisations (Gulati, Nohria, & Zaheer, 2000; Hinterhuber & Levin, 1994), as well as inter, intra, and diagonal connections (Hinterhuber & Levin, 1994). Gulati et al.'s (2000) explanation included links between different fields of industries and countries.

c)   The observed literature showed four (4) examinations of research on multi-correlation involving predictor, mediator, moderator, and dependent variables. Predictor variables were represented by partner characteristics; mediator variables were exemplified by joint combinatory efforts, relational capital, and strategic fit; and the moderator was represented by open innovation flow. There had not been many moderators' variable searches associated with partner characteristics. Since the moderator variable is scarce in this area of study, it inspired the researcher to find out if open innovation moderates strategic network partner characteristics and SMEs performance. Firms use open innovation and strategic alliances interchangeably to support resources and internal innovative activities. Both elements are attached to one another (Osman et al., 2018). Thus, open innovation was chosen as a moderator to determine whether it reduces or supports the relationship between strategic network partner fit characteristics and SMEs performance. Supposedly, according to Wang and Islam (2017), open innovation is the process of strengthening the

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engagement and collaboration of numerous allies that take part in a business ecosystem to collaboratively deliver new products or solutions.

Open innovation (OI) demands the collaboration of partnerships and alliances in several forms. In the practice of OI, SMEs frequently develop external networks with large corporations, non-profit organisations, business environment institutes, research centres at universities, other SMEs, the government, customers, and suppliers (Lee et al., 2010). SMEs in Malaysia, however, are still struggling with the adoption of OI activities (Hameed et al., 2018). In some cases, Malaysian SMEs are already implementing OI without realising it. As a result, OI becomes complicated for SMEs to manage, specifically concerning the effort, the output of the OI process, and partners' collaborations.

Network collaboration is the most vital component of open innovation. It helps SMEs develop their products and services in a different way by giving them access to complementary resources and technological know-how (Hameed et al. 2018). Choosing the right partner or partners for collaborative initiatives, however, is a difficult and time-consuming task (Che Mat, Cheung, & Scheepers, 2015; Pommerening, & Al Wawi, 2017). Furthermore, according to Pommerening and Al Wawi (2017), issues related to the incorrect selection of network partner characteristics are caused by: (i) SMEs not implementing any specific strategies when making selection; (ii) managers not understanding the importance of selecting the right partners; and (iii) there are so many partners fit characteristics that some SMEs do not know the exact criteria of their partners.

The motivation of this dissertation is to theorise the relationship between characteristics of strategic network partner fit and open innovation for SMEs' success. Most researchers tend to focus studies on the effect of strategic alliances on business performance, but less is studied on the relationship between characteristics of strategic network partner fit, open innovation, and organisational performance (Osman, Abas, Ngah, & Rahim, 2018). The framework is based on an integrated concept that combines the theory of inter-organisational relationships (IORT) and the resource-based theory (RBT) with provisions of resources and capabilities, achieving organisational performance at the same time.

The insightful discussion above has revealed the need to investigate the relationship between strategic network partner fit, open innovation, and SMEs' performance in the Malaysian context. In view of the discussion, it explains that firms cannot afford to make a wrong decision in the selection of partners' characteristics or delay the adoption of open innovation. By disintegrating or ignoring the importance of these two factors, firms may hamper their overall business performance.

The following sections highlight the analytical questions for the research, the research objectives, the importance as well as the aim of this dissertation, the interest of the study area, and the description of terms.

1.3 Research Questions

This study aimed to examine the influence of strategic network partner fit characteristics towards SMEs performance and whether open innovation moderates

both dependent and independent variables in relation to SMEs in Malaysia. The research questions that need to be examined are outlined below:

1. Does strategic network partner fit characteristics have a significant relationship with SMEs performance?

2. Does open innovation have a significant relationship with SMEs performance?

3. Does open innovation moderate the relationship between strategic network partner fit characteristics and SMEs performance?

1.4   Research Objectives

Objective of this research were to examine relationships between strategic network partner fit characteristics, open innovation and the performance of SMEs in Malaysia. The objectives include:

1. To investigate the relationship between strategic network partner fit characteristics and the performance of SMEs.

2. To investigate the relationship between open innovation and the performance of SMEs.

3. To investigate the moderating role of open innovation has in the relationship between the strategic network partner fit characteristics and the performance of SMEs.

1.5   Significance of Study

The investigation envisioned adding new insights to the management field by determining the relationship between characteristics of strategic network partner fit, open innovation and performance of SMEs. As yet, not much attention has been given

to this theoretical structure. Thus, this exploration will supplement reading materials and rational fields considerably as an effort is prepared in this study cohesively.

1.5.1 Theoretical Contribution

The present business landscape is facing a rising level of uncertainty due to globalisation and is driven by the complex advancement of technology. Due to this, SMEs are forced to team up with other firms to develop or share resources or capabilities to stay in touch with the changing market trend. Thus, collaboration enables SMEs to operate globally with as much ease as their larger counterparts. This research is underpinned by inter-organisational relationships theory (IORT) and resource-based theory (RBT). The connection and cooperation between SMEs and other firms are supported by IORT, while inter-firm organisations that provide resources and capability to engage in local as well as internationalisation activities are held by RBT.

This dissertation shall contribute towards theoretical outputs, as follows:

1.   Delivers evidence-based research stipulating the impact on the performance of SMEs. Most studies focused on a specific sector or type of business corporation. Whereas this research focused on multiple sub-sectors of SMEs.

2.   There have been many studies by researchers looking into the relationship between strategic alliances and organisational performance. However, Ahmad Abuzaid (2014) conducted a follow-up study on the relationship between strategic alliance partner characteristics and organisational performance. This intrigued the present researcher enough to expand the study by considering a strategic "network" instead. Hence, the theoretical attempt for this proposal is based on open innovation as

a moderator with regard to the relationship between strategic network partner fit characteristics and the organisational performance of SMEs.

3.   This investigation would be conducive to incorporating the concepts of inter-organisational relationships theory (IORT) and resource-based theory (RBT) using a new predictor variable called strategic network partner fit characteristics together with open innovation (moderating variable) and SMEs' performance (a dependent variable).

1.5.2   Practical Contribution
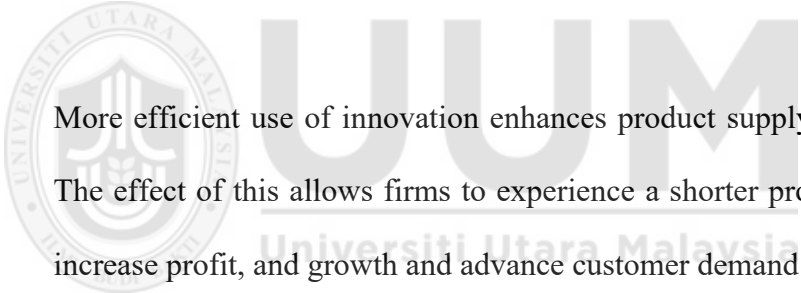
The findings of this study will shed light on how the characteristics of strategic network partners and open innovation affect the business performance of SMEs. The consequences make it important for SME owners to continuously find appropriate applications and results. This evidence-based research would provide a new perception of what business benefits are expected from practising strategic network partner fit characteristics and open innovation, as entailed:

i)   Able to manoeuvre and exploit the use of their limited resources through network partner's selection and open innovation in a proper way.

ii)   Attempt to practise the use of any relevant strategic network partner fit characteristics (partner's commitment, complementarity, and compatibility) and practise open innovation (inbound and outbound) in a dynamic and creative way to achieve better organisational performance.

iii)   Able to guide the management in handling and processing their internal assets to earn a competitive advantage.

In order to boost their growth, competencies, and performance, business organisations may decide to strategically transform their business model by using new inter-firm

collaboration and open innovation techniques. If put into practice, in the long run, SME owners would understand the revolution of characteristics required for their strategic network partners for different projects. At the same time, firms that refine and put together open innovation acculturation in their system could strengthen and spearhead the company for better performance.

The chain effect of SMEs practising strategic network partner fit characteristics and open innovation involves companies' stakeholders as much. In business point of view, consumers are key figures in the marketplace. They are at the centre of all product production and sales activities. The influence of firms' strategic network partner fit characteristics and open innovation towards customers include:

i) More efficient use of innovation enhances product supply in the market. The effect of this allows firms to experience a shorter product life cycle, increase profit, and growth and advance customer demand for satisfaction.

ii) When consumers are able to adopt novel products quickly, firms' market focus increases and the overall rate of technological progress becomes gradual

1.6 Scope of Study and Limitations

This research focused on small and medium-sized enterprises (SMEs), with a population of 213,395 comprising 192,783 small enterprises and 20,612 medium-sized enterprises (SME Annual Report, 2017/18). Small and medium-sized enterprises' annual revenues range between RM300,000 and RM50 million with a number of workers between 5 and 200 (SME Corp Malaysia, 2020). The targeted SMEs were

among the sub-sectors of manufacturing and services in Malaysia. The respondents for this research were the owners or managers of SMEs who plan and make decisions on selecting business network partners. This research used a quantitative method for analysis. Distribution and collection of data took place as soon as questionnaires were developed and tested. The analysis unit of this study is "company."

The present investigation anticipated reducing disparities in prior literature and outcomes in the Malaysian business context by examining the relationship between strategic networks, partner fit characteristics, open innovation, and the performance of SMEs. In relation to the concept developed, participants in the survey included small and medium-sized companies from across sectors throughout Malaysia.

The researcher tried as much for perfection, nevertheless, certain situations were beyond control. Any research conducted is not without limitations. During the research process for this dissertation, the researcher encountered two consequences of constraints. First, the constraint involved fewer receptive participants due to deteriorated business impact during movement control orders (MCO), and second, this investigation was only tested on a cross-sectional basis.

1.7   Definition of Key Terms

The following are the definition of the term expended for this research study.

1.7.1 Small and Medium-Sized Enterprise

Based on the SME Report (2020), small and medium enterprises (SMEs) in Malaysia consist of two main sectors, namely, manufacturing and service (other sectors). in

which they are classified as micro, small, and medium-sized. The definition of SME is focused on sales turnover or the number of full-time workers (SME Corp., 2014). The general definition was highlighted in Section 1.1.

For the purpose of this dissertation, the target population was small and medium-sized enterprises (SMSE) excluding micro enterprises. The definition of SMSE as described by SME Corp (2014) is shown in the Table 1.1 below:

Table 1.1
Small and Medium-Sized Enterprise Operation Definition

Sector (Size)	Sales Turnover	Number of Full-time Worker
Manufacturing (Small)	RM300,000 ≤ RM15,000,000	5 ≤ 75
Manufacturing (Medium)	RM15,000,000 ≤ RM50,000,000	75 ≤ 200
Services (Small)	RM300,000 ≤ RM3,000,000	5 ≤ 30
Services (Medium)	RM3,000,000 ≤ RM20,000,000	30 ≤ 75

Source: SME Corporation Malaysia (2014)

1.7.2 SMEs Performance

The performance of an organisation is the actual or real outcome of the firm that will be assessed according to its anticipated and desired objectives. In basic terms, SMEs performance can be defined as the capability of a business firm to effectively achieve its aims and objectives (Selden & Sowa, 2004; Mahmudova & Kovacs, 2018). According to Mohd Amy, Chee, and Mohamad Izham (2013) and Mahmudova and Kovacs (2018), there are two categories of performance that SMEs can use to measure, which are financial and non-financial performance. This research defines SMEs performance as the firm's ability to meet stated objectives using a combination of financial and non-financial performance metrics, since both are adjustable to accommodate SMEs from diverse sectors of the organisation.

1.7.3 Strategic Network Partner Fit Characteristics

The construct "strategic network partner fit characteristics" was introduced in this research after reviewing studies by Jalali (2017), Ahmad Abuzaid (2014), and Thorgren et al. (2010).

The strategic network is distinguished from tactical inter-firm network collaborations with the purpose of investing to exchange or share information, technology, market, or any kind of resource (Gulati et al., 2000; Thorelli, 1986). Types of networks include horizontal, vertical, and diagonal (Gulati et al., 2000; Hinterhuber & Levin, 1994), and internal (Hinterhuber & Levin, 1994).

Associated with the strategic network, partner fit characteristics are another important criterion to look at in making the decision to select proper partners (Hitt et al., 1995). Thorgren et al. (2010) posited "partner fit" as how partners match with one another to create synergy by examining complementary capabilities and organisational compatibilities. While Ahmad Abuzaid (2014) applied the construct dimensions of partner complementarity, partner commitment, and partner compatibility when using the term "strategic alliance partner characteristics," Shah and Swaminathan (2008) included dimensions such as complementarity, compatibility, trust, commitment, capability, interdependence, cultural compatibility, coordination, reputation, cooperation, and relational skills for partner characteristics.

This research focused on dimensions related to complementarity, compatibility and commitment. The following described the elements:

a)   Partner Complementarity

The complementarity of a partner can be defined as the degree to which a partner provides resources and capabilities that are non-overlapping with those of the other partner (Dyer & Singh, 1998; Ahmad Abuzaid, 2014; Manotungvorapun & Gerdsri, 2016). Indicators of complementarity expended for strategic network partner fit characteristics (SNPFC) include unique competencies, technical capabilities, market coverage, diverse customers, a quality distribution system, and synergistic values formed and matched assets (Pansiri, 2007; Ahmad Abuzaid A.N., 2014).

b)   Partner Compatibility

Ahmad Abuzaid (2014) emphasised that partner compatibility reveals suitable partners' organisational culture, congruence of firms' strategic goals, and work styles, while Kanter (1997) describes it as management practises and work procedures. Some of the items involved the compatibility of organisational culture, strategic objectives, management styles, and the company's size and strength (Ahmad Abuzaid, 2014).

c)   Partner Commitment

Anderson and Weitz (1992) described partner commitment as the extent to which alliances get involved in inter-organisational relationships. Also, as added by Shamdasani and Sheth (1995), strategic network partners pledged to take on some activities that would stabilise the achievement of the partner's goals. Partner commitment was examined through the willingness to dedicate resources, make a long-term investment, share expertise, and continue to contribute to the network (Pansiri, 2008; Ahmad Abuzaid, 2014; Forbes, 2018).

Because of the methodological gap in variables relating to partner characteristics, the source of variables for this current study was Ahmad Abuzaid (2014) and Pansiri (2007). Thus, the measurement for the construct of strategic network partner fit characteristics was multi-dimensional, comprising complementarity, compatibility, and commitment. Recognizing their significance (Casals, 2011; Shah & Swaminathan, 2008), complementarity, compatibility, and commitment dimensions were pertinent to this dissertation and the Malaysian context.

1.7.4   Open Innovation

Open innovation is "the use of purposeful inflows and outflows of knowledge to accelerate internal innovation and increase the markets for external application of the invention, respectively," according to Chesbrough (2006a, p. 1). The two types of open innovation are inbound and outbound open innovation. Inbound open innovation describes the new creative concepts and information inflow that come from an external party. On the other hand, outbound open innovation refers to the dissemination of an organization's innovative ideas and knowledge to the market for outside parties. (Gassmann & Enkel 2004; Herstad et al. 2008).

a)   Inbound open innovation

Bringing in a new source of external ideas and technology into an organisation is known as inbound open innovation (Liang et al., 2013). It benefits firms to create products and services for the market. Indicators of external sources include ideas, research and development initiatives, technology licensing, and personnel initiatives involving external sources from the university, government agencies, research

institutions, competitors, consultants, customers, suppliers, and personnel initiatives (Ju, Chen, Yu, & Wei, 2013).

b)   Outbound open innovation

Outbound open innovation is the outsourcing of ideas and technology to external organizations. The activity generates revenues or other benefits by helping other organisations develop new products or services. Instruments used for outbound open innovation activities incorporate commercialization and transfers of ideas, knowledge, technology, licensing, and R&D (Ju, Chen, Yu, & Wei, 2013).

1.8   Organisation of the Thesis

This thesis is divided into five chapters, which are as follows:

Chapter One: INTRODUCTION

This chapter provides general information about the current business situation. It also includes explanations about the environment that small and medium enterprises around the world are facing, which is unexceptional for a developing country like Malaysia. The researcher also explained the terms as well as illustrated issues before the problem statement was generated in the areas of strategic network partner fit characteristics, open innovation, and the performance of SMEs. This chapter also enfolds research questions, research objectives, and the definitions of significant variables.

Chapter Two: LITERATURE REVIEW

In Chapter 2, the literature on strategic networks, partner fit traits, open innovation, and the success of SMEs is examined in further detail. Additionally, the background of SMEs in Malaysia was discussed because the owners or managers of these enterprises were participants in this research investigation. The concepts that arise from this fragment also cover the research gaps as well as the underpinning theories.

Chapter Three: RESEARCH METHODOLOGY

The chapter worked out the objectives and questions of the research that were discussed in the initial course of this proposal. A research model has been illustrated accordingly through the development of the hypotheses, which were closely directed through the enhancement of the research questions. This chapter also explains the study's methodology and the framework that was planned for the research.

Chapter Four: DATA ANALYSIS AND DISCUSSION

Discussions and data analysis were fully presented in this chapter. Additionally, this section presents examples of the structural model, measuring evaluation, and early information assessment. This section is critical as it requires the researcher to extensively observe and analyse to provide a plausible theoretical outcome.

Chapter Five: CONCLUSION AND RECOMMENDATION

This chapter wraps up all of the research that was done. It covers discussions and conclusions about the research findings according to the intended objectives and enforcement of the underpinning theories. Also highlighted in this section were the contributions towards theoretical and practical implications, research limitations, and ideas for additional research.

CHAPTER 2

LITERATURE REVIEW

2.1   Introduction

The aim of this dissertation is to determine the relationship between strategic network partner fit characteristics, open innovation, and Malaysian SMEs manufacturing and services. The themes in the literature section comprise: strategic network, partner fit characteristics, open innovation, SMEs performance, and underpinning theories related thereto. The first part of the literature review examines the organisation's performance before probing into the measurement approach for SMEs. Achieving superior performance is vital in every business. Hence, the approach to measuring SMEs performance is explained here. The second part of the literature review explores the concept of strategic networks. The literature looks into the delineation of strategic networks and the relevance of today's businesses associated with business companies and organisations for development strategy. The expansion of the analysis included the key issue facing SMEs in finding suitable partners within their own networks. The literature explores and discusses several qualities for the selection of the right partners and forms the term 'strategic network partner fit characteristics", which is covered in Part 3. The fourth part examines the literature on open innovation practiced by SMEs. The section also explains the definition, obstacles, and benefits of open innovation (OI), different approaches proposed by a few authors on the usage of OI at various levels of business project activities, and the research gap. The fifth part defines SMEs in Malaysia. The final part explores the inter-organisational relationships theory (IORT) as a driver to build cooperation or collaboration between SMEs and other business firms and organisations. The resource-based theory (RBT) denotes

capabilities and resources that a company owns and uses as a strategy to gain a competitive advantage.

This study will contribute to the literature on the success of SMEs by investigating the strategic network partner fit characteristics and open innovation in Malaysian SMEs in the manufacturing and service sectors.

2.2   Organisational Performance

Sinclair and Zairi (1996) explain that the essentials of measuring organisational performance are to:

(a)   support and enrich improvement;

(b)   help managers to implement perspectives;

(c)   create a more accurate communication;

(d)   support organizations to distribute their resources in attractive development activities;

(e)   provide effective and efficient operating structure of planning and control or the performance system

(f)   individually stimulate and boost the adoption of a more appropriate organisational behaviour; and

(g)   support the creativities of the management and in the change management

The evaluation of an organization's performance in relation to its goals and objectives is known as organisational performance. It is understood that measuring organisational performance includes gathering actual outputs to compare with anticipated outcomes. There are three primary outcomes that need to be examined: income and expenses, sales, and earnings for the shareholder. (Neely, 2002; Gavrea et al., 2011).

Griffin (2003) and Richter et al. (2017) define organisational performance as the point at which a company is aware of its own survival needs as well as the needs of its stakeholders. Ali (2003) distinguished organisational performance as the result of an organisation after comparing the actual and expected outputs. In addition, (Selden & Sowa, 2004; Mahmudova & Kovacs, 2018) explain that organisational performance demonstrates a company's capacity to meet its set objectives and goals. Mahmudova and Kovacs (2018) implied that in literature there is no single standard perception of the concept of "performance," especially when related to business performance. The definition of the concept of performance might be less defined, specific, and general (Achim, 2010). In considering the definitions of Selden and Sowan (2004) and Mahmudova and Kovacs (2018), the researcher concluded that the definition was general and used by all business sectors of organizations. Continuous performance must be the primary goal of any business firm in any challenging situation. Additionally, businesses may only experience growth and expansion through performance.

In order for companies to know their growth potential, it is crucial for business firms to assess and measure their business development. Companies constantly strive for effective and efficient results. Over the years, researchers have made several studies to find out the elements that affect organisational performance. Organisational performance entails the appropriate selection and measurement of key variables that allow a firm to determine and monitor its competitive position in the market. The performance of any business venture is affected by the strategies that the firm has selected. Mahmudova and Kovacs (2018), Sethibe and Stein (2016), and Chong (2008)

classified financial performance measurement into two categories: financial and non-financial performance measurement.

In order to evaluate the financial features of the organization's performance, researchers commonly use accounting-based measures such as sales growth, profitability, return on sales (ROS), return on assets (ROA), return on equity (ROE), return on investment (ROI), stock market measures, and the price-earnings (P/E) ratio (Likar et al. 2014; Nawaz, Hassan, & Shaukat 2014; Tsao & Lien 2013).

On the other hand, for non-financial aspects of organisational performance that is based on the relationship between innovation and organisational performance, the measurement includes market share, customer satisfaction, productivity, operational efficiency, employment growth, quality, competitiveness, reputation or branding, product attractiveness, and quickness to market (Sethibe & Steyn, 2016).

Even though it is broadly known that organisational performance is crucial for any organisation, yet there have been conflicting arguments about the issues of terminology and concepts used to measure performance (Ford & Schellenberg, 1982). Moreover, as Snow and Hambirck (1980) claimed, a single method to measure performance cannot fully explicate all aspects of the term.

The following sub-section presents a review of SMEs performance measurement and the researcher's justification for using subjective variables in SMEs' performance.

2.2.1 Measuring the Performance of SMEs

The ability to keep the performance measurement system (MS) constantly updated is a challenge for every organisation. Several organisations around the world are still struggling to find the right performance measurement systems. According to Neely (2002), it is important for any firm to make clear its own performance measure to drive the whole implementation process. A predetermined measurement would reflect how an organisation is managed. When a company can efficiently measure and monitor its performance, that is one way to tell if it has achieved high performance through that process. Making the organisation's performance measure clear is vital because they are committed to exposing the company's values to their customers and other stakeholders. performance through that process. Making the organisation's performance measure clear is vital because they are committed to exposing the company's values to their customers and other stakeholders.

The way SMEs access their performance is different from that of large organisations. This is because their smaller size as compared to large companies leads them to have limited liabilities (Taticchi, Balachandran, & Botarelli, 2008). Chong (2008) elaborated on an extensive study made by scholars on how large organisations measure their performance as compared to SMEs. Accordingly, the dissimilarities are due to the complexity of the nature as well as the structure of a business and the degree of the SME owners' willingness to partake in the fact-finding processes. Chong's (2008) findings also revealed that SMEs make use of hybrid financial performance measures to determine their operational activity against the pre-planned objectives and the business phase frame. He emphasised that the time axis represents the length of time required to complete a project.

The term performance is distinguished through six various elements of resources (Xia, Qiu & Zafar, 2007), they include:

(i)   Technological resources

(ii)   Owner, founder or top manager's skill and competency

(iii)   Firm's internal cooperation

(iv)   Firm's external collaborations

(v)   Employee's professional or technical knowledge

(vi)   Employee's skill

Table 2.1 summarize several authors' methods of measuring organisational performance amongst SMEs using subjective sources.

Table 2.1
The Measurement of Organisational Performance amongst SMEs

Author (Year)	Performance Term	Measurement
M. Mohd Rosli and Syamsuriana Sidek (2013) Adopted from: Darroch, (2005); Bakar and Ahmad, (2010).	Firm Performance	(1) returns on sale, returns on asset, profitability, (2) market share (3) sales revenue (4) labour productivity (5) employment.
Ahmad Nasser Ahmad Abuzaid (2014). Adopted from: Benner and Tushman, (2003); Danneels (2002)	Firm Innovation	(1) Radical innovation (2) Incremental innovation
Joon Mo Ahn, Tim Minshall, Letizia Mortara (2015) Adopted subjective indicators happened in other SME studies: Akgun et al., (2007); Miller and Toulouse, (1986) and Rhee et al., (2010).	Firm Performance	(1) Relative sales (2) Relative new product development (or related service), (3) Relative market share
Dennis Kimani (2016)	Organisation Performance	(1) Gaining access to a market in the same industry. (2) Enhanced uptake of SME products by the consumer (3) Increased sales (4) To acquire competitive advantages that enables them to increase profits

Table 2.1 (Continued)

		(5) Reducing costs/obtaining scale economies
		(6) Gaining access to a market in another industry
		(7) Supplement critical skills
		(8) Reducing risks and major development projects
		(9) Developing new technologies
		(10) Meeting government requirements
		(10) Blocking the competition
Kambiez Talebi, Jahangir Yadollahi Farsi, Hamideh Mirias (2017) Adapted from: Arino, A. M. (2003).	SMEs Performance	(1) financial performance (firms achieved desired financial goals). (2) operational performance (the significant influenced on business activities, subsistence and continued collaboration) (3) organisational effectiveness (holds both previous groups and includes the achievement of objectives and aims, spill over result, and satisfaction from collaboration.)
Seyed Mehdi Mousavi Davoudi, Kiarash Fartash, Venera G. Zakirova, Asiya M. Belyalova, Rashad A. Kurbanov, Anna V. Boiarchuk, Zhanna M. Sizova (2017) Adapted from: Yang et al. (2012)	Organisational Performance	(1) Financial Performance (i) The cost objectives of firm were met. (ii) Total installed cost of the firm was under authorized budget. (iii) The budget for each of firm's projects was the same and under as planned (2) Non-Financial Performance (i) All firm's assignments were proceeded as planned and delivered on time. (ii) The Quality Objectives of firm were achieved for each project. (iii) The firm's deliverables complied with the contractual requirements.
Federico Moretti, Daniele Biancardi (2018)	Firm Performance	(1) Economic performance, Based firm's turnover (2) Financial performance, assess by share values at the end of each year; (3) Human capital performance, assess through the number of employees and full-time equivalents reported at the end of each year

Source: Compiled by author

The compilation in Table 2.1, derives from several selections of literature from the past 6 years (2013–2018), with variables that are closely related to this research topic. Agreeing with Daily and Dalton (1992) and Collins and Porras (2000), they indicate that different firms use different strategies for performance.

Rosli and Sidek (2013) surveyed 284 samples of SMEs in the food and beverage, textiles, clothing, and wood-based sub-industries throughout Malaysia. Their research study was to look into the performance of firms when influenced by innovation. Initially, they were using objective performance measures. However, when performance results were not met, they took a multi-dimensional approach, employing both financial and non-financial measurement.

Ahmad Abuzaid (2014) discovered in several previous studies that strategic alliances are often related to innovation. Hence, his focus was to test the firm's innovation performance and see if it was influenced by strategic alliances. Firms' innovation performance comprises incremental and radical innovation. As for the dimensions, Ahmad Abuzaid (2014) justified and used creative ideas, innovative goods, progression flows, and services to boost competitive advantage and cater to users' new needs.

Ahn, Minshall, Tim, and Mortara (2015) studied the SMEs' performance, in particular when stimulated by open innovation. Based on 306 innovation-oriented Korean manufacturing SME, they attempted using multiple subjective rather than single objective variables, namely: (1) relative sales; (2) relative new product development (or related service); and (3) relative market share.

Kimani (2016) undertook a study to determine the effect of strategic collaboration on the firm performance of small and medium enterprises in the Nairobi Central Business District. The size of the sample was 73 SMEs. He used ten elements in the organisational performance comprising financial, non-financial, and technological components.

Talebi, Yadollahi Farsi, and Mirias (2017) studied the effects of strategic alliances on the performance of SMEs in the auto parts manufacturers industry, surveying 400 senior managers. They adapted the performance measure of Arino (2003), who categorised it into three groups: financial performance, operational performance, and organisational effectiveness. Researchers' rationale was that there has never been any agreement or definition about the performance and success of an alliance.

Mousavi Davoudi et al. (2017) conducted research on the organisational performance based on the connection between open innovation and intellectual property rights of 30 new technology-based firms (NTBFs). They adapted questions from Yang et al. (2012)'s project performance measures, which depicted two (2) dimensions and were referred to as organisational performance, that is, financial and non-financial performance.

Moretti and Biancardi (2017) examined the firm's performance based on the influence of the degree of openness. The firm performance dimension was represented by three different indicators, which include: (1) economic performance using a logarithmic form to measure the firm's turnover; (2) financial performance—firms measure the share value at the end of the financial year each year; and (3) human capital

achievement-measured at the end of each year by the reported number of employees and full-time equivalents. Researchers used the objective and comparable indicators to justify that the increasing innovation results may be due to the overall sales results.

The firm's performance is determined and defined by SME owners themselves, based on their required strategy and the techniques used by each of them are not alike. Generally, the method depends on every company's goals. The financial element, for example, the return on investment, is not the only way to measure a firm's performance. A firm may also use the non-financial performance method, of which organisational effectiveness is an example.

Overall, the researcher finds that most companies use the financial and non-financial methods to measure their performance. However, the metrics varies from one firm to another. This is supported by Mahmudova and Kovacs, (2018), Rahim (2016), Rosli and Sidek (2013), Ali (2003), Daily and Dalton, (1992) who claimed that there is no one particular measure to evaluate the progress of small enterprises in particular. Thus, SME may choose various types of performance measure depending on the goal strategies of their company. Accordingly, Daily and Dalton (1992), rationalised that this may be due to managers of small firms, SMEs for instance, who may have different intentions. So, any given performance indicators may provide an unfair view.

According to several authors, it is a complete approach to argue that company success should incorporate both financial and non-financial measurements. Even though SMEs are generally not able to systematically compile their financial data, but the researcher finds that both methods are suitable for measuring SMEs in the manufacturing and

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service industries. As a result, for this study, the SMEs performance measurement is a unidimensional construct based on the indicators used by Rosli and Sidek (2013) in their study, which include revenue growth rate improvement, improved sales, company profit, employment growth, market growth, and customer satisfaction. In this study, SMEs performance is defined as a company's ability to achieve established goals through a combination of financial and non-financial performance metrics.

2.2.2 Justification in using subjective variables in SMEs performance

There are certain studies using objective measures (Rumelt, 1991; Varadajan & Ramanujam, 1990), while others use subjective sources (Covin & Slevin, 1989; Jmenez & Cegarra, 2007). Instead of focusing on a single objective, the researcher tried using several subjective features. First, the use of a single objective variable to assess a firm's success is difficult. There is no doubt that a good objective gauge of financial performance is revenue; however, revenue only reflects a portion of a firm's financial performance. Second, SMEs are typically hesitant to divulge their financial situation (Fiortito and LaForge, 1986). Thirdly, it can be challenging to determine whether their reported numbers are accurate (Covin & Slevin, 1989). Fourthly, a small business's management may not necessarily be growth-oriented if it has minimal net income or operating losses (Cooper, 1979). As a result, this study uses subjective indicators, as have numerous other SME investigations (Akgun, Keskin, Byrne & Aren, 2007; Rhee, Park & Lee, 2010).

Dess and Robinson (1984) conducted research and discovered from various reviews of literature that the majority of evidence-based studies link performance to success (Dess & Robinson, 1984). The success measured by one organisation may differ from

that measured by another; thus, the term "success" is highly subjective. Since it carries various meanings, no single measurement is considered adequate to quantify the different types of organisational success.

The next topic progressively explains the development of the term "strategic network partner fit characteristics." The section begins with the emergence of strategic networks, partner fit characteristics, and strategic network partner fit characteristics.

2.3   Strategic Networks

The change in the business landscape is seen as moving towards the era of partners' collaborative networks rather than competition. The shifting from competition to collaboration scenario is quite similar to the traditional practical "Art of War" by Sun Tzu and later, the "Art of Collaboration" by Zheng He. Sun Tzu quotes "Know your enemies, know yourself" in his famous Art of War (AoW). In contrast, the renowned Admiral Zheng He quoted, "Know your collaborators, know yourself," and this was his principle for the Art of Collaboration (AoC) (Sin Hun, 2012, p. 25). Hum (2012) arguably doubts the art of war; he proclaims aggression and conflict are not ideal to manage any business situation. Hum (2012), on the other hand, claims that the art of collaboration, or working together, will allow a business firm to grow indefinitely. In today's extremely interconnected world, business networks and relationships are much more complicated and complex. Thus, due to global competitiveness, there has been a remarkable growth in the number of firms moving into strategic alliances.

It is crucial to comprehend that the growth of networks of cooperating organisations, connected by various types of partnerships, has evolved into a crucial platform for

strategic development in many industries. There are several reasons why organisations need to collaborate and form alliances with others (Duysters & de Man, 2003). They argued that the change was specifically from an official joint venture to a more short-term connection. Some explanations for the change include:

▪ Partner match

Network versus dyadic fit Since speed is necessary, partners are frequently chosen from existing network members or reputable partners of networks available in the market.

• Delivery

Temporary partners versus a cautious strategy. Under an uncertain situation, swift response, knowledge gained, and timely action are essential and better than cautious planning, choosing, and partnership development.

• Partner Type

Complementarity versus acquaintance. Temporary partners is gradually becoming the method used now across traditional segments, markets, and technologies, compared to internally. Example: Microsoft and Lego work together to build an Internet-based computer game.

• Give focus

Limited, definite tasks versus multitasking. To reduce the difficulties of managing relationships, the scope of collaboration is narrowed and focused on the tasks at hand rather than the relationship.

 • Established commitment

Match objectives against trust. The temporary nature of connections makes the establishment of obligation and belief more complex, and partners depend more on fitting objectives and shared aims.

Many researchers have used different terms to refer to the collaboration of firms in business transactions. In most matters of network collaboration, the word "alliance" is commonly used. The following session describes the differences between "network" and "alliance" by Kovela (2002).

Table 2.2
Network versus Alliance

Composition	Network	Alliance
Definition	Link between 3 or more persons, firms or things	An exclusive partnership
Purpose	Each node or firm has its own individual purpose	Partner businesses share some common goals.
Limitations	Networks are wide-open	Outlined by collaborating companies
Associated with knowledge	Through relationships, resources and information are shared. Information has an impact.	Alliances are created so that each member can benefit from the other. Information is found in partners.
Management imperative	Establish trust with appropriate partners.	Avoid racial learning and foster trust
Management technologies?	None in principle	Unfinished agreements, reliance on a connection

Source: Kovela (2002)

According to Kovela (2002), the terms "networks, alliances and "joint ventures" are quite synonymous with one another when used for communication. His research identified the differences between the three. Assessing his compilation in Table 2.2, focusing only on "networks" and "alliances," An "alliance" often shows a group of similar resource networks, such as knowledge or finances, with the purpose of intensifying the growth of market control through economies of scale. Often, it also refers to linkages between owners of complementary resources who work together to achieve different goals and tasks (Kovela, 2002). On another note, according to Kovela (2002), "network" can be interpreted as a lateral connection for almost any relation

between firms comprising proper engagements, for example, coalitions, supply chains, and joint ventures.

Moving on, the following explanation encloses the importance and several definitions of strategic networks by different authors, as well as the model of networks.

2.3.1 The Strategic Networks: Definition and Purpose

Ibbara (2006) stressed that strategic networks are connections with people beyond a person's authority who will make it possible for one to reach important organisational objectives. According to Thorgren et al. (2010) and Jalali, (2017) the notion behind strategic networks is to make use of the benefits of collaboration with partners. Hitt, Tyler, Hardee, and Park (1995) figured that strategic networks are formed because firms frequently lack the resources to compete successfully in particular markets. As a result, firms' network to mitigate and share risk uncertainty (Van & Zwart, 2009; Sohrabi et al. 2021). Nonetheless, the responsible owners or managers must consider the evaluation and selection of partner mesh when making alliance decisions.

The following Table 2.3 are excerpts of definitions by some different authors.

Table 2.3
Authors Expression of Definitions on Strategic Network(s)

Author(s)/(Year)	Term Used	Definition
Hinterhuber and Levin (1994)	Business Unit Networks	Horizontal, internal, vertical, and diagonal networks are the four fundamental inter- and intra-business unit network types.
Achrol, (1997); Achrol and Kotler, (1999).	Strategic Networks	The actors share a value system that establishes their duties and obligations, and it is defined by reciprocal, close-knit interactions over an extended period of time.
J. Carlos Jarillo (1988)	Strategic Network	It is a tool for comprehending those collaborative ties and their function in the firm's strategy.
Gulati, Nohria and Zaheer (2000)	Strategic Networks	A company's network is made up of all of its horizontal and vertical connections with suppliers, clients, rivals, and other organisations. It offers connections between various fields of industries and countries. It was made up of strong organisational connections. Involving strategic alliances, joint

Table 2.3 (Continued)

		ventures, long-term buyer-supplier partnerships, and a variety of other connections is crucial for businesses entering them.
Ibbara (2006)	Strategic Networks	Strategic network is connection with people beyond a person's authority and who will make it possible for one to reach important organisational objectives.
Möller and Rajala, (2007).	Strategic Networks	Different strategic networks have various creation reasons at their core, but they are always guided by strategic goal.

Source: Compiled by author

Gulati et al. (2000) assert in Table 2.3 that networks include a firm's set of relationships with other organisations such as customers, other businesses with different nature counterparts, suppliers, competitors, institutes of higher learning, governments, or other entities. Unlike Hinterhuber and Levin (1994), Ibbara (2006) expands the descriptions to include internal and lateral links, as well as interactions between local and global countries and industries. Strategic networks are defined by Aldrich and Zimmer (1986); Dubini and Aldrich (1991); and Thorelli (1986) as investments in cooperative connections among firms in order to exchange or share information or resources. The limitless nature of the descriptions conforms to Kovela's (2002) statement that networks are open and borderless.

Despite the fact that all of the descriptions of strategic networks appear to be relevant, the researcher discovered that the one expressed by Gulati et al. (2000) and Hinterhuber and Levin (1994) is the most appropriate and in line with the measurement for the subject of this research. It characterised firms' relationships with network partners in the business, which could be horizontally, vertically, or diagonally across industries and countries.

2.3.2 Model of Network

Cravens (1997) and some other combined works with Achrol (1991) and Webster (1992) to create a network model as shown in Figure 2.1. They argued that because networks varied, they could be classified in a matrix using two crucial variables. The variables are the type of network relationships and the volatility of the environment.

		Environmental volatility	
		Low	High
Type of network relationships	Collaborative	Virtual network	Flexible network
	Transactional	Value-added network	Hollow network

Figure 2.1.
Model of Network by Cravens (1997)

The following paragraphs describe the model of network set forth by Cravens (1997), Achrol (1991) and Webster (1992).

1. **The hollow network**

   It is a business activity based on organisational methods and related to extremely unpredictable environments. The word "hollow" accentuates how important it is for an organisation to attract other organisations deeply in order to fulfil user needs. Organizations that use hollow networks are usually specialists. They coordinate a wide range of networks with suppliers and customers. The hollow organisation offers a cushion against the risks of a constantly changing environment (Achrol, 1991).

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2. **The flexible network**

   This type of network is linked to volatile environments, but it is distinguished by inter-organisational relationships that tend to cooperate over time. The network coordinator manages an internal team that identifies customer needs and establishes sources of supply to satisfy customer requirements. An example is Calyx and Corolla, Inc. (C&C) in the United States, which offers flowers, plants, bouquets, and gifts. The company provides its products for various occasions, including anniversaries, birthdays, business, weddings, housewarmings, and other events. C&C functions as a hub, handling internal packaging design, product design, promotion, and pricing while relying on a network of external partners such as flower growers and courier services to supply and deliver the flowers to the customer.

3. **The value-added network**

   This network is linked to less volatile environments and is primarily based on transactional relationships among network members. For example, the network coordinator may use an international network of suppliers, but still largely focus on internal operations. The members of the value-added network are specialists in carrying out value-added tasks at low cost. Examples of industries using this type of network are clothing manufacture, spectacles, furniture, and some other services.

4. **The virtual network**

   This network is engaged in conditions where the instability of the environment is low. The core organisation searched for cooperative interactions with other organizations, and they called it the "virtual corporation." Organizations tend to achieve adaptability to meet the requirements of fragmented markets

through long-standing partnerships rather than internal investment. Examples of some companies that practise virtual networks include Motorola, Hewlett-Packard, and General Electric. A flexible network and formal strategic alliances are common strategies for collaboration, in addition to market and technology as strategic drivers for firms. The virtual network offers a shield against market uncertainties and access to new technology.

According to Cravens (1997), the network change is significant for two reasons. It reveals, first, how firms could use the strategy of market connections, and second, how firms acquire the way their competitors create market control. Most importantly, an alliance network influences firms' capability to achieve competitive advantage (Greve, Rowley, & Shipilov, 2014). Firms should be alert and take advantage of the network change. The rapid inclination toward cooperation and other means of inter-firm connections in the present year, yet ignoring to plan firms' networks, may lead to a lack of understanding of a firm's behaviour and performance (Craven, 1997).

The selection of alliances to strategize for business accomplishments is a serious aspect of a firm's successful growth (Ahmad Abuzaid, 2014; Supriyadi & Ratna Ekawati, 2014; Išoraitė, 2009). The network built provides advantages to firms in sharing and merging information, abilities, and sources to develop cutting-edge innovation as well as mitigate excessive budgets and perils (Van & Zwart, 2009). Yet, it is undeniable that a strategic network can fail. Research in the past has affirmed that many strategic alliances collapse due to the inappropriate characteristics chosen by partners (Sohrabi et al., 2021; French, 2015; Elmuti & Kathawal, 2001). Ahmad Abuzaid (2014) emphasised the planning stage in particular. Many academics asserted that even

professionals in strategic alliance management might not be sufficient to overcome bad partner selection (Cummings & Holmberg, 2012).

In this dissertation, unlike other researchers who used the term "strategic alliance," this researcher employs the term "strategic network" in order to indicate the inter-organisational relationships that could be horizontal, vertical, or lateral, local and across the globe. Besides that, this study also exemplifies the flexible network model by Craven (1997) as a yardstick for business network practices. Thus, involving SMEs and networks from multiple sub-sectors of industries to participate in this study.

2.4 Partner Fit Characteristics

In terms of usage, the term "partner-fit characteristics" has yet to be explored. There has been no research to date that has linked the terms "aliance characteristics" and "partner fit." It is not the purpose of this investigation to discover the term, but a brief review is provided for the justification of use.

In this research, the term "fit" is emphasised to show that its partner is matched with the way in which two or more things suit each other or work together. How does the partner fit in this case? The word "fit" is occasionally used as a noun referring to a condition or state of being. At other times, fit is also used as a verb, illustrating a process or way of arriving at a condition. For the purpose of this study, it is practically a "noun." After reviewing numerous literatures, Ensign (2001) discovered several other words related to the word fit, such as alignment, co-alignment, match, congruence, consistency, and so on.

An exemplary study is by Thorgren et al. (2010), who used the term "partner fit" without associating "characteristics" but identified two variables: complementary capabilities and organisational compatibilities. This can be argued since "partner fit" means partner match or partner align, in which when the term "characteristics" is not articulated, the word is imperfect. Whereas, Ahmad Abuzaid (2014) expressed the attribute using "strategic alliance partner characteristics" with dimensions of commitment, complementarity, and compatibility. However, by leaving out the word "fit" or "match," we fail to illustrate the level of suitability of partner characteristics. According to Das and Teng (1998), there must be some degree of "fit" between the partners in order to maximise the likelihood of a successful alliance. This research, however, is not to study fitness levels but attempts to examine the types of network partner characteristics that "fit" strategically to influence the organisational performance of SMEs.

Moreover, the term "partner fit characteristics" would be used instead of "partner characteristics or attributes," which identify what captivates the potential partner synergies. A firm may either be facing risk or unsuccessful synergies if partners' characteristics or traits do not match. It creates a situation that does not allow the firm's business operations to run smoothly when there is no suitability between partners. Nielson (2002) indicates that several studies were seen to have made an attempt to identify the criteria for a compatible partner for these conditions.

The following sections provides explanation on strategic network partner fit characteristics and its definition viewed from various relevant literatures as summarised in Table 2.4.

2.5 Strategic Network Partner Fit Characteristics

It is with the intention of this study that the researcher combines the words "strategic network" and "partner fit characteristics" to identify a tactical approach by means of an integration of alliance and network features with partners' characteristics that match to escalate business competencies and performance.

Strategic network partner fit characteristics have become imperatively vital to steer firms toward innovation. The effect of partners' resources and characteristics on organisational performance has become a crucial subject in alliance portfolio research (Osman, Abas, Ngah, & Rahim, 2018). Nevertheless, Greve, Rowley, and Shipilov (2014) discovered many of the managers they interviewed did not understand the importance of alliance networks for the advantage of their firms. For their research conceptual framework, Osman et al. (2018) define strategic network partner fit as a combination of alliance linkage within networks and partnership attributes required for firms to achieve their greatest advantages.

As a result of the discussion in Sections 2.3 and 2.4, the strategic network partner fit characteristic can be defined as planned inter-firm network collaborations with the goal of investing to exchange or share information, technology, market, or any kind of resource (Gulati et al. 2000; Thorelli, 1986), preferably with partners of suitable characteristics (Hitt, Tyler, Hardee, & Park, 1995; Thorgren, Wincent, & Ortqvist, 2010; Theyel, 2013; Types of networks include horizontal, vertical, and diagonal (Gulati et al., 2000; Hinterhuber & Levin, 1994). Partner fit characteristics comprise complementary traits such as compatibility, trust, commitment, capability, interdependence, cultural compatibility, coordination, reputation, cooperation, and

relational skills (Pullen et al., 2010; Pansiri, 2008; Shah & Swaminathan, 2008; and Chen et al., 2009).

Table 2.4 exhibits the summary matrix of journals reviewed in relation to the methods and instruments measurement used for this topic.

Table 2.4

Literature Review Matrix

Author (Year)	Topic/Title	Theory Used	Method/ No. of Sample/ Sampling/ Analysis/Country	Variables Studied Dv=Dependent Variable Iv=Independent Variable Modv=Moderatorvariable Medv=Mediator Variable Cv=Control Variable	Key Findings/Results
Seyed Hossein Jalali, (2017)	How Partner Characteristics Can Affect Performance of Alliances with Different Time Frames?		• Quantitative • 13 different manufacturing companies with a sample of 540 alliances in East European region and have at least one Iranian partner •Simple Random •Descriptive statistics and Inter correlation •East European Region	DV= Export Performance IV = Partner Characteristics • Access to the distribution channel • Financial assets • Institutional knowledge • Intangible assets (non-technological) • International market knowledge • Links with buyers and suppliers • Managerial capability ▪ • Previous alliance experiences • Reputation of the partner • Technological capability • Trust representation CV= Industry, Firm Size and Experience	Findings: Emphasize the differences between varied partner characteristics in short/medium-term and long-term alliances. Results: Showed a framework that addresses certain and specific partner characteristics to improve the export performance of alliances, due to the time frame of strategic alliances
Erica Mazzola, Giovanni Perrone, Dzidziso Samuel Kamuriwo (2015)	Network embeddedness and new product development in the biopharmaceutical industry: The moderating role of open innovation flow		▪Quantitative ▪544 public companies bio-pharmaceutical ▪Descriptive and correlation	ModV=Open Innovation Flow ▪ Inbound ▪ Outbound DV= New Product Developement ▪NewBioProd_d ▪NewBioProd_c IV=Structural Network Embeddedness ▪Central ▪Structural Hole	Findings: Open Innovation and Structural Network Embeddeness impact new product development. Results: The interaction of the two network positions with the open innovation flow has a positive impact on the likelihood to develop new products.
Ahmad Nasser Ahmad Abuzaid (2014)	The Impact of Strategic Alliance Partner		•Quantitative •122 managers and head of divisions from strategic alliances, marketing and	DV= Firm Innovation • Radical Innovation • Incremental Innovation	Findings: The firms that seek innovation through a strategic alliance should select suitable partners with: complementary

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Table 2.4 (Continued)

	Characteristics on Firms' Innovation: Evidence from Jordan		production areas within 13 pharmaceutical companies Jordan •descriptive and ANNOVA •Jordan (developing)	IV= Strategic Alliance Partner Characteristics • Compatibility • Complementarity • Commitment	capabilities, compatible strategic objectives, and strong commitment for the alliance. **Results:** The strategic alliance partner characteristics had significant impact on the Jordanian pharmaceutical companies' innovation
Sara Thorgren, Joakim Wincent and Daniel Örtqvist (2010)	Unleashing synergies in strategic networks of SMEs: The influence of partner fit on corporate entrepreneurship	Inter-Organisational Relationship	•Mixed Method •Firms sample-the wood industry in a rural region of Sweden formed in 1996-1999. Consisted of 41 member firms •Structural Equation Models, longitudinal data •Sweden	MedV= Joint combinatory efforts Respondents estimated the extent to which they and their partners assigned for joint business development projects by combining mutual resources and then used the average number of hours in joint efforts as a measurement. DV=Corporate Entrepreneurship • risk taking • pro-activeness • innovativeness IV= Partner Fit • complementary • compatible resources	Findings: Partner fit requires mediating variables to unleash the potential synergies of partner fit for corporate entrepreneurship (CE). Resource combination as a mode to leverage resources necessary for CE activities. Results: Partner fit is positively associated with joint combinatory efforts among partners in strategic networks and that such efforts have a positive direct effect on CE.
Tser-Yieth Chen, Hsiang-Hsi Liu &Wei-Lan Hsieh (2009)	The Influence of Partner Characteristics and Relationship Capital on the Performance of International Strategic Alliances		•Quantitative •Tourist trade Industry. •1,000 top tourist agencies •LISREL model •Taiwan	MedV=Relationship Capital • mutual trust • information sharing • reciprocal commitment DV=Alliance Performance • goal accomplishment • relational harmony IV=Partner Characteristics • interdependence • cultural compatibility	Findings: Findings showed that mutual trust and information sharing affect alliance performance through the variable of reciprocal commitment. Results: Partner characteristics indirectly influence alliance performance through relationship capital.
Hitoshi Mitsuhashi and Henrich R. Greve (2008)	A Matching Theory of Alliance Formation and Organisational	The Matching Theory	•Semi structure and Quantitative •602 new alliances global liner shipping industry •Snowball Sampling	DV= Organisational Performance - return on assets (ROA) IV= • Market Complementarity	Findings: Alliances by networked firms against isolate firms, exhibit better match quality.

Table 2.4 (Continued)

	Success: Complementarity and Compatibility	•Regression Analysis •Japan	• Resource Compatibility Control Variables= • Firm age • Measures of size	Networks facilitate matching rather than sacrifice it. **Results:** They found that alliances with matched partners improve firm performance and survival chances.
Manir Zaman, Felix Tinoziva Mavondo (2004)	The implications for "strategic fit" between partnership characteristics and relationship management as a source of alliance success	**Literature Review** Conceptual Paper	MedV=Strategic Fit • Organisational, • Operational • Relational DV= Alliance Success • Alliance Performance • Organisational Performance IV=Partnership Characteristics • complementarity • compatibility of resources • capabilities • goals	Researchers intend to proceed this conceptual paper to anempirical study
MB Sarkar, Raj Echambadi, S. Tamer Cavusgil & Preet S. Aulakh (2001)	The influence of complementarity, compatibility, and relational capital on alliance performance	•Quantitative •561 firms of Global Construction Contracting Industry •Systematic Sampling •Partial Least Square • USA	MedV=Relational Capital • Mutual Trust • Reciprocal Commitment • Bilateral Information Exchange DV=Performance • Project Performance • Strategic Performance IV=Interfirm Diversity/Compatibility • Resource Complemetarity • Cultural Compatibility • Operational Compatibility	Findings: Organisational practices for partner selection require to be complemented by relationship management routines to maximize the potential advantages from an alliance. Result: Complementarity in partner resources and cultural compatibility as well as operational standards have dissimilar direct and indirect effects on alliance performance.

Source: Compiled by author

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Table 2.4 represents some journals that are linked to partner characteristics studies showing the cause and effect towards performance.

Jalali (2017) focused on the duration of the relationship while examining the effects of partner characteristics on export performance. The research was conducted in the East European region among firms from developing economies that were involved in short-, medium-, and long-term international strategic alliances. The variables were a uni-dimensional construct of partner characteristics, which include admission to the channel of distribution, recognised knowledge, pecuniary resources, immaterial resources (non-technological), international business market knowledge, linkages with customers and suppliers, managerial skills, previous alliance experiences, partner's reputation, technological skills, and trust. He used a quantitative method for his research, and the results showed that, whether the partnership is short- or long-term, a selection and specific partner traits do contribute to the improvement of alliances' export performance.

Mazolla, Perrone, and Kamuriwo (2015) investigated the dimensions of centrality and structural hole positions on the feasibility of developing new products, as well as the moderating impact of open innovation flow, a measure of net knowledge transfer beyond the firm's boundaries, on the aforementioned connection. Mazolla et al. (2015) examined a sample of 544 public companies' biopharmaceutical firms. This research was explored by researchers in the United Kingdom. Results from the study show that the interaction of the structural embeddedness network with the open innovation flow has a positive impact on the prospect of developing new products.

Ahmad Abuzaid (2014) surveyed 13 pharmaceutical companies in Jordan to assess the influence of alliance partner features on a firm's innovation. A total of 122 managers and department heads from marketing, operations, and strategic relationships were included in the sample. The strategic alliance partner characteristics construct used by Ahmad Abuzaid (2014) was multi-dimensional and consisted of partner complementarity, compatibility, and commitment. The study's findings demonstrated that the qualities of strategic alliance partners had a substantial influence on the innovation of pharmaceutical businesses. The results of his findings show that characteristics affect incremental innovation more than radical innovation.

Thorgren, Wincent, and Rosqvist (2010) stress capability complementarity and high compatibility as independent variables for partners' collaboration features to motivate firms to relate in the inter-organisational relationship. Thorgen et al. studied wood industry firms in a rural region of Sweden. It was a longitudinal study of firms that were formed between 1996 and 1999. Researchers used the term "partner fit" to distinguish the characteristics of an alliance. Thorgren et al. (2010) tried to discover if partner fit affected networking firms' corporate entrepreneurship. The findings indicated a favourable indirect link between business entrepreneurship and partner fit.

Chen, Liu, and Hsieh (2009)'s target of research was the tourist trade industry, and they had a 1,000-person sample of top tourist agencies to determine their concept theory using three construct variables: relationship capital, alliance performance, and partner characteristics. The research was in Taiwan. They used the LISREL model to investigate. The experimental findings demonstrate that through relationship capital,

partner traits indirectly affect alliance performance. The dimensions for partner characteristics were interdependence and cultural compatibility.

Mitsuhashi and Greve (2008) investigated and discovered networking dynamics by applying matching theory to the formation of inter-organisational alliances in Japan. Researchers employed resource compatibility and market complementarity as two crucial factors when forming alliances. Using data from linear shipping as their sample, both claimed that good matches intensify firm performance. The outcome of their research showed that firms with network alliances exhibit better match quality than isolated firms. They suggested that networks support matching, not undermine it. They discovered that partnerships with compatible partners increase a firm's performance and chances of survival.

Zaman and Mavondo (2004) came out with an integrative theoretical model to examine the performance of alliances based on "strategic fit" theory. They discovered that studies have not connected the concept of "alliance characteristics" to each partner's strategic, relational, and operational capacity. They supported Hitt et al. (2000), who suggested that one of the critical factors of success for local and worldwide alliances is partnership qualities. These partner characteristics include resource complementarity, partnership compatibility, and goal congruence.

Sarkar, Echambadi, Cavusgil, and Aulakh (2001), who observed the effect of partner quality traits on alliance performance, their sample size was 561 firms in the global construction contracting industry in the United States of America. They found that it is necessary for firms to have different means of supply and ability profiles to share

likenesses in their social foundation. Sarkar et al. (2001) utilised compatibility of culture, complementarity of resources, and compatibility of operations to construct partner characteristics. Outcomes on samples of partners from the global construction industry demonstrate that resource compatibility, cultural compatibility, and operations compatibility have various direct and indirect influences on partner performance.

Mohr and Spekman (1994), making observations from other scholars' literature, concentrate on coordination, commitment, interdependence, and trust as crucial attributes of alliances. Their scope of study was within the context of vertical partnerships in the computer industry. Through multiple regression, results showed that, excluding interdependency, other primary characteristics were significantly associated with partnership success. Their findings provide insight into how to better manage these relationships to achieve good performance.

Trust is unexceptionally important for an alliance's strategic network. Trust is defined as "the willingness of alliance partners to govern their own behaviour in light of the good of the alliance and to honour their commitments, cited by Weaver and Dickson (1998). According to Mesquita and Lazzarini (2008), strategic partnerships depend on both (i) official governance arrangements and (ii) relational and mutual trust. The researcher of this present research does not quite agree with the perception of some authors that state the "trust" feature appears when strategic alliances have both experienced success (Nagel, 2016). Trust could be developed within networks even before firms established any anticipated activities with their business counterparts that are based on the approach of certain personnel or goodwill trust (Child, 2001). Hence,

repeated connections with network partners will strengthen and increase the level of trust. Trust is a valuable mechanism in any strategic alliance. As a result, trust is assumed to have been built prior to the situation of strategic network partner fit characteristics in this study.

An overview of the summary in Table 2.4 shows that studies were not focused on a specific few but on various criteria. According to Jalali (2017) and Hitt et al. (2000), there has been an inadequate availability of empirical studies that define sets of partner characteristics for specific alliances, thus making it difficult to have a complete assessment of partner characteristics. This gap is supported by Shah and Swaminathan (2008), who added that the relational roles of different partner characteristics, like complementarity, commitment, trust, and financial payoff, within a combined conceptual framework were understudied. However, since 1997, many studies have focused on the dimension of "trust," which is considered an important trait in partner selection (Saxton, 1997; Hitt et al., 2000; Beckman, Haunschild, & Phillips, 2004).

In most research studies, it was found that the two dimensions most frequently used for the measurement of partner characteristics by researchers were complementarity and compatibility (Dhurkari & Nandakumar, 2015; Ahmad Abuzaid, 2014; Thorgren et al., 2010). As accentuated by Casals (2011), these two dimensions are important features to promote business success. Shah and Swaminathan (2008), on another note, evaluated more than 40 studies and complemented that partner commitment is also another important characteristic used in research. All three of these components (complementarity, compatibility, and commitment) have been identified as critical to

the success of a strategic alliance. The strategic network partner fit characteristics which were measured multi- dimensionsionally are explained below:

a)   Resource Complementarity

Complementary resources allow firms to share with their partners non-overlapping parts of their resource sets, which creates a package of resources that are exclusive and tough to imitate (Harrison, Hitt, Hoskisson, & Ireland, 2001; Ahmad Abuzaid, 2014). The arrangement to mishmash capabilities and exclusive resources offers the fundamentals of a firm's strategy, which provides a competitive advantage and subsequently delivers strong profits. This is according to resource-based theory. (Barney & Hesterly, 2012).

b)   Partnership compatibility

According to Ahmad Abuzaid (2014), partnership compatibility can also be described as the suitable partners' organisational culture, congruence of firms' strategic goals, work styles, (Kanter, 1997) management practices, and work procedures. The compatibility between partners was found to be an essential indicator of the success or failure of a strategic network (Shamdasani & Sheth, 1995).

Saxton (1997), in his research, found that, besides partner reputation, the degree of cultural compatibility between alliance partners was positively related to alliance success. In addition, Segil (1998) revealed that 75 percent of the 200 firms involved in alliances felt that alliance failure was largely due to incompatibility of business culture or personality

c)   Commitment

Commitment is defined as the degree to which the partners get involved in the inter-organisational relationship (Anderson and Weitz, 1992). Shamdasani and Sheth (1995) define it as a promise by strategic networks partners to take on some actions that will

level out the achievement of the strategic alliance's goals. In addition, committed partners are more supportive, communicative, and open, and they exhibit a determined willingness to make investments in the upcoming future; commitment is also vital for the success of an alliance (Hagen, 2002).

Due to methodological gap of variables in partner characteristics, the items for this current study were sourced from Ahmad Abuzaid, (2014), Pansiri, (2008) and Jalali, (2017). Both Ahmad Abuzaid (2014) and Pansiri (2008) used multi-dimensional constructs; however, Jalali (2017) used a uni-dimensional construct with which indicators are inclusive. The researcher decided to apply these three (3) dimensions as many studies affirmed their importance for the success of strategic alliances. This type of research, however, is broadly done in foreign countries, and there is no one similar study that has been found to examine SMEs in a developing country like Malaysia.

Thus, the measurement for the construct of strategic network partner fit characteristics was multi-dimensional, comprising complementarity, compatibility, and commitment. Recognizing their significance (Casals, 2011; Shah & Swaminathan, 2008), complementarity, compatibility, and commitment dimensions were pertinent to this dissertation and the Malaysian context. According to various research studies (Jalali, 2017; Ahmad Abuzaid, 2014; Thorgren et al., 2010; Chen et al., 2009; Mitsuhashi & Greve, 2008; Zaman & Mavondo, 2004; Sarkar et al., 2001; Mohr & Spekman, 1994), complementarity and compatibility are the most prevalent metrics employed for partner traits. Partner commitment is another important feature for superior business performance (Shah & Swaminathan, 2008). In addition, these variables

(complementarity, compatibility, and commitment) showed significant values and had a positive impact on the organisation's performance.

According to the literature review, attempts to understand the strategic components of the network have a major influence on the development of organisational network research. Networks have become a popular notion in this modern era. Knowing the importance of network partners with characteristics components of complementarity, compatibility and commitment could increase the growth and performance of SMEs, an investigation particularly within Malaysian context needs to be extended. Thus, it is anticipated that the strategic networks partner fit characteristics has positive relationship with the SMEs performance.

2.6   Open Innovation

Many years ago, huge companies employed in-house R&D as a valuable tactic to compete within their respective industries. These days, however, firms use different processes to overcome barriers in the competitive global market. The process requires firms to stay open so that they can team up, establish links with other organizations, and stay in touch with the latest technological developments. The establishment of ties between one firm seeking innovation and another is recognised as "open innovation."

Chesbrough was the first to introduce the idea of open innovation (OI) in 2003. He defines it as "the use of purposeful inflows and outflows of knowledge to accelerate internal innovation and expand the markets for external uses of innovation" (Chesbrough, Vanhaverbeke & West, 2006, p1). Illustratively, in this study, the researcher would expand the definition by associating two aspects of contacts within

the OI practicing firm: intra-firm and inter-firm. Even though more often open innovation has been related to inter-firm collaboration, it is vital to include open innovation intra-firm where collaborations do occur within the various function or business units in an organisation, reiterating part of the definition "to accelerate internal innovation". As an example, a firm may be able to gather personnel's tacit knowledge to assist in the development of new products or services. Hence, this would inter-relate with the definition by Hinterhuber and Levin (1994), where open innovation activities exist within business unit network.

Open innovation in inter-firm allows a company's innovation process to be visible to its surroundings and allows for secure outside partner collaboration, which can include consumers, universities, customers, suppliers, or even competitors (Guertler, Wiedemann, & Lindemann, 2015). Partnership is a fundamental component in applying OI principles to escalate business synergies, encourage economies, and encourage entrepreneurs (Upstate Business Journal, 2016). It has become so intensely important for both practise and theory.

Chesbrough (2003a) classified five key features of the OI process, covering: (1) establishment of contacts or network, (2) partnership collaboration with external alliances, (3) corporate entrepreneurship development through corporate venturing, start-ups and spin-offs, (4) intellectual property trade and develop markets for technology, and (5). research and development (R&D) superiority gained in the marketplace.

From time to time, there has been an evolution in the concept of OI. (Wynarczyk, 2014; Chesbrough, 2003a) state that it began with the "creative destruction" of a sole entrepreneur or an internal process within firms (closed innovation), before becoming a collaborative process between firms and/or in partnership with knowledge-creating organisations (open innovation). Researchers have distinguished three different types of open innovation: inflow open innovation, outflow open innovation, and coupled mode open innovation.

i. The inbound components of OI comprise purposeful inflows of knowledge that allow firms to search for and get knowledge and technologies from outside of the company's resources like suppliers, customers, competitors, consultants, governments, research organizations, or universities (Cheng & Shiu, 2015; Meissner, 2015).

ii. The outbound OI refers to the utilisation of in-house concepts or technological know-how that stream out of the company to an external market using intellectual property activities in order to obtain pecuniary or non-pecuniary gains (Hung & Chou, 2013; Lichtenthaler, 2009).

iii. Coupled mode OI is a mix of inflow and outflow that pursues both inbound and outbound practises with the goal of maximising the company's value in knowledge and technological abilities. (West & Bogers, 2014; Lichtenthaler, 2008; Van de Vrande et al., 2009; Gassmann & Enkel, 2004).

Dries, Pascucci, Torok, and Toth (2012) signify that OI happens at various junctures of innovation. It can happen at the following phases: (1) idea generation, (2) idea development or realization, and (3) commercialization. Hossain (2015), on the other

hand, disagrees with Dries et al. (2012), who argue that OI is more beneficial during the market movement stage of SMEs than during the early or R&D stage activities. While Guertler, Schneider, and Lindemann (2015) introduce Situative Open Innovation (SOI), a systematic process model based on desired projects, it illustrates the engagement of OI at every stage of the activities. As shown in Figure 2.2, the SOI open innovation model depicts the selection of partners for project collaboration. More importantly, Figure 2.2 exhibits SOI, where the emphasis is on the selection of partner in an OI situation. The choice of OI-Partners is identified in Phase 2 of the model. Inaccuracy in the selection of OI-partners stage, according to Guertler et al. (2015), may jeopardise the overall success of the OI project. Partners' cooperation may face numerous risks and obstacles related to OI, for example, employees' resistance and absence of internal commitment (Chesbrough & Crowther, 2006), brain drain, and/or the Not-Invented-Here-Syndrome (Braun, 2012; Gassmann, Kausch, & Enkel, 2010b).

Figure 2.2
Situative Open Innovation Model by Guertler et al., (2015)

This current research promotes the Guertler et al. (2015) SOI Model since the investigation is not focusing on the different time frames of OI phases in connection with the strategic network partner fit characteristics.

Segers (2013) expresses that the OI approach provides innovative ways for all sizes of firms to collaborate and creates opportunities for smaller enterprises. As arbitrated by Weverbergh (2013), "cross pollination between the corporate and the start-up worlds—whether through corporate accelerators, venturing, or open innovation—is fast becoming a trend." Nonetheless, Solesvik and Gulbrandsen (2013), Li, Eden, and Ireland (2008), and others have argued that the key factors in selecting partners for open innovation have received little attention in research. According to Solesvik and Westhead (2010), choosing a good partner is critical to the success of open innovation.

Small firms tend to face difficulties carrying out innovation because they may be lacking in technology skills, have inadequate expertise in managing innovation (Osman & Abbas, 2016; Rahman & Ramos, 2013), have scant innovation resources, have inadequate innovation knowledge, lack technical expertise, etcetera (Gassman, Enkel, & Chesbrough, 2010). Even though extensive OI research has been done on large firms, the probability of SMEs practising OI is much higher when considering their limited capabilities and assets. Due to SMEs' flexibility, there is a tendency for them to explore external innovation more than big firms by forming alliances or networks to inflate technology (Edwards, Delbridge & Munday, 2005; Rothwell, 1991). Thus, OI is an appealing resource for SMEs to resolve their constraints (Lee, Park, Yoon, & Park, 2010).

Small and medium enterprises are often regarded as a valuable source and a driving force for innovation and new technologies. Constantly, research revealed that only a portion of the total population of SMEs was responsible for innovation, R&D, new product expansion, exports, job employment, as well as wealth creation (Wynarczyk,

2014). OECD (2008), through their research, discovered that 5-20% of SMEs enthusiastically participated in OI endeavours.

Nonaka (1994), Ju, Chen, Yu, and Wei (2013), and Parveen, Senin, and Umar (2016) argued that OI is a requisite for collaboration with various organisations and partners to strengthen SMEs' in-house and outside information and ideas. The inclination of SMEs to open up (Lee et al., 2010; Parida, Westerberg, & Frishammar, 2012; Rahman & Ramos, 2013) has brought about an enormous change in the innovation environment that involves a broader division of labour, changes in working patterns, and improved opportunities to exchange ideas due to a better market landscape that is also encouraging new technologies to maintain global competitiveness (Huizingh, 2013).

The concept of open innovation (OI) implies that companies do not need to establish R&D capability in order to succeed (Chesbrough, 2003). Firms that practise open innovation tend to benefit from speediness to market, reduction of development cost, support for internal R&D capacity, amplified differentiation, expanded growth and income, and many others (Chesbrough, 2003; Garib Singh, Naqsbandi, & Jayasingam, 2014). There are several beneficial reasons that drive OI among large firms and SMEs. This motivation is caused by deviations in the business environment, for instance, quicker product life cycles, the growing interconnectedness of consumers (Tidd & Bessant, 2013), the inclination of workers' mobility, improved venture capital availability, and extensive knowledge accessibility (Garib Singh et al., 2014; Wallin & Krogh, 2010). Some firms initiate OI for revenue and growth, while others may embark for higher firm performance. As a result, there has been little research on the

use of open innovation by SMEs, particularly small and micro enterprises (Hutter, Hautz, Repk, & Matzler, 2013).

It is observed that many literatures tend to focus studies on the direct impact between strategic alliances and business performance (Jalali, 2017; Gulati, Nohria & Zaheer,2000; Chen et al, 2009) but much less on an intervening study, such as the relationship between a strategic networks partner fit, open innovation and organisational performance (Osman et al, 2018). Therefore, establishing a literature disparity.

The following Table 2.5 shows the summary matrix of journals reviewed in relation to Open Innovation Measurement.

Table 2.5

Open Innovation Measurement: Literature Review Matrix

AUTHOR(YEAR)	TOPIC/TITLE (SAMPLING FRAME)	ROLE OF OPEN INNOVATION VARIABLE /FINDINGS	MODERATOR/MEDIATOR MEASUREMENT
Waseem Ul Hameed, Muhammad Farhan Basheer, Jawad Iqbal, Ayesha Anwar and Hafiz Khalil Ahmad (2018)	Determinants of Firm's open innovation performance and the role of R & D department: empirical evidence from Malaysian SME's (Service-related SMEs only)	Independent Variables	**External Knowledge** (1)Bringing of external knowledge to internal system enhance open innovation system. (2)Our organization encourage employees to initiate new external collaboration practices. (3)Collaboration with external partners adds value to our innovation resources. (4) Collaboration with external partners/suppliers or customers adds value to our innovation activities. (5) Collaboration with external partners add value to customer relations. (6) Just extending the external relations with customers and suppliers are beneficial for innovation. **Internal Innovation** (1)Internal ideas are always welcomed in our organization. (2)Communication between partners occurs without problems. (3)Sufficient non-financial resources are available in our organization to achieve desired internal innovation. (4)Carrying out open innovation activities requires an internal R & D activity. (5)Degree of knowledge which is shared between me and my partners is sufficient to promote internal innovation.
Simona Popa, Pedro Soto-Acosta, Isabel Martinez-Conesa (2017)	Antecedents, moderators, and outcomes of innovation climate and open innovation: An empirical study in SMEs (Manufacturing SMEs)	Independent Variable Dependent Variable	**Inbound practices** (1)External partners, such as customers, competitors, research institutes, consultants, suppliers, government, or universities, are directly involved in all our innovation projects

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Table 2.5 (Continued)

			(2)All our innovation projects are highly dependent upon the contribution of external partners, such as customers, competitors, research institutes, consultants, suppliers, government, or universities (3)Our firm often buys R&D related products from external partners (4)Our firm often buys intellectual property, such as patents, copyrights, or trademarks, belonging from external partners to be used in our innovation projects **Outbound practices** (I)Our firm often sells licenses, such as patents, copyrights, or trademarks, to other firms to better benefit from our innovation efforts (2)Our firm often offers royalty agreements to other firms to better benefit from our innovation efforts (3)Our firm strengthens every possible use of our own intellectual properties to better benefit our firm (4)Our firm founds spin-offs to better benefit from our innovation efforts Firm performance (FP) (5)Relative to your main competitors, what is your firm's performance in the last three years in the following areas? Likert 1- much worse than my competitors - 7- much better than my competitors.
Seyed Mehdi Mousavi Davoudi, Kiarash Fartash, Venera G. Zakirova, Asiya M. Belyalova, Rashad A. Kurbanov, Anna V. Boiarchuk, Zhanna M. Sizova (2017)	Testing the Mediating Role of Open Innovation on the Relationship between Intellectual Property Rights and Organisational Performance: A Case of Science and Technology Park (New Technology Based Firms)	Mediator	**Idea Development** (1) The firm has intensive info exchanges with buyers (2) The firm has intensive info exchanges with suppliers (3) Reciprocity in sharing know-how with competitors (4) Do employees screen the external environment for new opportunities? **Commercialization** (1) Presence of high-skilled & English-speaking workers and familiar with IC (2) The firm is dependent on specific knowledge (3) The firm owns specific know-how

Table 2.5 (Continued)

Shazia Parveen, Aslan Amat Senin and Arslan Umar (2015)	Organization Culture and Open Innovation: A Quadruple Helix Open Innovation Model Approach (Telecom Industry)	Moderator (Commitment Towards Open Innovation)	Measurement not provided.
Pei-Hung Ju, Deng-Neng Chen, Yu-Chun Yu, and Hsiao-Lan Wei (2013)	Relationships among Open Innovation Processes, Entrepreneurial Orientation, and Organisational Performance of SMEs: The Moderating Role of Technological Turbulence (SMEs: Manufacturing and service sectors)	Independent Variable Dependent Variable	**Outside-in Process** (1) Your company sources external R&D initiatives from other organizations (e.g., ideas, knowledge, personnel, and technologies). (X) (2) Your company integrates customers' R&D initiatives (e.g., ideas and knowledge) (3) Your company integrates suppliers' R&D initiatives (e.g., ideas, knowledge, personnel, and technologies). (4) Your company integrates non-profit organizations' R&D initiatives (universities, government agencies, and other institutions). (5) Your company licenses-in external sources of R&D initiatives (e.g., patents, intellectual property, and technologies) **Inside-out Process** (1) Your company commercializes internally developed R&D initiatives (e.g., knowledge and technologies). (X) (2) Your company transfers internally developed R&D initiatives (e.g., knowledge, personnel, and technologies). (3) Your company licenses-out internally developed R&D initiatives (e.g., patents, IP, and technologies). (4) Your company sells internally developed R&D initiatives (e.g., patents, IP, and technologies). (5) Your company starts up new ventures drawing on internally developed R&D initiatives.

Table 2.5 (Continued)

Ting-Peng Liang, Deng-Neng Chen, Loo Geok Pee (2013)	The Impacts of Open Innovations on Organisational performance: A Perspective Based on Information Technology and Knowledge Ecology. (IT companies in Taiwan and Japan)	Independent Variable	**Inbound Open Innovation** (1) Due to the globalization, it is easy to access international innovative resource in your company (2) The external innovative resource is attached importance in your company (3) It is aggressive in your company to acquire the external innovative resource (4) It is aggressive in your company to acquire new advanced machineries/equipment to improve the quality of products/service significantly. (5) It is aggressive in your company to purchase or license patents, inventions, and any other type of knowledge from other organizations. **Outbound Open Innovation** (1) Our company would provide innovation suggestions to other collaborative organizations. (2) Our company would cooperate with other organizations to develop new products or service. (3) Our company would cooperate with other suppliers to develop new products or service. (4) Our company would cooperate with other research institutes to develop new products or service. (5) Our company would cooperate with other universities to develop new products or service. (6) Our company would cooperate with customers or consumers to develop new products or service.

The following are excerpts from journals on open innovation and the measurements that were used by several authors, as shown in Table 2.5.

Hameed, Basheer, Iqbal, Anwar, and Ahmad (2018), in their study, sought to identify the critical factors that influence how well Malaysian SMEs in the services sector perform in terms of open innovation. The OI construct represents the independent variable of their theoretical background. The measurement of the OI dimension variables focused on both external and internal innovation. Their research method was based on a quantitative research approach as well as a cross-sectional research design. Respondents in their study were managerial staff of service-related SMEs in Malaysia.

Popa, Acosta, and Conesa (2017) use an integrative research model to assess the impact of organisational antecedent variables on the innovation climate toward OI. Secondly, to investigate the impact of OI on SMEs' accomplishments. Finally, environmental dynamisms and environmental competitiveness were built alongside the model as moderating variables in the relationships between OI and innovation climate. As a result, in their study, OI was conceptualised as both an independent variable and a dependent variable. The hypotheses developed related to OI roles were: (1) the innovation climate has a favourable effect on OI; and (2) OI practises have a convincing effect on a company's performance. In measuring OI, Popa et al. (2017) adapted the instrument measure from Cheng and Shiu (2015) for the purpose of constructing inbound and outbound variables. Authors used covariance-based structural equation modelling (SEM) to analyse integrated relationships in SME samples with at least 20 employees from the manufacturing sector.

The goal of Davoudi et al.'s (2018) study was to investigate the relationship between 30 New Technology Based Firms' (NTBFs) organisational performance, OI, and intellectual property rights. In this research, researchers were testing OI's role as a mediator. For this research, two dimensions of OI were used based on the gauge established by Dries et al. (2013), comprising idea development and commercialization. The research process employed for this study was descriptive-correlation, and the analysis method utilised Structural Equation Modelling. Respondents to this study were among NTBF owners and managers.

Parveen, Amat Senin, and Umar (2015) investigated the linear regression of organisational culture, the open innovation model, and commitment towards OI. The variable "commitment" toward OI was set as the moderator in this framework. However, there was no description of the measurement instrument by the authors. As argued by Hossain (2015), open innovation can be used as a moderator or mediator variable. They used a quantitative approach to analyse correlation, multiple regression, and moderation with a sample size of 500 employees from the telecommunications sector in Pakistan.

Ju, Chen, Yu, and Wei (2013) objective were to discover the relationships between entrepreneurial orientation, OI, and SMEs' performances, with technological turbulence moderating these relationships. In the integration of the conceptual framework and hypotheses, OI represents the independent and dependent variables. Researchers adapt measurements from past studies to fit their background studies. The instrument for measurement was based on Gassmann and Enkel, (2004); Inauen and Schenker-Wicki, (2011; 2012) capturing three dimensions of OI: inbound, outbound,

and coupled. The study used a quantitative approach with a sample frame consisting of CEOs of Taiwan SMEs from both the manufacturing and service sectors.

Liang, Chen, and Pee (2013) sought to ascertain whether the acceptance of OI will affect organisational performance and how various knowledge administration techniques and IT abilities may influence OI application. Despite the theoretical diagram that exposes OI as a mediator, the researchers did not develop hypotheses to examine the role of OI as a mediator. Much emphasis was placed on the variables' relationships. Gassmann and Enkel (2004) and Herstad et al. (2008) used OI measurement to focus on OI inflow and outflow. Partial Least Square tool was used to examine and compare data from the sample frame of companies in Taiwan and Japan.

The measurement developed by Ju, Chen, Yu, and Wei (2013) was adapted for this dissertation. The rationale is due to the fact that the items constructed were across the spectrum, covering various junctures of innovation: the idea generation phase, the idea realisation phase, and the commercialization phase (Dries, Pascucci, Torok, & Toth, 2013), as well as the five essential points of the OI process featured by Chesbrough (2003a). The instrument that Ju et al. (2013) used was characterised to measure both sample frames for manufacturing and services—other related sectors—which were similar to this dissertation. On the contrary, it was observed that measuring instruments used by other researchers were tailored to the precise sample frame or specific industry under their study. As shown in Table 2.5, Hameed et al. (2018) focused on service-related firms, Popa et al. (2017) on manufacturing SMEs only, Davoudi et al. (2017) on new technology-based firms, and Liang et al. (2015) on information technology

firms. The OI construct would be based on multiple dimensions of internal and externally bound open innovation.

2.6.1 Open Innovation practices of SMEs in Malaysia

The current scenario reflects that Malaysian SMEs have struggled with low OI performance. The SMEs are still grappling to attain success in the adoption of OI. Failure to implement OI practises will hamper the overall performance and competitiveness of SMEs within the global market (Hameed et al. 2018).

According to research conducted by the Ministry of Science, Technology, and Innovation (MOSTI), which was duly reported in the Sixth National Survey of Innovation for the years 2009–2011, many new products were developed. The incredible thing is that these new products were created by those who practise closed innovation rather than open innovation. About 82% of new products and 78% of significantly improved products are derived from manufacturing. While 80% of new services and a significant improvement of 83% came from the close innovation service sector, Contrary to closed innovation, overall, less than 5% improvement occurred in both the manufacturing and service sectors that practised open innovation. The reported figure can be referred to in Table 2.6.

Table 2.6

Developer of New Products or Significantly Improved Products Across Sectors

DEVELOPERS	MANUFACTURING				SERVICES			
	NEW PRODUCT	(%)	SIGNIFICANTLY IMPROVED	(%)	NEW PRODUCT	(%)	SIGNIFICANTLY IMPROVED	(%)
CLOSED INNOVATION	7,632	82	4,331	78	746	80	848	83
OPEN INNOVATION	1,698	18	1,233	22	188	20	174	17
TOTAL	9,330	100	5,564	100	934	100	1,022	100

Source: National Survey of Innovation 2012, Malaysian Science and Technology Information Centre (MASTIC) MOSTI

The latest global innovation index 2019 indicates Malaysia has remained at 35th in the rank of business innovation since 2018. According to Kaufmann and Tödtling (2002), Malaysian SMEs have collaboration difficulties with technical institutes as well losing attention on R&D which inhibited their numerous innovation movements.

According to Yousaf and Majid (2016), inter-firm networks appeared to be an appealing idea to improve SMEs performance because these networks provide access to superior resources, capabilities, and chances. However, there are only a reasonable number of works of literature covering the field of organisational accomplishment and networks (Madison et al., 2014; Papke-Shield et al., 2001; Lumpkin & Dess, 2001). It is also determined that the examination of these theories in the situation of emerging countries is still understudied and requires investigation (Jalali, 2017; Yousaf & Majid, 2016; Zeng, Xie, & Tam, 2010), for instance, in Malaysia.

The selection of appropriate OI partners is necessary for the success of OI (Hossain, 2015; Huizingh, 2011). Several researchers hypothesized and revealed that OI strategies improve innovation performance (Cheng & Huizingh, 2014; Frishammar,

Lichtenthaler, & Rundquist, 2012; Leiponen, 2012). Zeng (2010) analysed inter-firm cooperation such as that between government agencies, intermediary institutions, and research organizations among the construct variables to examine SMEs innovation performance. Ju et al. (2013) investigated the relationship between open innovation (outside-in, inside-out, and coupled), entrepreneurial orientation (EO), and SME organisational performance in Taiwan. Yulianto (2021) examined the causal relationship amongst variables involving inbound and outbound open innovation, product innovation, marketing innovation, firm performance, and environmental turbulence as moderating variables, using SME owners or managers in Malang City, Indonesia, as a sample frame. It is discovered that in most research cases the linkages between open innovation and firm performance were positive and had a significant effect.

Unlike Ju et al. (2013), other researchers concentrated on technology enterprises. As a result, this study would add to the existing literature on SMEs in manufacturing and services across industries. The researcher believes there is an urge for further study into the relationship between strategic network partner fit characteristics, open innovation, and the performance of SMEs from the perspective of a Malaysian scenario.

The following section and its sub-sections cover the review of literature on the definition of SMEs, the classification of sectors, and the establishment of SMEs by states in Malaysia.

2.7   Small and Medium Enterprises in Malaysia

Despite the rapid changes in a highly competitive global market, small and medium-sized enterprises (SMEs) are still recognised as having a significant impact on the economies of many countries. SMEs are recognised as the drive mechanism of economic growth for their capability to innovate new merchandise and operation processes (Bruque & Moyano, 2007; Zeng, Xie & Tam, 2010). Another factor is that SMEs contribute to national income and hold an extremely large percentage as benefactors in countries all over the world (Rahim et al., 2014). Malaysia had 98.5% of SMEs in 2017 (SME Annual Report, 2017/18); just to name a few, the United States had 99% (TradeUp, 2015); and as reported by the Small and Medium Enterprise Agency (2014), Japan had 99.7% of SMEs.

SMEs are the primary source of employment, accounting for 70% of all jobs created. Besides that, SMEs are also key contributors toward value creation, which on average spawns between 50% and 60% of value added (OECD, 2016b). In economically developing nations, SMEs create 45% of total employment and contribute up to 33% of GDP (OECD, 2017). In addition, the SMEs Annual Report 2017–18 states that all ASEAN country members' establishment of SMEs ranged from 88.8–99.9% and the creation of employment opportunities ranged from 51.7–97.2%.

The performance of SMEs in Malaysia continues to remain very promising, even though they are facing a challenging business landscape. SMEs in Malaysia contributed around 37.1% of the national GDP in 2017 (SMEs Annual Report, 2017–18). a mark-up of 0.5% from 36.6% in 2016 (SMEs Annual Report, 2016). Moreover,

SMEs generated 66% of all employment in 2017, an increase of 0.70% from 65.3% in 2016.

Malaysia's SME GDP increased by 2.0%, from 5.2% in 2016 to 7.2% in 2017 (Figure 2.3). SMEs' expansion surpassed the common GDP growth of the country at 5.9%, ascertaining the prominence of SMEs in the nation's economy (SMEs Annual Report, 2017).
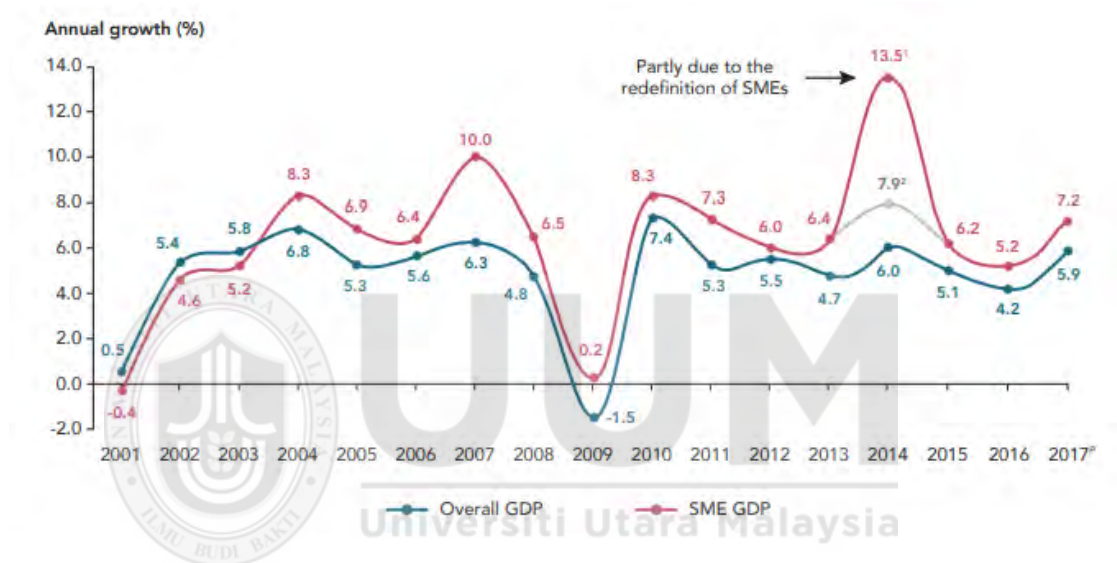
Figure 2.3
SME GDP and Overall GDP Growth; SME Corp Report, 2017/18

Because SMEs continue to play an important role, Malaysian authorities prioritise SMEs and entrepreneurship development (SME Insights, 2019/20). In the latest 2019 budget announcement, several measures were introduced to facilitate and develop the growth of SMEs.

2.7.1   Malaysian Small and Medium Enterprises Definition

The definition of an SME was officially updated in 2014 to provide a wider control for strengthening the objectives of the SME community. The revision of SMEs through The Guiding Principle is broad, precise, and includes all sectors of the economy,

namely construction, agriculture, and mining. The definition of an SME was first revised in 2013 by taking into consideration the price of inflation since 2005 and other factors involving forthcoming innovation, the formation of jobs, the main sectors that propel growth, structural change, and business trend change. It was after the 14th National SME Development Council (NSDC) assembly in July 2013 that the new SME definition was legally approved. (SME Corp., 2014). The classification was updated and depicted in Table 2.7 that follows:

Table 2.7
Definition of Micro, Small and Medium Enterprises: Manufacturing and Services

CATEGORY	MICRO	SMALL	MEDIUM
Manufacturing	Sales Turnover: < RM300000	Sales Turnover: RM300,000<RM15 million	Sales Turnover: RM15million<RM50 million
	Employees: < 5	Employees: 5< 75	Employees: 75 < 200
Services and Other Sectors	Sales Turnover: < RM300000	Sales Turnover: RM300,000<RM3 million	Sales Turnover: RM3million<RM15 million
	Employees: < 5	Employees: 5< 30	Employees: 30 < 75

Source: Official Website SMECorp Malaysia (2022)

A company is recognised as an SME if its features meet either one of these criteria: i) number of permanent employees or ii) amount of sales turnover, whichever is lower. However, if a company's income fell in the category of small but the number of employees was under medium, then the business would be classified as a small SME (SME Corp., 2014).

2.7.2 Classification of SMEs by Sectors, Size and States

Having gone through the review process in 2013, the two main sectors of economy, manufacturing and services and other sectors were further improved (SME Corp,

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2014). The following Table 2.8, portrays categories of sectors as well as their descriptions.

Table 2.8
The Classification on Small and Medium Enterprise by Sectors

Category	Description
Manufacturing	The process of turning chemical, physical materials or components into new product items
Services	Services of all kinds, including retail commerce, commercial, professional, and ICT services, lodging and dining, entertainment, private healthcare and education, financial intermediation, and manufacturing-related services like R&D, logistics, warehouse, engineering, etc.
Other Sectors	The three main economic activities contributing to the nation are: (i) construction, infrastructure, residential and non-residential and special trade; (ii) primary agriculture, which includes cash crops (vegetables, fruits, etc) and perennial crops (including rubber, cocoa, oil palm, and pepper; Livestock, forestry and logging, marine fishing, aquaculture, (iii) mining and quarrying, and other industries.

Source: SMECorp (2014)

The service sector is where Malaysia's SMEs tend to gravitate the most. The service sector accounts for (n= 809,126, 89.2%) of all SMEs, followed by manufacturing (n=47,698, 5.3%) and the remaining others (n=50,241, 5.5%). In terms of classification, a large number of SMEs (n = 693,670) are classified as microbusinesses, followed by small businesses (n = 192,783) and medium businesses (n = 20,612). The breakdown details are presented in Table 2.9.

Table 2.9

Number of SMEs Establishments by Sectors and Size

Sector	No. of SME Establishments				% Share of SMEs
	Micro	Small	Medium	Total SMEs	
Mining & Quarrying	217	458	190	865	0.1
Agriculture	4,863	4,143	1,212	10,218	1.1
Construction	17,321	17,008	4,829	39,158	4.3
Manufacturing	22,083	23,096	2,519	47,698	5.3
Services	649,186	148,078	11,862	809,126	89.2
Number of established SMEs	693, 670	192,783	20,612	907,065	100

Source: Profile of Small and Medium Enterprises 2017/2018, Department of Statistics, Malaysia

An excerpt from the SME yearly report for 2017–18 shows established SMEs spread across Malaysia's states (Table 2.10). SMEs were found highly populated in the centre of the country, namely Selangor (n = 179,271, 19.8%) and Wilayah Persekutuan Kuala Lumpur (n = 133,703, 14.7%). Subsequently, Johor (n = 98,190, 10.8%), then Perak (n = 75,140, 9.3%), were followed by Malaysia Borneo: Sarawak (n = 61,036, 6.7%), Sabah (n = 55,702, 6.2%), and Pulau Pinang (n = 66,921, 7.4%). The aforementioned states acquired a large number of SMEs. The possibility could be because of the large size of the states or because they are highly populated. Other states with fewer than 50,000 established SMEs include Kelantan (n = 46,618; 5.1%), Kedah (n = 48,894; 5.4%), Pahang (n = 37,573; 4.1%), Negeri Sembilan (n = 32,721; 3.6%), Melaka (n = 31,361; 3.5%), Terengganu (n = 29,324; 3.2%), Perlis (n = 6,808; 0.8%), the Labuan Federal Territories (n = 2,567; 0.3%), and Putrajaya (n = 1,236; 0.1%).

Table 2.10
Number of SMEs Formation by State

STATE	TOTAL SMEs	%
Wilayah Persekutuan Putrajaya	1,236	0.1
Wilayah Persekutuan Labuan	2,567	0.3
Perlis	6,808	0.8
Terengganu	29,324	3.2
Melaka	31,361	3.5
Negeri Sembilan	32,721	3.6
Pahang	37,573	4.1
Kelantan	46,618	5.1
Kedah	48,894	5.4
Sabah	55,702	6.2
Sarawak	61,036	6.7
Pulau Pinang	66,921	7.4
Perak	75,140	8.3
Johor	98,190	10.8
Wilayah Persekutuan Kuala Lumpur	133,703	14.7
Selangor	179,271	19.8
Number of SMEs	**907,065**	**100.0**

Source: Profile of Small and Medium Enterprises (2016), Department of Statistics, Malaysia

This research will be focusing on multiple sub-sectors from the category of small and medium-sized enterprises as the definition described in Table 2.7.

2.8 Underpinning Theory

As explained earlier in Chapter 1, this research is underpinned by inter-organisational relationships theory (IORT) and resource-based theory (RBT). IORT supports the

connections between SMEs and other firms, while RBT explains the capabilities and resources that firms possess and use as a strategy to gain a competitive advantage.

The following sub-section provides an overview of inter-organisational relationship theory and resource-based theory in the context of SMEs are cast off to underpin this research study.

2.8.1 Inter-Organisational Relationships Theory

The research framework of this study is underpinned by Inter-Organisational Relationships Theory (IORT). Inter-organisational theory is regarded as the study of relationships between and among organisations (Cropper, Ebers, Huxham, & Smith Ring, 2009). The fundamental subjects discussed in many articles on IORT are how it helps firms design value by merging resources, sharing knowledge, increasing speed to market, and gaining entry to global markets (Doz & Hamel, 1998).

Organizations can be for-profit, public, or non-profit, and relationships can be dyadic (consisting of two organisations), multiple (including extensive networks of many organisations), or neither (Cropper et al., 2009). Strategic alliances, inter-company networks, network alliances, diverse market transactions, etc. are common IORT words that have been used to explore and put into practise finding new sources of knowledge and innovation (Lorange & Roos, 1992). Inter-Organisational Relationships Theory reflects the nature and pattern of relationships, as well as their basis, origin, and consequences. Sydow, Schüssler, and Müller-Seitz (2015) extended that, besides large companies, public utilities, universities, small business ventures,

and other types of research organizations, IORTs are also established between non-governmental organisations and governmental agencies.

Cropper et al. (2009) state that terms are interchangeably and inarticulately used to explain various types of inter-organisational bodies. This claim is supported by Clegg, Chandler, Binder, and Edwards (2012). The following excerpt in Table 2.11 is from a study done by Cropper et al. (2009) showing several phrases used in IORT.

Table 2.11
Commonly used language in inter-organisational relations

Names for inter-organizational entities			
an alliance	an association	a cluster	a coalition
a collaboration	a consortium	a constellation	a cooperation
a federation	a joint venture	a network	a one stop shop
a partnership	a relationship	a strategic alliance	a zone
Descriptors for inter-organizational entities			
collaborative	cooperative…	coordinated…	interlocking
inter-organisational…	inter-professional…	joined-up…	joint…
multi-agency…	multi-party…	multi-organisational…	multiplex…
trans-organisational…	virtual…		
Names for inter-organisational acts			
bridging	collaboration	contracting	cooperation
franchising	networking	outsourcing	
working together			

Source: Cropper *et al*., (2009)

Palmatier, Dant, and Greval (2007) enlightened four theoretical views in an attempt to understand the components of successful inter-organisational relationship performance. They include commitment and trust, dependence, transaction cost economics, and relational norms. The outcomes show that commitment, trust, and relationship are parallel and equally important as key drivers of exchange performance in IORT.

There are two kinds of relationships involved in IORT: interactive and non-interactive (Cropper et al., 2009). The interactive relationships include the exchange of information or resources. The non-interactive relationship is when organisations share particular attributes such as status, identity, strategic positioning, cognitive structures, or technology. Both tend to have similar motivating behaviours. A series of studies has focused on partner attributes as descriptions of alliance behaviour and achievement (Abuzaid, 2014; Thorgren et al., 2010; Mitsuhashi, 2009; Harbison & Pekar, 1998; Dickson & Weaver, 1997). According to Barringer and Harrison (2000), none of the theories completed the formation of IORT. Each concept is insufficient to comprehend the complexities of establishing inter-organisational relationships. However, combining the theories provides very useful meaning for accepting the development of IORTs.

2.8.2 Inter-organisational Relationships involving SMEs

It is well known that the role of SMEs remains significant in supporting the economies of many nations across the globe. Despite their numerous characteristics, such as being highly flexible, engaging in informal interaction, and frequently having a horizontal organisational structure (Ngah & Ibrahim, 2009), SMEs face certain constraints in their ability to go international, be innovative, and compete in an increasingly competitive environment. Due to these shortcomings, SMEs might partner with other businesses to supplement their limited resources and create inter-organisational linkages (Partanen, Chetty, & Rajala, 2014). Through the relationship, it helps SMEs create value by complementing resources and capabilities, sharing knowledge, accelerating speed to market, and acquiring access to international markets (Doz & Hamel, 1998).

Through the discussions and arguments, this study also advances the understanding of IORT in relation to network strategy, particularly where SMEs matching partners for resource collaboration is rarely looked into. According to Agostini and Nosella (2017), there hasn't been a thorough assessment of the literature on SME inter-organisational relationships (IORs) yet. A literature review on SME IORs is necessary because of the practical significance of the topic, which is illustrated by the rising trend in IOR creation. They emphasised that the IORs of SMEs frequently differ from those created by large enterprises in several ways. Such SMEs have different abilities to insource external knowledge compared with large companies, can allocate fewer resources for building and utilising relationships, and are often short on the capabilities required to establish and manage their IOR. Finally, SME entrepreneurs may not possess all the required network-related expertise and skills. Colombo, Laursen, Magnusson, and Rossi-Lamastra (2013) also advocated that the networking patterns of SMEs and larger organisations differ, making it impossible to simply generate studies of larger firms for the SME area.

The resource-based theory then becomes important if it involves the matching of production assets or resources (Barney, 1991), as it expresses how firms can create more value when their inadequate assets are combined with the assets of other firms. Mitsuhashi and Greve (2009) argue that firms have resources to choose from. Furthermore, emphasise the importance of resource matching between alliances. Therefore, Resource-based theory is also vital to supporting the theoretical framework of this research.

2.8.3   Resource Based Theory

Resource-based theory (RBT) can be seen as an "inside-out" process of strategy formulation and determines the resources and capability the firm possess. (Grant, 1991). The following are definitions of resources and capabilities:

a) Resources are inputs for the production process such as capital equipment, skills of employees, patent, brand and etc. Fundamental categories include physical human, financial, technological, reputational and organisational.

b) Capabilities or capacity for a team of resources to perform some tasks or activity. They contribute towards the main source of competitive advantage.

Resource-based theory advocates that resources that are valuable, uncommon, impossible to imitate, and non-substitutable best position a firm for long-term success (Wach, 2020). These strategic resources can be responsible for laying the foundation for the development of firm capabilities that can lead to superior performance over time. Capabilities are needed to bundle, manage, and otherwise exploit resources in a manner that provides value to customers and creates advantages over competitors.

Resource-based theory has been an insightful work of Barney's since 1991 and has gone through stages of evolution from nascent growth to maturity (Barney, Ketchen, & Wright, 2011). It is now a well-known and powerful theory in the field of strategic management, with the goal of understanding organisations (Corte, D'Andrea, & Del Gaudio, 2017) through the description, explanation, and prediction of firm interactions (Barney et al., 2011). Barney and Hesterly (2012), in their literature, further describe RBT as a concept of strategic management supporting a firm's competitiveness that relies on the resources it has at its disposal.

Many resource-based theorists believe firm attainment is influenced by external and internal reasons (Dierickx & Cool, 1989; Prahalad & Hamel, 1990). The theory promotes that every firm has different resources and capabilities, which are essential for the firm's strategy as well as the foundations of the firm's competitive advantage (Utami & Alamanosm, 2022; Ringim, Razalli & Hasnan, 2012; Barney, 1991; Grant, 1991). In other words, it is important that the capabilities of the firm be rare and that its resources are neither substitutable nor easily imitated by other firms (Amaral & Parker, 2008). Firms differ in their resource situations, and that resource heterogeneity is a foundation of performance differences across firms (Barney, 1991).

Resources can be categorised as tangible or intangible (Barney and Hesterly, 2012). Barney et al. (2011) describes how intangible resources, when combined with tangible resources, generate goods and services and massive business values for a firm. Tangible resources are physical forms and include land, labour, machines, equipment plants, sharing networks, nearness to location for inputs and markets, IT infrastructure as well as computers, transportation, and raw materials (Barney & Hesterly, 2012). Intangible resources or non-physical resources (Barney et al. 2011) include company's goodwill, intellectual property, strategy, corporate image, inter- firm's relationships, experience, skills and expertise of people in the organisation (Arnold, Fang & Palmatier, 2011). It also covers the enterprise over time, resulting in exceptional cost-effectiveness.

2.8.4 Resource-Based Theory involving SMEs

Small and medium enterprises (SMEs) differ from large corporations. The dissimilarities are predominantly related to traits that recognise SMEs as being

reactive, owning limited resources, using informal approaches, having a fire-fighting attitude, being flexible in structures (Hudson, Smart, & Bourne, 2001; Qian & Li, 2003), and lacking an innovation culture in both planned and structured behaviour (Terziovski, 2010). On the contrary, they are identical when using factors such as innovation strategy and formal structure to impel their performance (Terziovski, 2010). Runyan, Huddleston, and Swinney (2007) and Barney (1991) advocate that the RBT of firms has focused on large companies, but that insufficient studies exist on the RBT application for small firms.

Research-based theory exposes a strong heritage of industrial organisation (IO) by incorporating five (5) theories that have been important in the historical evolution of IO. The five theories include the neoclassical theory of the perfect competition model, the Schumpeterian and Chicago responses, transaction cost theory, and Bain-type industrial organisation (Corner, 1991). Corner (1991) also examined the differences and similarities of RBT and IO and found that RBT integrates as well as eliminates at least one of the major components of each of the five (5) theories. It was debated whether RBT encompasses a new theory of the firm when compared to the other five theories. In other words, Corner (1991) elucidated that RBT covers the theory of the firm (Murphy, 2020) as follows: (i) a firm exists and makes decisions to maximise profits (a microeconomic concept); (ii) impacts decision-making about how to allocate resources, how to produce things, how much to charge, and how much to produce overall; and (iii) distinguishes between long-term and short-term goals, such as sustainability and profit maximisation, respectively.

RBT can be implemented in both large and small businesses. The profits of small firms do not follow those of large firms. According to the dualistic theory, small businesses serve a distinct economic purpose and do not compete directly with large businesses (Audretsch, Prince, & Thurik (1998)). According to Audretsch et al. (1998), the level of seller attentiveness, the presence of small businesses, growth, the industry's export share, size utilization, and competing imports all have a similar effect on the profit margins of large and small businesses.

SMEs possess fewer resources to survive in an antagonistic environment than their larger competitors. The literature on how SMEs should react to these concerns is scarce. Instead, the literature emphasises major industrial companies (Zahra, 1993). The resource-based theory contends that a firm's distinct set of resources enables it to produce competitive advantages (Utami & Alamanosm, 2022; Barney, 1991; Peteraf, 1993). Identification of these resources is crucial for SMEs to survive, as the RBT of the firm places a focus on the distinct collection of resources that each firm has (Barney, 1991). The RBT of the company offers SMEs' owners a framework to plan their strategies based on the assets that will serve as the basis for a long-term competitive advantage (Runyan et al., 2007). However, little has been done to identify how the resources that SMEs possess or make use of to obtain competitive edge. Thus, the aim of this research is to find out how SMEs are utilising resources that meet valuable, rare, inimitable, and non-substitutable (VRIN) criteria in an alternative manner; through strategic network partners with matched characteristics with openness practiced would be able to gain a competitive advantage and subsequently increase performance.

The performance of SMEs is important for their growth and survival within an industry. The initiative to achieve higher performance triggers SMEs to develop formal and informal relationships with other firms—that is, they prompt negotiation and collaboration (Welbourne & Pardodel-Val, 2009; Utami & Alamanosm, 2022). SMEs, through careful selection of partners that fit through networking and while remaining open to innovation, may enhance their strategic position in the aggressive market by providing resources and while also achieving organisational performance.

Resource-based theory suggests that IORT provides SMEs with access and availability to tangible and intangible resources that strengthen their current resource base, which will positively impact their performance (Rahman, 2015). For the purpose of this study, IORT and RBT both underpin the research framework by enforcing the independent variables of strategic networks and partner fit characteristics, while the dependent variable involves organisational performance and open innovation as a moderator.

Summary

This chapter has broadly analysed the literature pertaining to the construct variables' involvement: strategic network partner fit characteristics, open innovation variables, and SMEs' performance, together with the literature's shortcomings that give motivation for the researcher to explore the concept. There is a distinct need for SMEs to comprehend how characteristics of strategic network partners and open innovation can influence firms' achievement. Moreover, this field of research is still inadequate in developing countries, which includes SMEs in the Malaysian setting.

CHAPTER 3

RESEARCH METHODOLOGY

3.1 Introduction

This chapter begins with the discussion on the research strategy, research framework and making more emphasis on variables comprising the independent, dependent and moderator. Next, elaboration of the development of hypotheses is debated and reasoned out to test the link of these variables. Subsequently, the following discusses about the justification of research design which includes the methodology adopted and process plans, population, sampling techniques, sample of the study, data collection procedure, questionnaire design and the instruments to be used.

Overall, this chapter review the methods and procedures that was used to carry out the research.

3.2 Research Design

Research design must be prudently constructed so that the assembled data can be analyzed and produced a result (Sekaran & Bougie, 2010). It is a preparation that involves sampling design, methods for data collection and analysis of data which must be consistent with the research objectives. The key elements of a research design according to Campbell, Taylor and McGlade (2018) are the essence and aim of research.

The motive of this study is evaluating the relationships between strategic network partner fit characteristics (independent variable), performance of SME (dependent variable) and open innovation (moderator variable). This research relied on

quantitative approach using standardized questionnaire to survey. It is an appropriate approach to verify the connections between the variables and to determine the final outcomes. Additionally, it enables a researcher to obtain a quick picture of respondents' opinions and attitudes on the social issue under investigation (Sekaran, 2003).

(a) Research Process

This study was organized matching the flow exemplified in Figure 3.1. The procedure includes research intent, review of literature, the research design (sampling design, the collection of data, analyzing data), the conclusions with recommendations and final report writing.

```
                          ┌──────────────────────────┐
                          │      Research Goal        │
                          └──────────────────────────┘
Literature Review                      │
                          ┌──────────────────────────┐
                          │ Preliminary Review of Literature │
                          └──────────────────────────┘
```

Definition of Research Problem ◆Definition ◆Objectives	**Theory Discovery** ◆Theoretical Framework

```
                          ┌──────────────────────────┐
                          │        Sampling           │
                          └──────────────────────────┘
Sampling Design
                          ┌──────────────────────────┐
                          │ Basic Research Approach Selection │
                          │ Establishment of Questionnaire │
                          └──────────────────────────┘
                          ┌──────────────────────────┐
                          │      Instrumentation      │
                          └──────────────────────────┘
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                          ┌──────────────────────────┐
                          │ Data Collection (Online Survey) │
Data Compilation          └──────────────────────────┘     Research
                          ┌──────────────────────────┐     Design
                          │      Edit Data Code       │
                          └──────────────────────────┘
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                          ┌──────────────────────────┐
                          │ Quantitative (Survey) Analysis │
                          │  • Preliminary Data Analysis │
Data Analysis             │  • Measurement Model      │
                          │  • Structural Model       │
                          └──────────────────────────┘
                          ┌──────────────────────────┐
                          │    Results Clarification  │
                          └──────────────────────────┘
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Illustrates Conclusion    ┌──────────────────────────┐
                          │ Conclusion and Recommendations │
                          └──────────────────────────┘
Report Writing            ┌──────────────────────────┐
                          │     Final Thesis Report   │
                          └──────────────────────────┘
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Figure 3.1
Research Process Flowchart

This research processes began with the study intention by reviewing literatures on strategic networks characteristics, open innovation and performance of SME in the context of small and medium sized enterprises. At this stage, attention was given on essential information such as concepts, results and findings from previous researchers' work related to this study.

Once the problem was identified, the next step was defining, clarifying objectives of the study and generating hypotheses from the concept networks of variables. Theory exploration was done simultaneously, when integrating all information on the problem. During this stage, theoretical framework was formulated.

The next crucial part comprises sampling design, data collection and data analysis and their process involved:

i)   The sampling design undertakes to identify the samples, the development of questionnaire and to select survey instrumentation. It is important to get the right target population sample who can give right answers during the survey, otherwise it may distort the research process (Sekaran, 2003).

ii)   Data collection is a technique form for respondents to provide answers to similar questions and enable researcher to gauge several variables also to assess multiple hypotheses (Neuman, 2007). These data are fundamental groundwork for the preparation of further analysis.

iii) In the data analysis stage, the data collected are statistically examined based on the researcher's objectives using relevant statistical tools. As Nayak and Hazra (2011) described, the type of test used is based upon the manner of the research

question being examined. The researcher used the statistical test not only to interpret data and findings but also to make decisions on the observed data.

The final step includes drawing a conclusion by interpreting and documenting the meaning of results deriving from the data analysis. The result and finding deductions were used to make recommendations on the related problems.

The continuing section explains the structuring of research framework upon the determination of the research problem.

3.3 The Research Framework

Once the research objectives were identified the next step was to assess the connection between strategic network partner fit characteristics, open innovation and the performance of SMEs in Malaysia by structuring the framework. The construct consists of strategic network partner fit characteristics (predictor variable), open innovation (moderator variable) and performance of SMEs (dependent variable), as illustrated in Figure 3.2.

Conceptually, this research framework is underpinned by inter-organisational relationships (IORT) and resource-based theory (RBT). According to Koza and Lewin, 1998 the IORT development is quite fragmented and constituting several disciplines to the field, reflecting a mixture of motives, intentions, and objectives. In addition to the theory, Barringer and Harrison (2000) reviewed six commonly used conceptual models that explained IORT formation which includes transaction costs economics, resource dependency theory, strategic choice, stakeholder theory, organisational learning, and institutional theory. However, despite researchers' coverage on all issues

affecting IORT, yet the study is not exhaustive. Vanhaverbeke (2005) further relates open innovation (OI) with IORT. On the other, Agostini and Nosella (2017) argued that mass of information has been produced on the topic of interorganisational connections impacting SMEs (SME IORs), but so far it has not yet been systematised. They supplement that SME IORs have not yet been the subject of an extensive literature review.

Within the context of this research, strategic network partner fit characteristics dimension signifies SMEs selection of network partners across sectors which match to the criteria that firms require to collaborate or cooperate in a business project. It also entails a process whereby network partners with chosen traits interact through formal and informal negotiation, collaboratively developing the rules and frameworks guiding their interactions with intended goals. It is the action or decisions they make regarding issues that brought them together. Complementary of resources and capabilities among SMEs and network partners from several industry sectors, is one factor in the formation of IOR. Hence, the discussion is connected to the majority of authors in this IOR stream with related definitions (Barringer & Harrison,2000; Thomson & Perry, 2006; Agostini & Nosella ,2017).

Vanhaverbeke, (2005), elaborates specifically how firms have to collaborate with other actors in the business system and shape IORT networks to backup open innovation. The framework of this research includes open innovation as a moderator variable used by SMEs in enriching their business growth. SMEs openness can gain additional advantages from being more transparent, inclusive methods of strategizing together with the involvement of large quantities as well as varieties of network

partners, stakeholders locally and globally. This concept elaborates on the inter-firm collaboration between SMEs, network partners with match attributes and other innovation partners as a way to encourage the introduction of new products as well as services. Besides choosing the right partners, SMEs also operates through open innovation process in accepting information to speed up internal innovation and increasing markets for external use innovation to increase their performance.

Apart from the many factors fastening with IORT, this research explained the framework engaged with inter-organisational relationship (IOR) strategic alliance characteristics and open innovation. Authors Vanhaverbeke, (2005); Simard & West, (2006) suggest that deep networks lead to incremental innovations. Open innovation consists mix of deep versus wide ties and formal versus informal ties (Vanhaverbeke, 2005; Simard & West, 2006). However, Agostini and Nosella (2017) in their new contribution of study, systemized SMEs IOR into four (4) streams of alliances that include: Stream 1-SMEs strategic alliances, Stream 2-Social capital in SME networks, Stream 3-SME networks and innovation and Stream 4 – SME networks and internationalisation. Thus, this present research projecting 3 streams of SMEs IOR, which is, Stream 1, 3 and 4. Agostini and Nosella (2017) assert that open innovation (OI) is the subject matter of articles in stream-3, which most authors (e.g., Lee et al., 2010) regard it as a body of literature rather than a theory, Moreover, other theories, such as the RBV or SNT, are regularly used to supplement the OI literature.

This theoretical framework is also underpinned by resource-based theory (RBT). The researcher regards the theory is vital to explain the internal and external relationship via networking is perceived as resources to small firms. In order for SMEs to sustain

within the accelerated trend of globalisation, networking has become a crucial element in the performance and operation of SMEs. SMEs performance is significant for the survival and growth of SMEs within the industry (Hafiz et al. 2021; Selvam et al.,2016), Firm performance is getting more attention than ever before given the current state of the turbulence market. Resource-based theory (RBT) in this framework model deliberate the involvement of all organisations or all actors in this study. Organisations as in this dissertation comprise SMEs, actors in the strategic network partner fit characteristics, in open innovation and indirectly firms' stakeholder. Somewhat the model reflecting RBT are business networks involving appropriate characters of business partner from other manufacturing and services sectors, suppliers, customers, public sectors and private sectors with which SMEs direct pupose is to gain resources and capabilities from them. Being small firms, SMEs are lack of resources. It is through resource availability and the application of a resources management plan, are what give it SMEs strength to ensure growth (Hafiz et al. 2021)

Thus, the organisational characteristics of every SME from the network (particularly their resources and capabilities) are of greatest importance in influencing both the creation of the network and sub sequential success of the network. Using theory of resource base, SMEs access to additional resources, competitive advantage and increased overall performance are predicted outcomes of the networks.
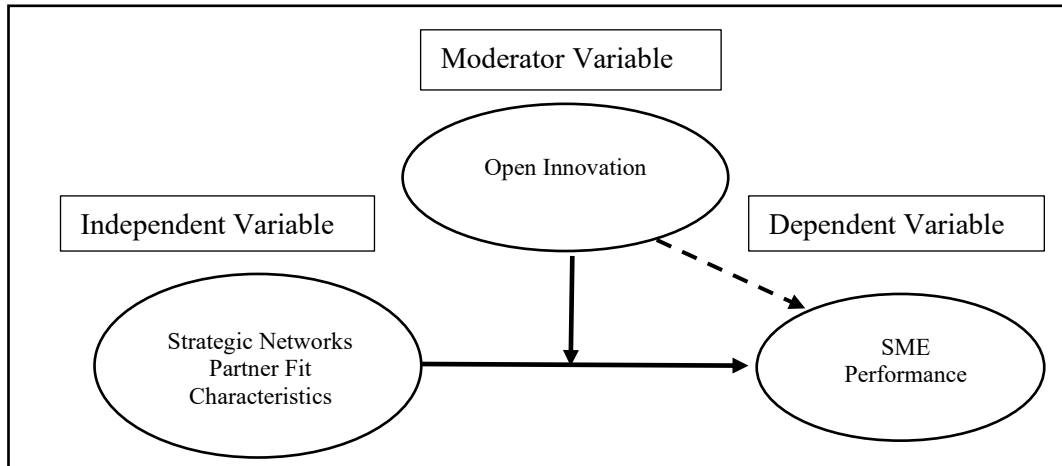
Figure 3.2
The Research Framework

In Figure 3.2, concept shows SMEs tend to have a lateral strategic inter-firm network of various organisations. Through smart selection of partners and resources that fit well in the network shall create more values of their own goals requirement. Thus, the implication of using both IORT and RBT is believed to escalate the competitive advantage and the performance of SMEs.

The forwarding section explains how the links of variables are hypothesized and a conceptual framework is developed. It is noted that each variable, strategic network partner fit characteristics (SNPFC) and open innovation (OI) have hypothesized impacts on performance of SMEs (SP).

As distinguished earlier, the term 'strategic alliance' may restrict the area of study within a specific industry, in contrast, 'strategic networks' projects partnering firms are without boundaries, collaborate with multiple partners and can come from various sectors of the industry.

3.3.1 Framework Development

A study by Ahmad Abuzaid (2014) revealed that there was a significant effect between the strategic alliance partner characteristics of pharmaceutical company's and innovation performance. The characteristics used for the investigation include; partner complementarity, partner commitment and partner compatibility. This study examined a direct relationship between partner characteristics towards innovation performance without any intervening nor interacting variable as shown in Figure 3.3. In conjunction to this, the term 'strategic networks partner characteristics' was initially coined for the independent variable but was later changed to 'strategic network partner fit characteristics' basing on the word 'partner fit' used by Thorgren, Wincent and Ortqvist (2010), research study.

Independent Variable	Dependent Variable
Strategic alliance partner characteristics • Compatibility • Complementarity • Commitment	Innovation Performance •Radical Innovation •Incremental Innovation
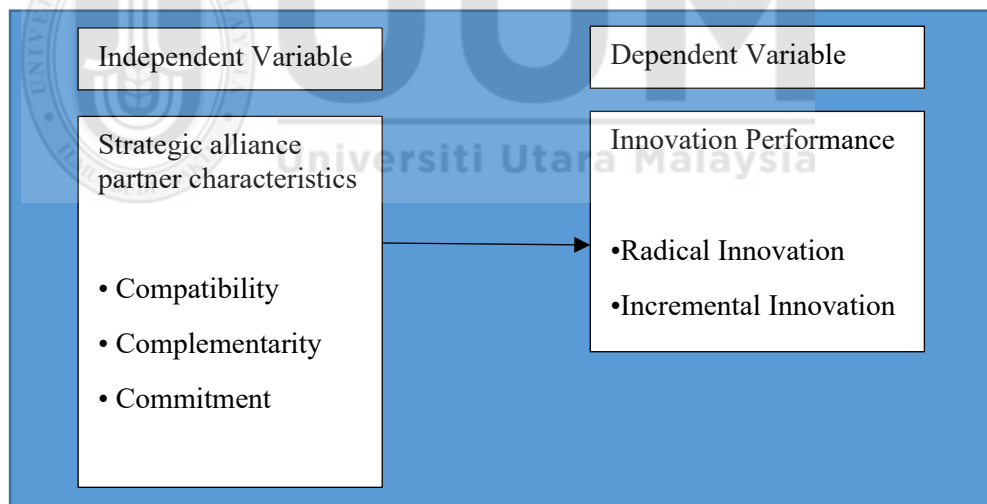
Figure 3.3
Abuzaid (2014): Research Framework

As discussed in the earlier chapter, there is scarce literature that covers open innovation as either a mediator or moderator variable. Supporting this issue, Hossain and Kauranen (2016) emphasised the fact that it is yet undistinguishable in research if practising OI has a beneficial or negative relationship with certain variables.

Nevertheless, one study that is a close enough specimen for open innovation as a moderator is the research assessed by Mazolla, Perrone and Kamuriwo (2015). Mazolla et al. (2015) investigated the impact of structural network embeddedness positions on the possibility of developing new products and open innovation flow as a moderator effect, a measure of net knowledge flow crossing firm boundaries. The theoretical framework was tested on biopharmaceutical firms through the period 2006–2010. They argued that network positions give firms the information content, while open innovation flow explains how the firm uses that content. This mixture of these two concepts has a major impact on new product development. The theoretical framework can be structured as in Figure 3.4:
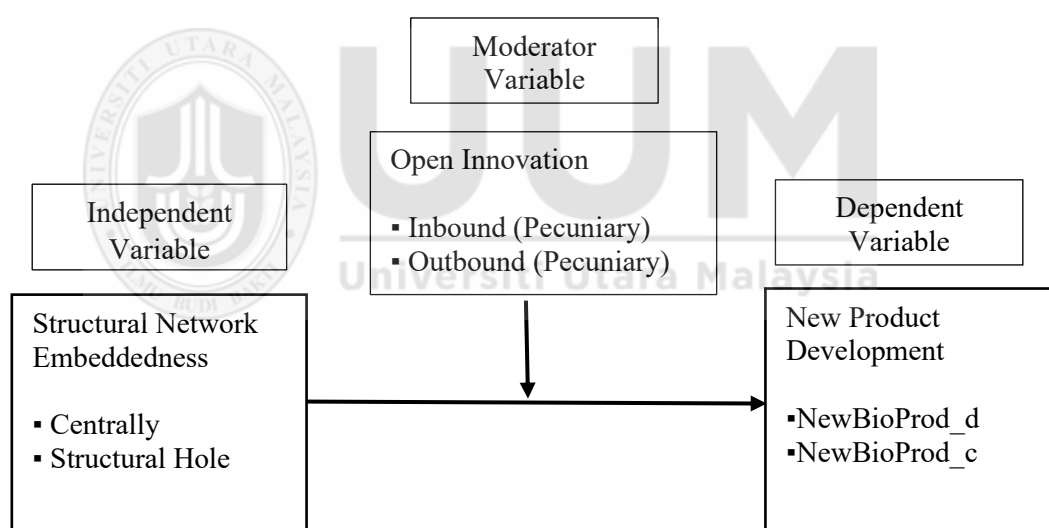
Figure 3.4
Author's Estimation of Mazolla et al.'s (2015) Model Framework

Another near example that inspired the framework development of this current research is the inter-firm partnerships matrix that was created by Mazolla et al. (2015) from Bioworld data to form the networks of biopharmaceutical enterprises. The strategic network partner fit is a notion that is almost identical to Mazolla et al. (2015)

independent variable when related to inter-firm partnerships but yet different in description.

The following are three research questions tailed by section 3.4 articulating development of hypotheses that will guide the structured investigations of the study's moderation model:

Q1.   Does strategic network partner fit characteristics have significant relationship with SMEs performance?

Q2.   Does open innovation have significant relationship with SMEs performance?

Q3.   Does open innovation moderate the relationship between strategic network partner fit characteristics and SMEs performance?

3.4   Development of Hypotheses

The following sub-sections elaborate and provide the process and argumentative review on hypotheses establishment.

3.4.1   The relationship between Strategic Network Partner Fit Characteristics and SMEs Performance

Strategic network partner fit characteristics are important drivers functioning towards firms' performance. The outcome of partners' resources and characteristics on SMEs performance has become a vital in alliance portfolio research. An alliance portfolio is a fundamental firm's set of all direct alliances, which take several forms and occur across both vertical and horizontal boundaries (Wassmer, 2010). Firm success is determined by the adoption of varied tactics by companies (Rosli & Sidek, 2013).

Moreover, different companies will employ different performance strategies. In relation to the selection of partners

Ahmad Abuzaid (2014) examined the impact of strategic alliance partner characteristics comprising partner complementarity, partner commitment, and partner compatibility on business creativity. The study's findings showed that the strategic alliance partner traits had a superior impact on Jordanian pharmaceutical enterprises' innovation, and vice versa.

To be successful in accessing international markets, firms are found increasingly adopting cooperative techniques and forming strategic partnerships with overseas partners. Jalali, (2017) proposed a novel empirical approach to inspect the effect of partner characteristics on alliance export success in both short/medium-term and long-term partnerships. Jalali, (2017), examined unidimensional construct of partner characteristics using 12 various indicators for each type of alliances based and found that the effective characteristics of an alliance is determined by its time frame, which is classified into short/medium-term partnerships and long-term alliances.

Strategic networking symbolises the firm's long-term competitive commercial ties with diverse market participants (Milovanović, Primorac & Kozina, 2020). Companies that build business networks can minimise risk and production costs while increasing flexibility, efficiency, knowledge capacity and gain access of particular resources. Milovanović et al. (2020) investigated the function and extent of strategic networking's effect on the performance of Croatian manufacturing SMEs. Using commitment, trust,

reputation, communication and cooperation as the dimensions of strategic networking (SN), authors' analysis discovered positive effect of SN on business performance.

In many studies, complementarity and compatibility are most common measurement used for partner characteristics. Casals (2011) describes that not only complementarity of resources and skills, but compatibility in similar culture, is also important for business success. Shah and Swaminathan, (2008) referred more than 40 studies and found partner commitment as another important trait to upsurge business performance.

Knowing the importance of network partners with characteristics components of complementarity, compatibility and commitment could increase the growth and performance of SMEs, an investigation particularly within Malaysian context needs to be extended. Thus, it is anticipated that the strategic networks partner fit characteristics has positive relationship with the SMEs performance.

H1: Strategic networks partner fit characteristics has a significant relationship with SMEs performance

3.4.2 The Relationship between Open Innovation and SMEs Performance

Open innovation was introduced when experts comprehend business firms' intention to market bringing company's own innovative ideas together with other firms. This pursues innovative approaches to transfer firm's internal ideas to the marketplace. This is owing to firms inclining need for external new knowledge as well utilizing their internal new ideas. Innovation process depends intensely on knowledge (Gloet & Terzioki,2004) and earnings from the open innovation network attributes are crucial for firms' success or failure (Enkel, 2010). Chesbrough et al. (2006) deliberated "open

innovation is the use of purposive inflows and outflows of knowledge to accelerate internal innovation, and expand the markets for external use of innovation, respectively". Moreover, Chesbrough (2006) includes open innovation as the part of innovations produced in cooperation with universities, customers. research organisations, venture capitalists, suppliers, business assistance centres, and other new technological based firms (NTBF), which is opposite to inventions produced completely inside the firm. Firms can resort to adopt to one or more OI activities that include inbound, outbound or coupled (Cheng & Huizingh, 2014; Gasmann & Enkel, 2004).

Ju et al., (2013) identified the relationship between open innovation (outside-in, inside-out, and coupled), entrepreneurial orientation (EO), and SME organisational performance of Taiwan-based. In line with this current study, the discussion focused on the effect of open innovation using outside-in and inside-out and SMEs performance. It was observed that Ju et al., (2013) hypotheses showed that both outside-in and inside-out were positively related to SMEs performance. This suggests that OI procedures have critical mechanisms that can unify organisations' innovation plans to increase performance among small and medium-sized firms. Many authors hypothesized and revealed that OI strategies improve innovation performance (Cheng & Huizingh, 2014; Frishammar. Lichtenthaler, & Rundquist, 2012; Leiponen, 2012).

An open innovation model highlights how corporations innovate by collaborating with other organisations. The selection of suitable OI-partners is necessary for the success of OI (Hossain, 2015; Huizingh, 2011) relying on the goal of the project, the innovation process phase, the needed competence, or context considerations such as knowledge

secrecy and project outcomes. Inter-firm cooperation, cooperation with government agencies, cooperation with intermediary institutions and cooperation with research organizations were the constructs variables used by Zeng (2010). However, since this present research concentrates on cooperation network, it was found that the empirical relationship between cooperation networks and innovation performance was significant and positive.

Yulianto (2021) explored and examined sample of SMEs owners or managers in Malang City, Indonesia on the causal link amongst variables comprising inbound and outbound open innovation, product innovation, marketing innovation, firm performance, and environmental turbulence as moderating variables. It is discovered that there was a positive and significant effect in the relationship of inbound open innovation to product innovation however, hypothesis on the link between outbound innovation and product innovation was not supported.

To increase performance among small and medium-sized firms (SMEs) in dynamic technological environments, open innovation processes have become significant tools that are integrated into firms' innovation plans. Therefore, it is expected that open innovation has a significant relationship with SMEs performance.

H2: Open Innovation has a significant relationship with SMEs performance

3.4.3 The relationship between Strategic Network Partner Fit Characteristics, Open Innovation and Performance of SMEs

The researcher of this study intended to examine if open innovation moderates the connection between characteristics of strategic network partner fit and the performance

of SMEs. According to Hossain and Kauranen (2016), OI activities can serve as mediators and moderators between multiple factors, however, it is unclear whether these activities have a positive or adverse impact on how these determinants interact. For this particular research, OI is considered from the perspective of strategic network partner fit characteristics. There have been several studies devoted to different aspects of innovation partnerships, such as the motives for and effects of collaboration. Nevertheless, the essential characteristic of partner selection for open innovation has received limited attention from researchers (Li et al. 2008; Osman et al. 2018). Consequently, this study proposed that the success of SMEs performance is dependent on the strategic network partner fit characteristics (compatibility, complementarity and commitment) and open innovation as a moderator between both variables. The multi dimensions for OI construct variable comprise inbound and outbound open innovation practices. Theoretically, open innovation modifies the form of strength of the relationship between strategic network partner fit characteristics and SMEs performance.

Though the research evidence of OI as a moderator is rarely found, Mazolla et al. (2015), successfully conducted their analysis based on structural network embeddedness and new product development with open innovation flow as the moderator variable. The interaction of the dimensions, centrality and structural hole of structural network embeddedness with the open innovation flow enriches the possibility of new product development.

The survival and success of small and medium-sized businesses are dependent on strategic network partner fit and open innovation. Many studies have been conducted

to date that address the following topics: measuring how open the firm is (Dahlander & Gann, 2010); how differentiated (breadth) or intensively exploited (depth) are the firm's external search channels (Laursen & Salter, 2006); and how and why the firm commercialises external sources of innovation (West & Borges, 2013). However, how firms choose the right network partner fit, which is a crucial aspect of open innovation and influences the direction of a relationship between variables, has received limited attention from scholars (Li et al., 2008; Solesvik & Westhead, 2010). One important question is what are the appropriate network partner fit characteristics that firms would identify in order to interactively use open innovation (inbound acquiring or outbound selling) knowledge, and the likelihood that this would improve firm performance. SMEs' network partners include universities, government agencies, public or private research institutions, business enterprises of different fields, competitors, consultants, customers, suppliers, employees, and any other relevant stakeholders. While for partner fit charateristics eventhough it may cover a wide range criterea but for this study, compatibility, complementarity and commitment were the researcher's focused.

The research anticipates to learn if SMEs in choosing their current partners with identified characteristics are favourable for engagement with open innovation to support changes towards organisational performance. Jointly, to also find out if the open innovation affects the direction and/or strength of a relation between independent variable and dependent variable.

H3: Open innovation moderates the relationship between strategic networks partner fit characteristics and performance of SME.

Hence, the hypothesis as related to RQ1 is:

H1:   Strategic network partner fit characteristics has a significant relationship with SMEs performance.

The hypothesis as related to RQ2 is:

H2:   Open Innovation has a significant relationship with SMEs performance.

The hypothesis as related to RQ3 is:

H3:   Open Innovation moderates the relationship between strategic network partner fit characteristics and SMEs performance.

After having reviewed, related theories were developed as shown in Figure 3.5. The diagram illustrates hypothesized relationships through which open innovation (OI) was posited to interact with strategic network partner fit characteristics (SNPFC) and SMEs performance (SP).
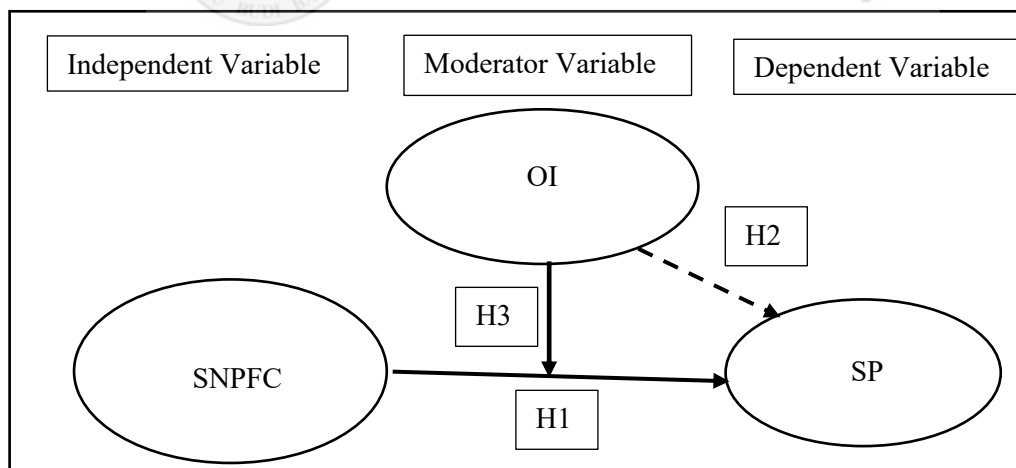
Figure 3.5
Hypotheses Illustration in the Framework
(Key: SNPFC-Strategic Network Partner Fit Characteristics; OI-Open Innovation; SP=SME Performance)

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The forwarding sections detailed out the justification of research strategy to appropriately determine answers to the research questions established by utilizing the observed data.

3.5. Sampling Design

The sampling design is a strategy fixed to get a sample from a given population. The following are the proposed techniques to obtain the sample for this research.

3.5.1 Population

Population refers to the entire population of individuals, occasions, or objects of interest present in the area under investigation. For this research, the population for this study is registered small and medium enterprises (SMEs) in Malaysia. According to SME Annual Report (2017/2018), there were 907,065 number of established of SMEs in Malaysia. Small and medium enterprises as defined by SME Corps Malaysia (SME Report, 2020) comprises all main sectors; services, manufacturing, construction and mining and quarrying. There are divided into categories of micro, small and medium. However, the focus for this research is on small and medium-sized enterprises (SMSE) , in which definition is centered on the criteria of sales turnover or number of full-time employees (SME Corp 2014). Small and medium enterprise by size operation can be defined as follows:

(a) Manufacturing

Description for small size – Sales from RM300,000 to not more than RM15 million **OR** from 5 to fewer than 75 full time workers

Description for medium size – Sales from RM15 million to not more than RM50million **OR** from 75 to fewer than 200 full time workers

(b) Services & Other Sectors

Description for small size – Sales from RM300,000 to not more than RM3million **OR** from 5 to fewer 30 full time workers

Description for medium size – Sales from RM3million to not more than RM20 million **OR** from 30 to fewer than 75 full time workers

As shown in Table 3.1, the total number of registered SMEs population for this present research is 213,395 consisting of 192,783 small size and 20,612 medium sizes.

Table 3.1
Number of SMEs in Malaysia by Size, 2015

Sector	Micro	Small	Medium	Total SMEs
Number of SMEs	693,670	192,783	20,612	907,065

Source: Profile of Small and Medium Enterprises 2017/2018, Department of Statistics, Malaysia

Johnson and Christensen (2010) provided a rule of thumb to determine whether research should be using a population survey or a sample survey. According to Johnson and Christenen, (2010), for a fewer number of population (i.e.,100 or less), they suggested the population survey or otherwise the sample survey. Since the total population of this research was 213,395 which is many folds more than 100, sample survey was utilized instead of population survey. Initially, just before the announcement of movement control order (MCO), the the researcher made contact with SME Corp Malaysia for the full lists of SMSE but was not responded. However, it was found later around November 2020, the companies' lists with details were provided through free on-line National Entrepreneurs Dircetory (NED) by SME Corporation Malaysia for the Ministry of Entrepreneur Development and Cooperatives

(MEDAC) during movement control order (MCO). (The accessibility of the lists was somehow regulated around April, 2021, which no longer allowing free entry). For the purpose of this study, the researcher required owner's name, contactable number and email address for the data collection.

3.5.2 Unit of Analysis

This present research identified 'company' (SMEs of various sectors) as the unit of analysis. The company is represented by the owner or the managerial level of SMEs who plans and make decisions on selecting business network partners for their firms. This study chose the owner or top management because as heads of the organization, they are able to reveal information of their firms (Bakar, Mahmood & Ismail, 2015; Lyon et al., 2000). For that reason, this investigation used single-respondent self-report (Chandler & Hanks, 1993), which is considered suitable and also very useful to operationalized main variables when executed.

3.5.3 Sample Size

Size of sample indicates a subsection of a people, or in other words, a number of participants are chosen from the inhabitants (Cavana et al. 2001) to be included in the study. In theory, a study should gather data from every subject under consideration, although this is typically not feasible (Hair et al., 2007; Kumar et. al, 2013). A subset of a population is referred to as a sample size, or in other words, a certain number of participants are chosen from the population to be a part of the study (Cavana et al. 2001). In theory, a study should gather data from every subject under consideration, although this is typically not feasible (Hair et al., 2007; Kumar et. al, 2013).

A sample size is normally assessed to represent a population and the process is crucial to get good results. In deciding a suitable sample size, there are several factors that need to be considered such as nature of research, statistical analysis, data analysis programme, research supervisor and practical concerns (Memon et. al., 2020). For this study, the sample consists of the owner or the managerial level of SMEs of various sectors in Malaysia who plans and make decisions on selecting business network partners. According to Memon et al., (2020), unit of analysis may affect sample size. An example added was, the organisation level with top management as participants (e.g., owner, CEO or senior manager) would have smaller size of sample as compared to research that includes individuals from non-managerial level (e.g., employees, clients, etc.).

Table 3.2
Sample Size Chart of Inhabitants

Population (N)	Sample (S)
1000000	384
500000	384
100000	383
75000	382
50000	381

Source: Krejcie and Morgan (1970)

Krejcie and Morgan (1970) outlined a table to decide on the samples size of a population. For the population of 213,395 SMEs that lies in between 100,000 to 500,000, the estimated sample size is 384 (Table 3.2).

Over the years there have been many methods suggested by researchers to determine sample size. Recent studies, recommend researchers to use power analysis to look for the size of sample (Hair et al., 2018; Hair et al., 2017; Hair et al., 2019; Uttley, 2019). Power analysis ascertains the smallest possible number of sample size by considering relatively the model, with the maximum number of independent variables (Hair et al.,

2014; Roldán & Sánchez-Franco, 2012). In doing so, power analysis must have information with regards to effect size, power and significance level. (Hair et al., 2018).

There are several statistics programmes which are accessible carrying out power analysis, but the first option for business and social science researchers recommended to use is G*Power by Faul et al., (2007). The application is obtainable from the internet for free. The steps in handling G*Power for a moderator model is arranged as the following (Memon et al, (2020). Upon downloading, the application prompts a template to insert key commands; first, for multiple regression select "*F tests*" analysis from the *test family options*; secondly, choose "*Linear multiple regression: fixed model, R_2 deviation from zero*" from the statistical test items; third step, the power type analysis should be fix at *"A-priori: Compute required sample size – given α, power and effect size"* ; Fourthly, set the input values for the effect size at 0.15 (medium effect), α at 0.05, and power at 0.80. According to Hair et.al. (2017), this is the main regular metric for social and business science study (Hair et al., 2017); Fifth is to enter the numbers of predictors, which is based on hypothesized model of this research. For a moderating model, the number of predictors should include the number of independent variables, the number of moderator (as independent variable) and the term for all hypothesised moderating relationships, which is independent variable*moderator. As in this study, the number of predictors is 3; Finally, to click 'Calculate'. The results in G*Power displays the minimum sample size for this research is 77. For this dissertation, the researcher applied the sample size of 384 as recommended by Kricjie and Morgan (1970) for a population between 100,000 to 500,000 (Table 3.2),

3.5.4 Sampling Technique

Techniques for sampling can be classified into probability and non-probability. In probability sampling, the components of the population have a known likelihood of being chosen as sample subjects. The types of probability sampling include simple random, cluster, systematic and stratified random sampling. While, the elements in non-probability sampling do not have a known chance of being chosen as subjects and can fit into the category of convenience, sampling, snowball and quota sampling. The criteria to use simple random sampling as highlighted by Thomas, (2020) comprise:

i)   The researcher has a complete list of every member of the population.

ii)   The accessibility or contact of each member of the population.

iii)   There is sufficient time and resources to collect data from the required sample size.

When requirements were met, this investigation used probability-sampling technique to choose the number of samples of small and medium-sized companies (SMSE) that were scattered throughout Malaysia. The researcher acquired 213,395 lists of companies in the category of SMSE from SME Corp. In this situation, the homogeneity of SMSE based on their sales turnover and/or number of workers as determined by SME Corporation Malaysia (refer Table 1.1) were included. The established SMSE cover various sectors throughout Malaysia can be found in Table 3.1. According to Sekaran and Bougie, (2010), the benefits of using simple random sampling are, it reduces biasness and offers the most generalizability and Horton, (2022) added, simple in method and less knowledge is required. Besides that, random sampling can be applied when the target population to be studied is homogenous in characteristics (Awang, 2010). In this situation for SMEs homogenous include;

business models differ from large corporations, operations are in smaller capacity, smaller operations, lesser capital outlay, limited human resources (Nasir et al., 2017), essential source of employment in the economy (Alvarez & Crespi, 2001), and superior flexibility (Gomez et al. 2018).

Horton, (2022) elaborated that a simple random sample also has some points of weaknesses which include; difficulty in accessing population lists, time consuming and costly.

a)   Complicated Access to Population Lists

A complete list of the entire population for the research is necessary to acquire an accurate statistical measure of a large group. As such, obtaining access to the entire list might be difficult. Some businesses may not be able or unwilling to share information about employee groups because of privacy policy.

b)   Time consuming

When a complete list of a larger population is unavailable, the researcher conducting simple random sampling has to get information from other sources. Smaller subset lists can be used to rebuild a complete list of the large population if they are visibly available, however, this technique takes time to complete and costly.

In simple random sampling, a smaller group is used to represent a broad population. The guided schedule by Krejcie and Morgan (1970) as in Table 3.2 was referred to distinguish the number of focused populations. In using simple method of random sampling, everyone person in the inhabitants is known to likely have the same chance of getting nominated for the sample dispersal (Sekaran & Bougie, 2010). Even though the procedure is not so efficient but it has a high value of generalizability of findings.

Similar research in employing the simple random sampling approach within the population of SMEs in Malaysia were used by Poorangi and Kim, (2011), Aziz et al., (2014) and Nasir et al., (2017).

Based on 213,395 number of populations, the questionnaire was required to be distributed to 384 participants of SMEs (Krejcie & Morgan, 1970). Nevertheless, the researcher on considering to achieve 384 responses, anticipated that questionnaires should be distributed to a greater number of participants than fewer, hence decided to disseminate to 500 participants. Respondents to the study were the owners or managers of the company who make most of the key decisions (Ahmad, Ramayah, Wilson, C. & Kummerow, 2010). In such situation, the researcher was to pick a random sample of 500 records out of the 213,395 numbers of population.

Random number function (RAND) in Microsoft Excel was used to randomly select 500 participants out of 213,395 listed SMSE. Each of the company was assigned a number in sequence and along with-it data elements such as owner's name, email address and telephone number were associated. Randbetween 1-500 was used to get the respondents at random.

3.5.5   Questionnaire Development

This research used standardized questionnaire which issues of questions were adapted from several authors as a procedure for survey. The survey form was composed using bilangual; Bahasa Malaysia and English for the convenience of respondents (See Appendix A). Since the common language for Malaysian is Bahasa Malaysia, speaking and understanding English among the SME owners may differ. According to Cooper

and Schindler (2008), question adaptation takes place when respondents fail to digest every word in the question, hence the question was modified to suit their understanding. It is necessary to resolve how participants modify indefinite questions.

Translations of the languages may use Brislin's translation model or submit to Institute Terjemahan Negara. For this research, questionnaire was interpreted through UiTM Language Centre.

3.5.6 Instrumentation

The survey question was developed by reviewing literature and was sorted into four parts:

(1) Company's profile and demographic information.

(2) Characteristics of strategic network partner fit.

(3) Open innovation.

(4) SMEs performance.

The questions were designed in a precise and simple manner. Oppenheim (1986) suggested each questionnaire item was not to go beyond 20 words. Moreover, Jobber (1989) proposed that survey questions should be sentenced shorter than long if researchers needed to achieve higher response rate. The survey questions for this research contain 56 items. The measurement scales which came from previous research was re-testified. All of the instruments for variables were majority presented with close-ended questions and multiple-choice answers. They were measured using nominal and Likert scale. The Likert Scale was based on five-points scale and the sample of questionnaire is in Appendix A. The five-points scale is selected because it

is more practical and easier to observe and is also suitable for this research (Hair, Babin, Money, & Samouel, 2003).

This study aims to look at the relationships between strategic network partner fit characteristics (independent variable), performance of SMEs (dependent variable) and open innovation (moderating variable). The first section of this survey has 13 demographic introductory items consist of the study samples such as job position, business identity, number of full-time employees, annual income, length of business operation, main sector (manufacturing or services), sub-sector, number of employees, number of local and international network partners, types of connection and types of collaboration.

The constructs are multidimensional as each construct consists of several numbers of attributes or dimensions and subsists in multidimensional domain. The next three sections provide questions pertaining to independent and dependent variables. The researcher planned to adapt items matching the developed theoretical framework and thereafter, to test them in this dissertation. The illustration can be referred to in Table 3.3, Table 3.4 and Table 3.5.

3.5.6.1 Strategic Network Partner Fit Characteristics

Strategic Network Partner Fit Characteristics (SNPFC) is a term that carries a similar behaviour with other expressions used by other authors such as; partner characteristics (Jalali, 2017), strategic alliance partner characteristic (Ahmad Abuzaid, 2014), partner fit (Theogren, 2010), partnership characteristics (Zaman, 2004) and characteristics of partner on strategic alliance (Pansiri, 2007). It can be interpreted as a purposive

tactical relationship between independent firms (Mohr & Spekman, 1994) that initiated inter-organisational link that includes exchange, sharing, or co-development of business activities for success (Kale & Singh, 2009). An effective inter-firm alliance are related with proper selection of partners. Choosing partners who owns the required resources and with whom strategic economic incentives can be associated would provide success in business performance. Kale and Singh, (2009) coined the behavioural characteristics comprising partner complementary, partner commitment and partner compatibility as key drivers for alliance success and was replicated by Ahmad Abuzaid, (2014).

For this study, the researcher adopted the scale used by Ahmad Abuzaid, (2014) as well as adapting a few from Pansiri, (2007). The Cronbach Alpha test value done by Ahmad Abuzaid, (2014) was 0.89. Alpha value on research by Pansiri, (2007) was not considered as he was also using other additional criteria for the alliance characteristics. The objective of construct strategic network partner fit characteristics is to determine the multi-dimensional traits involving alliance partners' compatibility, complementarity and commitment are beneficial to SMEs in Malaysia in influencing the business performance. Table 3.3 illustrates the 17 items used for the strategic network part fit characteristics variable.

Table 3.3

Strategic Network Partner Fit Characteristics: Construct and Dimension Variables, Code, Item and Sources

Construct variable	Dimension variable	Code	Item	Sources
Strategic Network Partner Fit Characteristics	(a) Compatibility (4)	14COMPAT1	We choose our network partner because of its organisational culture compatibility.	Source 1: Kale and Singh (2009)
		15COMPAT2	We choose our network partner because of our strategic objectives are compatible.	
		16COMPAT3	We choose our network partner because our management styles are compatible	Source 2: Pansiri (2007)
		17COMPAT4	We choose our network partner because of our approximately similar in size and strength.	
	(b) Complementarity (7)	18COMPL1	Our company's network partner has unique competencies that we need.	Source 3: Ahmad Abuzaid A.N., (2014)
		19COMPL2	Our company's network partner has higher level of technical capabilities that we need.	
		20COMPL3	Our company's network partner has wider market coverage.	
		21COMPL4	Our company's network partner has diverse customer.	
		22COMPL5	Our company's network partner has a quality distribution system.	
		23COMPL5	Our company choose our network partner because we perceived synergies when working together.	
		24COMPL7	Our company's network partner has complementary assets we require.	
	(c) Commitment (6)	25COM1T1	Our network partner is willing to dedicate whatever resources to make their alliance a success.	
		26COMIT2	Our network partner is willing to make long-term investment.	
		27COMIT3	Our network partner has a strong sense of loyalty with their alliance.	
		28COMIT4	Our network partner is willing to share their expertise.	
		29COMIT5	Our network partner is likely to continue with this strategic network.	
		30COMIT6	We choose our network partner for their commitment in our business relationship.	

3.5.6.2 Open Innovation

The term open innovation (OI) was first coined by Chesbrough (2003) and is illustrated as knowledge inflows and outflows for the improvement of innovation performance. It is also broadly recognized as a crucial innovation management practice (Chesbrough, 2003; Chesbrough et al., 2014; Dahlander & Gann, 2010). According to Chesbrough, (2003a) the creation of contacts or network is one of the key features in the open innovation process. Ju, Chen, Yu and Wei, (2013), agreed and further added that OI is needed for inter-firm's collaboration to strengthen SMEs internal and external knowledge and ideas. Researchers have identified three different kinds of OI: inward bound, outward bound and combine mode of open innovation. The inward bound OI implies the flowing in of new concepts and information which come from outside source of a firm. On the other hand, the outward bound denotes the flowing out of a company's innovative ideas and information to outside market. Lastly, the combine represents the merge on inward and outward bound (West & Bogers, 2014; Gassmann & Enkel 2004). The construct variable for this study, focused on multi-dimension of inbound and outbound open innovation. The aim for open innovation in this research is to examine the interaction effect with strategic network partner fit characteristics towards the SMEs performance.

Open innovation predictor is presented by 20 indicators (Table 3.4), comprising 12 inbound OI and 8 outbound OI. Ju et al (2013) referred Gassmann and Enkel, (2004) besides Inauen and Schenker-Wicki, (2011), (2012) to develop three-dimension measurement scales for inbound, outbound and coupled activities. For this study, the researcher modified the instruments so as to suit the understanding of Malaysian SMEs respondents. The Reliability Coefficient for both dimensions were 0.873.

Table 3.4

Open Innovation: Construct and Dimension Variables, Code, Item and Sources

Construct variable	Dimension variable	Code	Item	Sources
Open Innovation .	(a) Inbound (12)	31INB1	Our company gets IDEAS from the PUBLIC SECTOR (E.g.: university, government agency and/or research institution)	
		32INB2	Our company gets IDEAS from the PRIVATE SECTOR (E.g.: business of different nature, competitors, consultants, research institutions and/or university).	
		33INB3	Our company gets IDEAS from the CUSTOMER.	
		34INB4	Our company gets IDEAS from the SUPPLIER.	
		35INB5	Our company gets R&D initiatives from the PUBLIC SECTOR (E.g.: university, government agency and/or research institution).	
		36INB6	Our company gets R&D initiatives from the PRIVATE SECTOR (E.g.: business of different nature, competitors, consultants, research institutions and/or university).	Source 1: Gassmann and Enkel, (2004) besides Inauen and Schenker-Wicki, (2011), (2012)
		37INB7	Our company INTEGRATES TECHNOLOGY with or without license of intellectual property from the PUBLIC SECTOR (Eg.: university, government agency, research institution).	
		38INB8	Our company INTEGRATES TECHNOLOGY with or without license of intellectual property from the PRIVATE SECTOR (E.g.: other business different nature, competitors, consultants, research institutions and/or university).	Source 2: Ju, P.H., Chen, D.N., Yu, Y.C. and Wei, H.L. (2013)
		39INB9	Our company INTEGRATES TECHNOLOGY with or without license of intellectual property from SUPPLIER.	
		40INB10	Our company gets PERSONNEL INITIATIVES from the PUBLIC SECTOR (E.g.: university, government agencies, and/or research institution).	
		41INB11	Our company gets PERSONNEL INITIATIVES from the PRIVATE SECTOR (E.g.: business of different nature, competitors, consultants, research institutions and/or university).	
		42INB12	Our company gets PERSONNEL INITIATIVES from the SUPPLIER.	

Table 3.4 (Continued)

Construct variable	Dimension variable	Code	Item	Sources
	(b) Outbound (8)	43OUTB1	Our company COMMERCIALIZES internal idea and knowledge initiatives into the NEW MARKET.	
		44OUTB2	Our company TRANSFERS internal developed idea and knowledge initiatives to EXTERNAL MARKET (Local and/or global).	
		45OUTB3	Our company COMMERCIALIZES internal developed R&D INITIATIVES into the MARKET (local and/or global).	
		46OUTB4	Our company TRANSFERS internal developed R&D INITIATIVES to the EXTERNAL MARKET.	
		47OUTB5	Our company COMMERCIALIZES internal developed TECHNOLOGY INITIATIVES into the NEW MARKET.	
		48OUTB6	Our company TRANSFERS internally developed TECHNOLOGY INITIATIVES to EXTERNAL MARKET (Local and/or global).	
		49OUTB7	Our company LICENSE-OUT internally developed initiatives (e.g., IP and technology) to other ORGANISATIONS.	
		50OUTB8	Our company TRANSFERS internally developed PERSONNEL INITIATIVES to external ORGANISATION.	

3.5.6.3 SMEs Performance

Stakeholders would normally assess a firm's ability based on its performance. In other words, performance is much a reflection or an image projected of a company. Different firms may adopt different performance measures, depending on their goals. In this study, the researcher used across indicators from financial to non-financial to measure the overall organisational performance of SMEs under a unidimensional construct. The researcher adapted the performance indicators applied by Rosli and Sidek, (2013) in his study which include revenue growth rate improvement, increased in sales, company's profit, employment growth, market growth and customer's satisfaction. The Alpha value on the construct was 0.93 (Rosli & Sidek, 2013).

Table 3.5

SMEs Performance: Construct and Dimension Variables, Code, Item and Sources

Construct	Dimension	Code	Code	Sources
SME Performance		51PERF1	From 2017-2019, our revenue growth rate improved.	
		52PERF2	From 2017-2019, our sales increased.	
		53PERF3	From 2017-2019, our company's profit consistently increased.	Source 1: Darroch, (2005); Bakar and Ahmad, (2010).
		54PERF4	From 2017-2019, our number of employees increased.	
		55PERF5	From 2017-2019, our market growth increased.	Source 2: Rosli and Sidek, (2013)
		56PERF6	From 2017-2019, our customer's satisfaction increased on our product and/or service quality increased.	

3.6 Data Collection Procedure

During the progress of this research, the sources were gathered from both primary and secondary data.

3.6.1 Primary Data

Sekaran (2003), outlined primary data as original data or an internal source that are collected for research from the real scene. In other words, data which are collected first-hand by a researcher for a particular research purpose. The primary data can be collected through several methods. For this investigation, an online survey questions were designed for the participants to complete or self-administered without interference of the researcher.

The questionnaires were formatted in Google Form and were sent to companies under studied. The owners or the managerial level of small and medium sized enterprise were chosen to represent because they belong to a higher-level group and most often are involved in making company's policy as well as familiar with the overall aspects of their company's performance. Survey questions were administered by electronic e-mail due to the wake of global Covid 19 pandemic followed by movement control order (MCO) in Malaysia.

3.6.2 Measurement Validity

Validity fundamentally means "measure what is intended to be measured" (Field, 2013). Validity can be described as the degree to which a concept is precisely measured in a quantitative manner. There are several types of validity namely; content validity, construct validity, criterion validity (Heale &Twycross, 2015, Sekaran &

Bougie, 2010). The researcher set out to conduct content validity and construct validity tests for the benefit of this study. These validities are explained in the following sections.

3.6.2.1 Content validity

The content validity looks at whether the instrument sufficiently cover the entire construct it was designed to measure. The further there are scale items signifying the main concept measured the greater would be the content validity (Sekaran & Bougie, 2010). This dissertation involved a panel of experts to attest the content validity of the instrument. The instruments were evaluated by three (3) academicians from the Universiti Teknologi MARA, who were experts in the field. Their comments were acknowledged and the questionnaire was adjusted accordingly.

Besides that, face validity, which is the subset of content validity was also applied (Sekaran, 2003; Heale & Twycross, 2015). Face validity is used to assess the clearness of the questionnaires. It is quite similar to content validity; however, it is more informal and a subjective way of evaluating (Sekaran, 2003). For this research, face validity was used to ensure questions adapted are suitable for the local environment. The approach is basic and exhibits a minimal guide of content validity. As described by Sekaran and Bougie (2010) that face validity is relevant and suitable to use at the early stage of developing a method.

Five (5) owners of small and medium enterprises, who are experts in the field were selected and met to help evaluate the standards. The questions were then discussed as according to the way they comprehend. Subsequently, eight minor wording

modifications were made on open innovation (Appendix B), that is part three of the questionnaire; one improvement on demographic question; and no items were removed or added. Once the questionnaire was adjusted, then they were readily used for the pilot test.

3.6.2.2 Construct Validity

Construct validity refers to whether the researcher can obtain inferences on the test scores related to the concept being examined. Construct validity comprises two components: convergent and discriminant validity. Discussion about the process of convergent and discriminant validity are covered under sub-section 3.7.3 under Structural Equation Model Using Partial Least Squares. While the discovery or findings were explained in Chapter 4.

3.6.3 Measurement of Reliability

Reliability is concerning the degree to which the instrument measurement of a concept is stable and consistent (Sekaran & Bougie, 2011). Testing for reliability is essential to confirm the stability and consistency of the measuring instruments. One of the most common reliability tests is the alpha coefficient. It is perceived as the most suitable measure of reliability when use Likert scales (Whitley, 2002; Robinson, 2009). No absolute rules exist for internal consistencies, however most agree on a minimum internal consistency coefficient of .70 (Whitley, 2002; Robinson, 2009).

Reliability test on instruments measurement for this study was done at two junctures. The first, researcher used SPSS to analyse data to examine the Cronbach's Alpha (α) value for the pilot study. In the second stage, real data collection used PLS–SEM

method to find the Alpha value. It was elaborated under Assessing Measurement Model in sub-section 3.7.3 of this chapter. An acceptable range Alpha value according to Sekaran (2003) and Hair et al. (2006) is 0.60. However, 0.70 is preferred by Pallant, (2020).

Both validity and reliability are concepts used to assess the quality of research. Both characterised different concepts but are so strongly related to one another. The following explained the first stage assessment of Cronbach Alpha from the pilot study.

3.6.4 Pilot Test

During data collection phase, the initial process normally begins with pilot testing. This procedure is to develop appropriate questionnaire which is for the preparation of actual survey (Sekaran 2003; Cooper & Schindler 2003; Hussey & Hussey, 1997). The test is used to investigate the running condition of the survey and to assess if the questionnaire form is effective in the "real situation". Another aim is to ensure that persons involve in the research sample would understand the questions in a similar manner. Some other advantages to conduct a pilot test include the following (Sproull, 1995):

    i.   facilitate to find out the relevance of survey questions and hypothesis;

    ii.   possibility of examining method of data collection;

    iii.   facts collected allows methods for amendment ahead of the real test;

    iv.   appropriate statistical test; and

    iv.   improved researcher's standing for attention to detail

Participants for this pilot test were owners of SME companies from different sectors. A total of 50 questionnaires were distributed through emails and links to the researcher's close contacts of SMEs owners and managers. Out of the total, 32 of them responded to the survey. Cooper and Schindler (2003), delineated that the group for pilot study can range between 25 to 100 respondents without having to choose statistically. On the other hand, Rossi, Wright and Anderson (1983), define between 20 to 50 respondents are sufficient to detect a questionnaire's error. As such the number of respondents for the pilot study was sufficient to run the test.

The internal consistency of the instruments was evaluated using reliability test and was compared with the results of the previous researchers. The results obtained showed consistency despite some modification. The pilot test Cronbach's alpha scores for all dimensions are shown in Table 3.6. It shows all value were above the minimum alpha value of 0.70. This indicates all scales were good reliability.

Table 3.6
Cronbach's Alpha: Previous Study Versus Pilot Test

Construct Variables	Previous Study Cronbach's Alpha	Pilot Test Cronbach's Alpha
Network Partner Fit Characteristics	>0.89	0.873
Open Innovation	>0.873	0.944
SMEs Performance	>0.93	0.969

3.6.5 Survey Method

Besides an increasing method of use, the researcher adopted an online survey technique in the collection of data because of its cost effectiveness, quicker than conventional methods, ability to reach high volume and assorted samples swiftly,

handy to use as well as easy to reproduce because of its normalisation of data collection process (Hays, Liu, & Kapteyn, 2015). This method allows researcher to get swift information without having to face respondents' biasness when compared with face-to-face interview.

Bryman, (2012) pointed out several advantages in using an online survey, first, this method of survey would be able to cover a broad range of geographical area. Secondly, online survey has a uniform and a variety attractive format to use and that the questionnaire is accessible in many ways. Thirdly, online survey ensures complete responses. The questionnaire designed online, prompts any unanswered or incomplete answers. Besides, the respondents are unable to skip to the next question without answering the current one. The fourth benefit of online survey is that the straight forwardness of using information. The feedbacks are deposited into databank in a numeric set-up manner that makes it easy to access and transmit them for data gathering and analysis. Thus, avoiding any missing data collected.

However, the online survey techniques do have their limitations. Some of the weaknesses of online surveys are lesser participation rate, unused or false email addresses are provided and respondents may lack of focus if the survey questions are designed too time consuming and lengthy (Lefever, Dal, & Matthíasdóttir, 2007). In addition, respondents may hesitate to participate when concerning data security and privacy (Bryman, 2012).

In conjunction to the disadvantages, the researcher took some necessary measures such as; Firstly, when the researcher sent through the electronic email, 'informed consent'

or brief introduction was supported to describe the aim and activities of the research, significance of study, how results are to be used, the researcher's contactable information, a reminder of clicking 'submission button' on completion of answering the questionnaire and the assurance of confidentiality. Secondly, simplifying the questions and the language used as much as possible. Thirdly, to use several non-bias methods to increase survey response rates as much as possible, especially when using online survey. This is in line with suggestions by Nulty, (2008).

Google Form was used for the in real time survey in this study. Google Form is handy, easy-to-use programme with unrestricted access that allows for user-friendly raw information collection and straightforward exports of data analysis. Moreover, participants had the option of responding to the survey on a smartphone or tablet in addition to a personal computer or laptop.

The researcher distributed survey questions to 500 samples of population amongst randomly selected owners or managers of small and medium size enterprises from SME Corp's list irrespective of location and sectors. The researcher considered online survey was appropriate for two reasons. First, the data collection occurred during movement control order of Covid-19 pandemic. At that point of time, online survey was the safest way to conduct. There was no in-person contact and hence, avoiding the spread of COVID-19. Secondly, at the present situation, many businesses have considered moving on from conventional to digitalisation to accelerate their business and non-business tasks.

3.6.6 Data Processing

There are five general steps involving data processing, they include: data editing, handling blank responses, coding, categorizing and data entering.

i. Data Editing

Data editing is vital as it facilitates the maximum usefulness of data. Data editing is required when involved with open-ended questions (Sekaran, 2003; Sekaran & Bougie, 2010). For this current study, open-ended questions were minimal. Only four questions from the demographic profiles were set with open-ended. Despite the setting, the researcher did not face any issue at all. Thus, in all 125 responses were received and answered.

ii. Handle Blank Responses

Sekaran (2003), explains that non-responses occur due to several causes such as unclear enquiries, unfamiliar feedback by participants, information confidentiality and others. For this current research, all questions in the Google Form were automated. A *'required to answer'* message prompted for any incomplete answers. Therefore, handling blank responses was unnecessary when using online survey.

iii. Data Coding

Data coding helped to simplify data entry and data analysis. Each response must be given a code before it can be entered into an assessment tool (Pallant, 2020). For instant, question 01D1 from the demographic variables on respondent' position was coded as 1. SMEs Owner or Founder; 2. Managing Director; 3. Managerial and 4 Others (To specify).

iv. Data Categorisation

Data categorisation is helpful mainly when items were clustered together to evaluate hypotheses, utilizing transform and RECODE function in the assessment tool (Sekaran, 2003). If any items questions were negatively worded, they need to be reversed so that answers are consistently in the same direction. As far as this research is concerned, all items' questions were positively worded.

3.7 Data Analysis Method

The aims of data analysis are; to feel the data, to examine the wellness of data and to examine hypotheses that had been earlier established for the research. The feel for data provides primary concepts on the quality of scales, coding and entering of data. In testing the goodness of data, the researcher could asses by way of factor analysis, determining the Cronbach's alpha, reliability and others. Finally, hypotheses testing, is to examine if the hypotheses that had been developed can be accepted by using appropriate software program.

For this study, data collected were assessed in two stages. As shown in Figure 3.6, the first stage, preliminary data analysis involved data distribution test, normality assessment, common method variance and collinearity variance inflation (VIF). Preliminary data analysis is the sequence flow in examining the data file and the features of variables (Pallant, 2020). While, stage 2 observes the full model of research using two assessment models involving the measurement model assessment and the structural model assessment (Hair, Matthews, Matthews, & Sarstedt, 2017). The aim of model validation is to test whether the quality criteria for observed variables and relationships are met through both, the measurement and the structural model (Urbach

& Ahlemann, 2010). The following Figure 3.6 gives a summary of the data analyses processes.
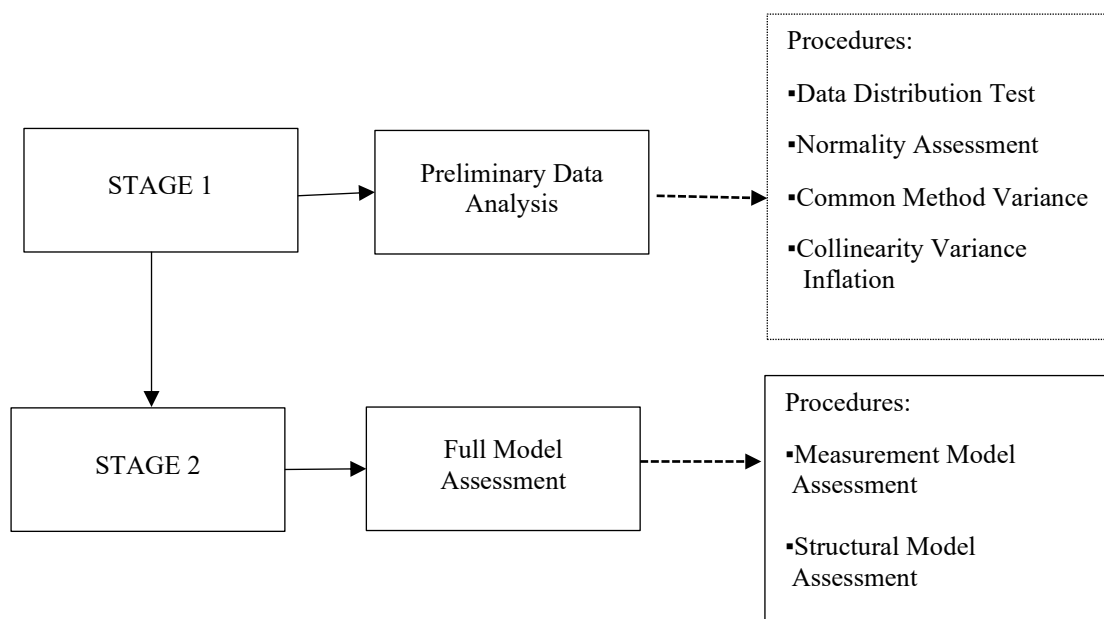
Figure 3.6
Data Analysis Procedures

3.7.1 Preliminary Data Analysis

The aims of preliminary data analysis are to inspect the data file, editing the data, preparing for advance exploration, explain the significance of the data, and to summarize the results. This is to ensure that data are good and of quality for further analysis (Sekaran,2010). Despite several software programs available such as Excel, SYSTAT, SAS, STATPAK, for this preliminary stage, the researcher employed "Statistical Package for Social Science" (SPSS) 21 to arrange and present the raw information. This software enables to interpret and analyse the data under studied. Through the use of SPSS, the researcher employed the following steps as described in stage 1 of the data analysis process. (Shown in Figure 3.6)

3.7.1.1 Data Screening

A process called "data screening" is used to make sure obtained data is pure and suitable for use in subsequent statistical studies. Clean data are considered meaningful, reliable, and acceptable to test causal theory. With these features, the study would derive with the best possible information, otherwise results of final analyses could be biased. Data screening requires the researcher to check on:

i.   Missing Data and Errors

       During analytical process, the researcher is required to inspect if there is any missing data from the data file. The researcher needs to find out the percentage missing and why it happened (Pallant, 2020).

       It is also important to re-check data that has been entered by the respondents. Errors can mess up the researcher's analyses (Pallant, 2020).

ii.   Outlier Detection

       After recognising the missing data, the next step is to detect outliers. This attempt is essential, to curb incorrect data entries.

3.7.1.2 Descriptive analysis

Once certain that the data file is free from error, the next step is summarizing data to give a meaning. Through descriptive analysis the researcher is able to:

i.   Describe features of the research sample.

ii.   Examine the research variables

iii.   Address particular research questions

3.7.1.3 Normality Assessment

In order to know if the distribution of scores of the research variables are 'normal' the data need to be tested. Data is normal when illustration shows a bell-shaped curve, it is symmetrical, has the highest frequencies of scores in the center with lesser frequencies towards the extreme (Gravetter & Wallnau, 2004). Normality can also be assessed by obtaining 'skewness' and 'kurtosis' values (Pallant, 2020). Skewness is the measure of a symmetry, while kurtosis measures the 'peakedness' of a distribution. In addition, according to Pallant, (2020) Skewness and Kurtosis distribution are considered perfectly normal if both their values are zero (0).

Kim (2013) recommended that if the sample size is n<50, and the criteria z value > 1.96, data are not normally distributed. While, a sample size ranging between 50-300 and if z value is > 3.29, data are considered not normally distributed

3.7.1.4 Common Method Variance

During a study, a researcher may experience different types of biasness. Biasness may come from different approach; the researcher's perspective, the respondent's perspective, or even the instrument which was used. Richardson et al (2009, p. 763) define CMV as "systematic error variance shared among variables measured with and introduced as a function of the same method and/or source." There is slight agreement about the accuracy and degree of its impact.

3.7.1.5 Collinearity variance inflation

Collinearity also known as multicollinearity is the existence of a high intercorrelations between two or more independent variables in a multiple regression model (Pallant,2020). The presence of multicollinearity within independent variables can mislead results of the researcher in predicting or understanding the dependent variable in the statistical model. Two methods were used to measure the degree of multicollinearity in a set of multiple variables (Pallant, 2020). They were Pearson correlation coefficient and Variance inflation factor (VIF).

a) Pearson's correlation coefficient aids to examine the collinearity of independent variables. The indicator provides values from -1 to +1. The sign before the figure signifies whether it is a positive correlation on negative correlation. A positive correlation explains as one variable increases, so as the other variable. On the other hand, a negative correlation is described as one variable increases, the other decreases. A perfect correlation of 1 or -1, a perfect linear relationship. While, a correlation of zero (0) means varibles have no relationship (Pallant, 2020).

b) The collinearity of the independent variables was measured using variance inflation factor (VIF). Accordingly, tolerance is the opposite of VIF. The lower the tolerance the higher the multicollinearity of the variables. If the VIF =1, it implies that the independent variables are not correlated to each other. For the value $1 < VIF < 5$, indicates that independent variables are moderately correlated to each other. If VIF value is between ≥ 5 to 10, variables are considered highly correlated and signifies the presence of multicollinearity

among predictors. More than 10 specifies the regression coefficients are weak with the existence of multicollinearity (Belsley, 1991; Shrestha, 2020).

3.7.2 Structural Equation Model Using Partial Least Squares

Structural equation modeling (SEM) is widely used in many fields. SEM is designed to work with multiple regression and provides benefits over some familiar methods (Monecke & Leisch, 2012). The number of sample size requirement for SEM is presented in Table 3.7

Table 3.7
Structural Equation Model and Minimum Sample Size

Statistical Analysis	Minimum Sample Size
Structural Equation Model (SEM)	• A sample size of 50 can yield reliable results (Hair et al., 2006). • Recommended minimum sample sizes of 100-150 to ensure stable Maximum likelihood estimation (MLE) solution (Hair et al., 2006). • Sample size in a range of 150 - 400 is suggested (Hair et al., 2006).

Source: Hair et al. (2006)

Besides, suggestions by Hair (2006), Marcoulide and Chin (2013) recommended using power analysis to determine appropriate size of sample, in which this method considers the model frame, significance level and estimated effect sizes. The estimated sample size using power analysis has been highlighted in sub-section 3.5.3 of this chapter. Additionally, Hair (2006), Marcoulide and Chin (2013), and others advocate using power analysis to decide on the proper sample size, which takes into account the model frame, significance level, and predicted effect sizes. In this chapter's subsection 3.5.3, the projected sample size based on power analysis has been underlined.

There are two approaches of SEM. According to Ramayah et. al (2018), they are Covariance-based SEM (CB-SEM) and Partial Least Square SEM (PLS-SEM). The tools used for research basically depend on the type of approaches in which; the first method is Covariance-based SEM (CB-SEM) with software packages include AMOS, EQS, LISREL and MPlus. Second is Partial Least Squares (PLS) using PLS-Graph, VisualPLS, SmartPLS, and WarpPLS (Wong, 2013).

The researcher chose PLS-SEM approach due to several reasons. Firstly, PLS-SEM supported this research in creating models using latent variables to show their connections (Hair & Ringle, 2017) besides, enabling to test the framework from a prediction perspective. In relation to this research, latent variables were strategic network partner fit characteristics (Independent Variable), open innovation (Moderator Variable) and SMEs Performance (Dependent Variable). Next, PLS-SEM can be applied to either simple or complicated model and is not rigid with data requirements. Thirdly, PLS-SEM was suitable for theory development (Ramayah et al. 2018; Hair et al. 2018). Finally, since the sample size was only 384, it was appropriate to employ PLS-SEM, as it can be used to test not only for smaller sample size (Rigdon, 2016), but also for large samples (Akter et al., 2017).

In representing PLS output, two models' assessment are involved, that is 1) measurement model and 2) structural model. The measurement theory helps to assess factor loading, composite reliability, Cronbach's alpha, average extracted variance (AVE), and discriminant validity. While, the structural theory is used to examine the significance of path coefficient, the variance explanation of endogenous construct, the

size effect and predictive relevance. The discussions on both the measurement and structural models are further described below.

3.7.3 Assessing Measurement Model

The evaluation of the measurement model, which comprises of formative and/or reflective components, is the head start of the PLS-SEM evaluation process. For this research, reflective constructs are used for the measurement model. The validation for reflective constructs as based from this study, were examined through factor loadings, internal consistency reliability, convergent validity and discriminant validity (Hair, Hult, et al., 2017). Researchers can then evaluate the structural model once results meet all the necessary criteria (Hair, et al., 2017)

a. Factor Loading

Factor loading is to examine the consistency of items or indicators used with what they intend to measure (Urbach & Ahlemann, 2010). The recommended and acceptable value for factor loading is more than 0.708 (Hair et al., 2018) as it shows that the construct explains more than 50 percent of the indicator's variance. Item with loading of less than 0.708 would be deleted and reported.

b. Internal Consistency Reliability

Traditionally, internal consistency reliability was measured using both the composite reliability and Cronbach's alpha.

(i) Composite Reliability

Jöreskog, (1971) states that the higher the value of composite consistency, the higher is the reliability. Reliability values from 0.6 to 0.7 are considered as "acceptable in exploratory research", while values from 0.70 to 0.90 are regarded as "satisfactory to excellent". However, the reliability value which

is greater than 0.95 is viewed as problematic because it shows that the products are redundant. It also promotes the likelihood of unwanted reaction patterns that caused overstated correlation (Hair et al., 2018).

(ii)   Cronbach's Alpha

Cronbach's Alpha is another measure of internal consistency reliability besides composite reliability. The Cronbach's alpha is designated as the lower bound, while composite reliability is the upper bound (Hair, et al., 2018).

c.   Convergent Validity

Convergent validity is the degree to which the construct meets and explains its indicators' variability. The metric used to measure a construct's convergent validity is the average variance extracted (AVE). The minimum acceptable AVE is 0.50 or more. An AVE of 0.50 or greater indicates that the construct accounts for 50 percent or more of the variance of the construct's items (Hair et al., 2018).

d.   Discriminant Validity

The discriminant validity is the extent to which items or indicators distinguish from one construct with other constructs in the structural model (Ramayah et al. 2018). There are three types of instruments to evaluate discriminant validity; cross loading criterion, Fornell and Larker's (1981) criterion and Heterotrait-Monotrait ratio of correlation (HTMT). However, amongst the three, Henseler et al. (2015) illustrates that HTMT is able to reach greater accuracy and sensitivity rates (97% to 99%) compared to cross-loadings criterion (0.00%) and Fornell-Larcker criterion (20.82%). HTMT value if above 0.85 (Kline,

2011) or above 0.90 (Gold, Milhotra & Segar, 2001) shows that there is a problem with discriminant validity.

Table 3.8
Guideline for Measurement Model

Item	Validity Type	Criterion	Guidelines
a	Indicator Reliability	Indicator loading	Item loading > 0.708 Item loading < 0.708 is deleted and reported
b	Internal Consistency	Composite Reliability (CR)	CR < 0.6 (Less reliable) CR = 0.6 to 0.7 (acceptable in exploratory research) CR = 0.70 and 0.90 (satisfactory to good) CR > 0.95 (Problematic)
c	Convergent Validity	Average Variance Extracted (AVE)	AVE > 0.50
d	Discriminant Validity	HTMT	HTMT 0.85 (Kline,2011) (Stringent Criterion) HTMT 0.90 (Gold.et.al2001) (Conservative Criterion)

The validity of the measuring model would be satisfactory and acceptable if the variables in this research meets the following criteria: indicator loadings greater than 0.708, composite reliability R is higher than 0.708 but lower than 0.95, AVE is larger than 0.5 and HTMT <0.85 or < 0.90, upon which the researcher may proceed with the structural model assessment.

3.7.4   Assessing Structural Model

When all the results for the measurement model have been fulfilled, the process continues to examine the structural model. Structural model characterizes the

fundamental theories of the model. The results are used to reveal whether observed data would support the concept theory. Methods of evaluation for the structural model of this research consists of path coefficients (β), coefficient of determination (R²), effect size (f2) and predictive relevance (Q²) value (Hair et al., 2019).

3.7.4.1 Path coefficient (β)

In order to validate the proposed hypotheses and the structural model, the path coefficient between two latent variables is evaluated. The researcher is required to run the PLS-SEM algorithm to show the hypothesized relationships among the constructs. The path coefficients are valued between -1 and +1 (Hair et al., 2014), indicating if path coefficient is near +1 a strong positive correlation exists and vice versa for a negative value. It also signifies that the relationship of two latent variables is weak when estimated coefficients is closer to zero (0).

3.7.4.2 Coefficient of Determination (R²)

Determination Coefficient or R^2 value is a measurement used to assess the structural model's predictive accuracy. R^2 value symbolizes all the exogenous latent variables linked to it that influences the endogenous latent variable (Hair et al., 2014; Ramayah et al., 2018). The effect ranges from 0 to 1 with higher values signifying higher levels of predictive accuracy. In addition, researchers can be dependent on "rough" rule of thumb for acceptable R^2:

1. Cohen, (1988), describes 0.26, 013, 0.02 are substantial, moderate or weak levels of predictive accuracy, respectively.
2. Chin, (1998), describes 0.67, 033, 0.19 are subsequently large, moderate or weak levels predictive accuracy, respectively.
3. Hair et al., (2017), describes 0.75, 050, 0.25 are substantial, moderate or weak levels of predictive accuracy, respectively.

The above three items show variations of values because R^2 is supported by different disciplines.

4. Urbanch and Ahlemann (2010) recommend that R^2 values must be adequately large for the model to reach a minimum level of explanatory power.

5. Falk and Miller (1992) recommend that R^2 values must be the same or more than 0.10 which is acceptable for the difference to explain a particular endogenous latent and be considered appropriate.

3.7.4.3 Effect Size (f^2)

The effect size (f^2) tends to evaluate the relative effect of a predictive construct at an endogenous construct (Cohen, 1988), that is, assessing the difference of the R^2 values that estimates the model with and without predecessor construct. The interpretation of the f^2 when values are 0.02, 0.15 and 0.35 represents small, medium and large respectively by Cohen, (988). The formula is:

$$f^2 = \frac{R2 \text{ included} - R2 \text{ excluded}}{1.0 - R2 \text{ included}}$$

3.7.4.4 Predictive Relevance (Q^2)

In order to evaluate predictive relevance, (Geisser, 1974; Stone, 1974) are usually used besides blindfolding procedure which is available in SmartPLS software package (Ramayah et al., 2014). This procedure is applied and would precisely predicts the data points of indicators in the reflective measurement models of endogenous constructs and endogenous single-term construct. In the structural model, if Q^2 is larger than 'zero' then this implies that the exogenous constructs have predictive relevance for the endogenous construct under study (Fornell & Cha, 1994). There had been discussions on goodness-of-fit (GoF) measure for PLS-SEM, where, researchers found that GoF is inappropriate for detecting indefinite model (Henseler & Sarstedt, 2012). Subsequently, researchers using PLS-SEM depend on model's predictive capabilities in signifying the model's quality (Heneler et al. 2014) or GoF.

3.7.5 Moderation Analysis

A moderator variable is one that affects the relationship between the independent variables and the dependent variables. It involves the direction and/or strength of a relation between the predictor variable and the dependent variable (Baron & Kenny, 1998; Hair et al., 2014). The conception of moderator effects is equivalent of a mediator variable. However, its main distinction is that moderator variable does not rely on independent variable (Hair et al.,2014) In moderation analysis, the R^2 change becomes an important issue.
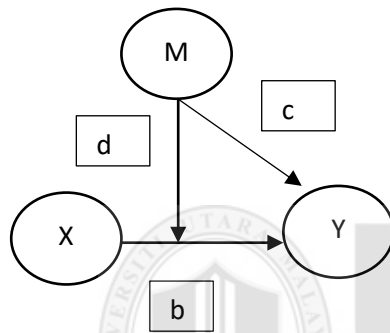
Figure 3.7 Moderating Effect　　　　　　*Figure 3.8* Moderating effect when analysis
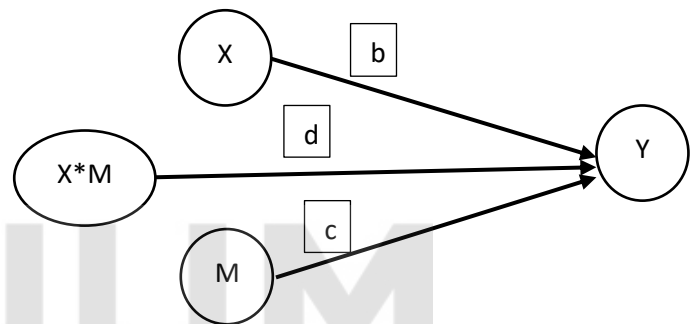
The illustrations Figure 3.7 and 3.8 were depicted from Ramayah et al. (2018) and Hair et al. (2017). Figure 3.7 is a model that exemplifies the moderating effect. The moderator variable (M), impacts the relationship between exogenous X (independent variable) and endogenous Y (dependent variable). An arrow pointing (d) to the moderating effect connects X and Y. In addition, when the moderating effect is included in a PLS path model, there is a direct link (c) between the moderator and the endogenous construct (Y). This second channel is critical (and a common source of error) since it accounts for the moderator's direct influence on the endogenous construct. If route (c) is excluded, the influence of M on the connection between X and Y (i.e., b) is exaggerated. Moderation is similar to mediation in that being a third variable (i.e., a mediator or moderator variable) influences the strength of a link

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between two latent variables. The difference between the two notions is that the moderator variable is independent of the exogenous construct. In contrast, there is a direct impact between the external construct and the mediator variable in mediation. When no moderator is involved, the formula can be written as:

Y = a + b. X + c. M

As shown, the effect of X and Y is determined by the intensity of the simple effect b, and by the product of d and M. To see how a moderator variable may be incorporated into the model, the equation is as follows:

Y = a + (b + d. M). X + c. M

Y = a + b. X + c. M + d (X*M)

This equation demonstrates that having a moderator effect necessitates specifying the influence of the exogenous latent variable (b X), the effect of the moderator variable (c M), and the product term d (X*M), also known as the interaction term. As a consequence, d illustrates how the moderator variable M influences the impact b. The idea of an interaction term is depicted in Figure 3.8. The strength of relationship between X (exogenous) and Y(endogenous) when M (moderator) is zero. If the quantity of moderator rises by one standard deviation unit, b is expected to vary according to the size of d. It is shown that the model adds an extra latent variable, the interaction term, which reflects the product of the exogenous latent variable X and the moderator M. Researchers frequently refer to interaction effects when modelling moderator variables as a result of this interaction term.

3.8   Summary

This section enlightens the research design and methods planned for this dissertation. It illustrates the proposal elements to make sure that the investigation is in the right

course, besides, ensuring a proper and adequate research procedure. Appropriate development of hypotheses development was debated in order to reinforce the research framework. The research blueprint area deliberately covers the questionnaire development and simple random sampling technique, that discusses the population besides the sample size scheming were included within this research. Subsequently, the collection of data procedure together with how data for this study would be analyzed were also emphasized. Validation on the findings of this survey is further discussed on the following chapter.

CHAPTER 4

RESULTS AND DISCUSSION

4.1 Introduction

This section continues the methodology from chapter three by talking about data analysis. The study methodology and the analysis of the survey data are covered in the discussion. This report's organisation roughly adheres to Hair et al. (2018) definition of the typical accepted PLS valuation. The preliminary data analysis was conducted prior to ensure data is clean and then it is followed by the assessment of validity as well as the reliability of the measurement model. Next, is the establishment of the structural model, the evaluation of moderation and the hypotheses results. This section completes by summing up the primary results with a summary.

4.2 Preliminary Data Analysis

For the preliminary stage, the researcher utilized "Statistical Package for Social Science" (SPSS) version 21 to arrange and present the raw figure. This software enables to interpret and analyse the data under studied.

4.2.1 The Response Rate

The collection of data was conducted from September 2020 to May 2021. The process took a longer period than expected because during that time, Malaysian government imposed a nationwide lockdown which is known as Movement Control Order (MCO). The lockdown, has indirectly impacted the mobility of people as well as the economy, be it to any individual persons or business owners.

This research is initiated on a survey instrument sent through electronic e-mail to 500 randomly selected owners or managers of SMEs in Malaysia. The selected samples of SMEs were not restricted to any kind of industries or geographical areas since the survey was done online. However, it is targeted to small and medium size enterprises only. Details of SMEs were acquired from National Entrepreneurs Directory under SME Corporation Malaysia (SME Corp Malaysia).

A total of 125 out of 500 companies responded to the questionnaire showing a response rate of 25%. The questionnaire was sent to the SME owners' or relevant managers' email addresses as appeared in the directory. This is rational on the ground that owners or managers involved are the top management who have the authority to reveal information for their firms. In addition, they also have the discretion to appoint relevant people to respond the questionnaire.

Nulty (2008) and Holtom et al. (2022) proposed some relevant methods to increase the number of participants in answering the survey. One useful method suggested by Nulty, (2008) to boost response rate and particularly for online method is to repeat reminder emails to non-respondents. Having to face the slow response throughout the Covid-19 pandemic, the researcher sent reminders after two weeks, only to respondents who had not responded to the survey. Moreover, during the pandemic interference where there was mobility constriction that impacted the business economy and it was found that some companies existed and some have dissolved. Each non-responded SME was again emailed with a related online link through the Google Form containing the sets of questions of the final survey.

A total of 125 completed questionnaires were received out of 500 questionnaires distributed to SMEs owners. The response rate for this study was 25%. Accordingly, it is slightly better for internet surveys, as Abdullah et al. (2013) and Ramayah et al., (2005) highlighted that the moderate online survey response rate in Malaysia is between 10 and 20%. Nevertheless, the response rate is below average of 35.7% for firm-level as published in high-ranked journals (Baruch & Holtom, 2008). Inspite of the response rate being below average of firm-level, the generalizibity for this research was ensured based on the following reasons; Firstly, a recommended method for PLS to search for an appropriate sample size is by using G*Power (Faul et al., 2007; Ramayah et al., 2018). When examined through G*Power with effect size of 0.15, (medium effect), α at 0.05, and power at 0.95; according to Cohen (1988) power range between 0.80 to 0.95, thus, the required sample size was 119 and could make certain of generalizibility. For this study, the response rate received was 125 and beyond the required sample size, thus, generalizibility was possible. Next, this study was also backed by the sample size of SMSE with homogeneity characteristics and were appropriate to support the generalisation. Finally, in order for the researcher to avoid sampling bias and validate so that samples represent the population, random sampling was employed to select the number samples of SMSE from various sectors that are dispersed all around Malaysia.

4.2.2 Data Screening

A set of questionnaires was sent through an online link to owners of SMEs email addresses. Initially, the researcher managed to get 125 participants to completely respond the survey. A detailed check-up was performed on all responses to detect any infeasible data. Except for two responses, all other data were found relevant. The

whole 123 responses were then used for the statistical analysis. The reason for the invalid responses was because of a double entry. Once a completed online questionnaire is submitted, the respondent is unable to retrieve to cancel. However, double entries were alerted during the screening process and confirmation was made with the participants. As such, two responses were excluded.

The procedures to prepare information involved coding, data entry into a data file, filtering information as well as ascertaining missing responses. Since research made use of online survey, transformation of information was almost instantaneous into a database.

Once the initial screening was done, usable data were inserted into IBM SPSS Version 21 software to prepare general descriptive statistical reporting (Appendix C). Again, an exploratory analysis for each variable was generated to inspect on the non-response or infeasible data material. In order to analyse measurement and structural models for multivariate analysis, SmartPLS 3.0 software was used. SmartPLS 3.0 is a primary software uses the partial least squares (PLS) path modelling technique to do variance-based structural equation modelling (Ramayah et al., 2018; Hair et al, 2019). For the purpose of creating raw input for the SmartPLS software, the data was retrieved from an Excel CVS file.

4.2.3 Descriptive Statistics

As shown in Table 4.1, out of 123 responses, 69.1% respondents were SME owners, 18.7% were managing directors and 12.2% were managers. About 65 (52.8%) of SME owners registered as sole proprietors, 14(11.4%) partnership and/or limited liability

partnership and 44 (35.8%) as private limited. The business structure of SMES companies consists of 65 (52.8%) sole proprietor, 14 (15.4%) partnership or limited liability partnership and 44 (35.8%) private limited.

Majority of the respondents with the count of 102 (82.9%) were SMEs in the category of small size with annual sales turnover between RM300,000 to less than RM3 million and 21 (17.1%) were medium size companies with annual sales between RM3million to RM50 million. There were 46 (37.4%) business enterprises involving with manufacturing, while, 77 (62.6%) were in service sector. The manufacturing sectors' activities from SMEs sample involved food and beverages, textiles, electronics and electrical, rubber, machinery, chemical product, metal products, wood, pharmaceutical products and transportation equipment. Whilst, service sectors activities consist of wholesale, retail, computer services, transportation, paper and printing and human health

There were 41(33.3%) business companies that have operated for more than 10 years, 25 (20.3%) 2 to 4 years, 20 (16.3%) 5 to 7 years, 19(15.4%) 7 to 9 years and the remaining 18 (14.6%). About 105 (64.3%) enterprises had established local networks partners while 18 (35.7%) had not developed. On the other hand, 56 (45.5%) of the enterprises have international network business partners, while the remaining 67 (54.5%) enterprises have none. Using both formal and informal network type of linkage is most favoured by 70 (56.9%) of the SMEs, compared to 30 (24.4%) of the SMEs strictly preferred formal network linkage, while the rest 23 (18.7%) chose the informal way.

The most popular type of collaboration by SMEs with their business network partners is strategic alliance with the rate of 33 (26.8%), followed by joint marketing activities with the count of 30 (24.4%), next is sub-contracting 20 (16.3%), joint venture 17 (13.8%), licensing 9 (7.3%), retail services 2 (1.6%) and lastly, others 1 (0.8%).

Table 4.1
Companies' Demographic Information

Variable	Description	N	%
Job Position	SME Owner	85	69.1
	Managing Director	23	18.7
	Managerial	15	12.2
Business Structure	Sole Proprietary	65	52.8
	Partnership or Limited Liability Partnership	14	11.4
	Private Limited Company	44	35.8
Number of Employees	5-74	111	90.2
	75-200	5	4.1
	Above 200	7	5.7
Annual Sales Turnover	RM300,000 less than RM3 million	102	82.9
	RM3 million less than RM 5 million	13	10.6
	RM5 million - RM50million	8	6.5
Business Age	Less than 2 years	18	14.6
	2-4 years	25	20.3
	5-7years	20	16.3
	8-10years	19	15.4
	Above 10 years	41	33.3
Type of Industry	Manufacturing	46	37.4
	Services	77	62.6
Local Networks	None	18	14.6
	Less than 4	34	27.6
	4 to 6	23	18.7
	7 to 9	7	5.7
	More than 10	41	33.3
International Networks	None	67	54.5
	Less than 4	30	24.4
	4 to 6	17	13.8
	More than 10	9	7.3
Network Type of Linkage	Formal	30	24.4
	Informal	23	18.7
	Formal and Informal	70	56.9

Table 4.1 Continued)

	Strategic Alliance	33	26.8
	Joint Venture	17	13.8
	Licensing	11	8.9
	Sub-Contracting	20	16.3
Type of Collaboration	Joint R&D	9	7.3
	Joint Marketing Activities	30	24.4
	Retail Services	2	1.6
	Others	1	0.8

n=123

4.2.4 Normality Assessment

There are several methods that can be used for normality test. The test can be either graphical or numerical. Basing on the sample size of this study numerical z value of skewness and kurtosis method was used (Appendix D).

To get z score, the skewness values and excess kurtosis are divided by their respective standard errors. As shown in Table 4.2, z score skewness and kurtosis for organisational performance are -1.92 and -0.762 respectively. The strategic network partner fit characteristics variable has score skewness of -1.99 and kurtosis -0.566. Meanwhile, open innovation has z score skewness 0.711 and kurtosis of -0.663. Hence, the normality assessment for this research shows that with n=123, based on Kim (2013) the data is normally distributed as the z value of skewness and kurtosis for all the variables is < 3.29. Values above 3.29 signify as non- normal distribution.

On the other hand, common guidelines by Hair et. al (2017) predicate when skewness value is greater than +1 or lower than –1, distribution stretches toward the right or left tail. For kurtosis value greater than +1, distribution becomes too peaked and if less than –1 distribution is too flat. Distributions exhibiting skewness and/or kurtosis that exceed these guidelines are considered non-normal. Accordingly, the scores shown in Table 4.2 are considered normal.

Table 4. 2
Normality Test

Mean Variable	Sample Size (n)	Skewness	SE skewness	Z- score skewness	Kurtosis	SE Kurtosis	Z-score Kurtosis
Organisational performance	123	-0.418	0.218	-1.92	-0.330	0.433	-0.762
Strategic Network Partner Fit Characteristics	123	-0.435	0.218	-1.99	-0.245	0.433	-0.566
Open Innovation	123	0.155	0.218	0.711	-0.287	0.433	-0.663

4.2.5 Common Method Variance

For this research, Harman's single-factor test was performed to evaluate the common method variance (CMV). It is a method which is most commonly used by researchers to examine CMV. In this study, the Harman's single-factor analysis in Table 4.3 explained that the variance was 45.168 % (Appendix E). According to Podsakof et al. (2003), variance which is less than 50 percent indicates that there was no common method bias. As such, the data collected is relevant and may proceed for further analysis.

Table 4.3
Common Method Variance

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% Of Variance	Cumulative %	Total	% Of Variance	Cumulative %
1	1.889	62.966	62.97	1.355	45.168	45.168
2	0.621	20.695	83.66			
3	0.490	16.338	100.00			

4.2.6 Collinearity Variance Inflation Factor (VIF).

In Table 4.4 portrays the correlation coefficient of SMEs performance with the variable of strategic network partner fit characterisitcs has positive moderate

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correlation (r = 0.472, p < 0.01), followed by positive open innovation correlation (r = 0.379, p < 0.01).

Table 4.4
Correlations

		Mean Organisational Performance	Mean Strategic Network Partner Fit Characteristics	Mean Open Innovation
Pearson Correlation	Mean SMEs Performance	1.00	0.472	0.379
	Mean Strategic Network Partner Fit Characteristics	0.472	1.00	0.480
	Mean Open Innovation	0.379	0.480	1.00

The absolute score of Pearson correlation coefficient is less than 0.8, thus, indicating collinearity is very less likely to happen (Shrestha, 2020).

Table 4.5
Collinearity Statistics

Construct Means	Collinearity Statistics	
	Tolerance	VIF
Strategic Network Partner Fit Characteristics	0.77	1.30
Open Innovation	0.77	1.40

a. Dependent Variable: Mean Organisational Performance

As shown in Table 4.5, the variance inflation factor (VIF) is greater than 1 which shows that the the independent variables are not correlated to one another. For strategic network partner fit characteristics, the value 1< 1.30 <5, whereas open innovation has value of 1< 1.40 < 5, showing both independent variables are moderately correlated to each other. This reveals the collinearity of independent variables is not an issue.

Now that the preliminary data analysis was found valid, the next session gages further the measurement and structural model of the research using PLS-SEM. Smart PLS Version 3.0 software was used to access the models theorised in this research.

4.3 Measurement Model Assessment

This is the first stage in assessing PLS-SEM results that is associated in evaluating the measurement models. The following covers the results of reflective constructs: items or factor loadings, internal consistency reliability, convergent validity and discriminant validity.

4.3.1 Factor Loadings

The following Table 4.6, shows the outcomes of the variables' indicator loading. In assessing reflective measurement model, loading values is equivalent and more than 0.708 which are accepted. It shows a latent variable can describe at least 50 percent of the item variance (Hair et al, 2018). After running through, 8 items namely: compat4, compl7, inb1, inb2, inb3, inb4, inb6 and inb9, had been deleted due to their loadings which were less than 0.7.

Meanwhile, Table 4.7 displays the summary of indicators that have been declined due to lower loading. The table shows original number of items, final number of items, number of items dropped and the descriptions of items dropped.

Table 4.6
Factor Loading

| Code | Strategic Network Partner Fit Characteristics | | | Open Innovation | | SMEs Performance |
	Compatibility Loading	Complementary Loading	Commitment Loading	Inbound Loading	Outbound Loading	Performance Loading
Compat1	0.837					
Compat2	0.858					
Compat3	0.822					
Comp11		0.741				
Comp12		0.715				
Comp13		0.82				
Comp14		0.769				
Comp15		0.844				
Compl6		0.813				
Comit1			0.758			
Comit2			0.711			
Comit3			0.859			
Comit4			0.79			
Comit5			0.888			
Comit6			0.856			
Inb5				0.754		
Inb7				0.816		
Inb8				0.784		
Inb10				0.838		
Inb11				0.891		
Inb12				0.846		
Outb1					0.783	
Outb2					0.812	
Outb3					0.845	
Outb4					0.892	
Outb5					0.882	
Outb6					0.906	
Outb7					0.734	
Out8					0.796	
Perf1						0.884
Perf2						0.928
Perf3						0.906
Perf4						0.847
Perf5						0.901
Perf6						0.748

*Note: compat4, compl7, inb1, inb2, inb3, inb4, inb6 and inb9 were deleted due to low loadings that is less than 0.7

Table 4.7
Summary of Dropped Items

Variable	Items Code	Original Number of Items	Final Number of Items	Number of Item Dropped	Description of Items Dropped
Strategic Network Partner Fit Characteristics	COMPAT	4	3	1	**compat 4**: We choose our network partner because of our approximately similar in size and strength.
	COMPL	7	6	1	**compl7**: Our company's network partner has complementary assets we require.
	COMIT	6	6	0	
Open Innovation	INB	12	6	6	**Inb1**: Our company gets IDEAS from the PUBLIC SECTOR (E.g.: university, government agency and/or research institution)
					Inb2: Our company gets IDEAS from the PRIVATE SECTOR (E.g.: business of different nature, competitors, consultants, research institutions and/or university).
					Inb3: Our company gets IDEAS from the CUSTOMER.
					Inb4: Our company gets IDEAS from the SUPPLIER.
					inb6: Our company gets R&D initiatives from the PRIVATE SECTOR (E.g.: business of different nature, competitors, consultants, research institutions and/or university).
					inb9: Our company INTEGRATES TECHNOLOGY with or without license of intellectual property from SUPPLIER.
	OUTB	8	8	0	
Organisational Performance	*PERF*	6	6	0	

4.3.2 Internal Consistency Reliability

According to Hair, Black and Babin, (2010), a measurement model has sufficient internal consistency reliability when composite reliability (CR) is greater than the 0.7 threshold for each construct (Hair, Black, & Babin, 2010). Table 4.8 exhibits that for this research, the CR of each construct surpasses the recommended limit of 0.7.

Table 4.8
Internal Consistency Reliability and Convergent Validity

	Composite Reliability	Cronbach's Alpha	Average Variance Extracted (AVE)
Compatibility	0.877	0.791	0.704
Complementary	0.906	0.875	0.616
Commitment	0.921	0.896	0.66
Inbound	0.926	0.904	0.677
Outbound	0.948	0.936	0.694
Organisational Performance	0.949	0.935	0.759

Cronbach's alpha (CA) is another measure of internal consistency reliability. According to Julie Pallant (2020) values above 0.7 are acceptable, while above 0.8 are preferred. Thus, CA's scales in Table 4.8 show the lowest is 0.791 and highest is 0.936, which values are all acceptable.

4.3.3 Convergent Validity

Convergent validity is the third step to assessing the reflective measurement model. Hair et al. (2019) illustrate that an average variance extracted (AVE) above 0.50 is acceptable, as it describes that the construct explains at least 50% of the variance of

items. As shown in Table 4.8, all the values above are acceptable and have fulfilled

the requirements of internal consistency reliability and convergent validity.

4.3.4 Discriminant Validity

In testing discriminant validity (DV), Heterotrait-Monotrait (HTMT) was chosen

because it is more robust compared to other methods of DV test. Discriminant validity

problems exist when HTMT scores are too high. According to Gold, Milhotra and

Segar (2001) acceptable value is below 0.90. Based on table 4.9, values range between

0.24 to 0.88 and were all below 0.90, which are distinct and conserve (Henseler et

al.,2015). In this case, the discriminant validity has been achieved.

Table 4.9
Hetrotrait-Monotrait (HTMT)

ITEMS	Compatibility	Complementarity	Commitment	Inbound	Outbound	Organisational Performance
Compatibility						
Complementarity	0.764					
Commitment	0.709	0.88				
Inbound	0.28	0.294	0.369			
Outbound	0.339	0.379	0.393	0.761		
Organisational performance	0.424	0.449	0.543	0.342	0.338	

Through the various steps of evaluation, all items under the measurement model were

found to be reliable; as such, this study was advanced to the next stage, which was the

structural model assessment.

4.4 Structural Model Assessment

The following subsections focus the tests used to assess this structural model. As discussed in Chapter Three, path coefficients (β), determination coefficient (R²), effect size (f²) and predictive relevance (Q²) value (Hair et al., 2019). In addition, this investigation also determines the moderator relationships as suggested in the research model.

4.4.1. Path Coefficient (β)

T-statistics were generated for all routes to examine the significant level. This can be done using the SmartPLS bootstrapping feature. The setup for the critical values included two-tailed test of 1.96 with significance level of 5% (Hair et al, 2014). The number for bootstrap sample was set at 5000 (Hair, Hult, et al., 2017). Table 4.10 illustrates the path coefficients, observed t-statistics, and significance level before moderating interaction of open innovation. Table 4.11 indicates the path coefficients, observed t-statistics, and significance after the creation of moderation interaction between strategic network partner fit characteristics and open innovation.

4.4.2 Coefficient of Determination (R²)

The coefficient of determination, abbreviated as (R²), denotes the percentage change in dependent variables explained by changes in independent variables. As a result, a higher R^2 value improves the structural model's predictive ability. In this study, the SmartPLS algorithm function is used to calculate R^2 values for Figure 4.1.
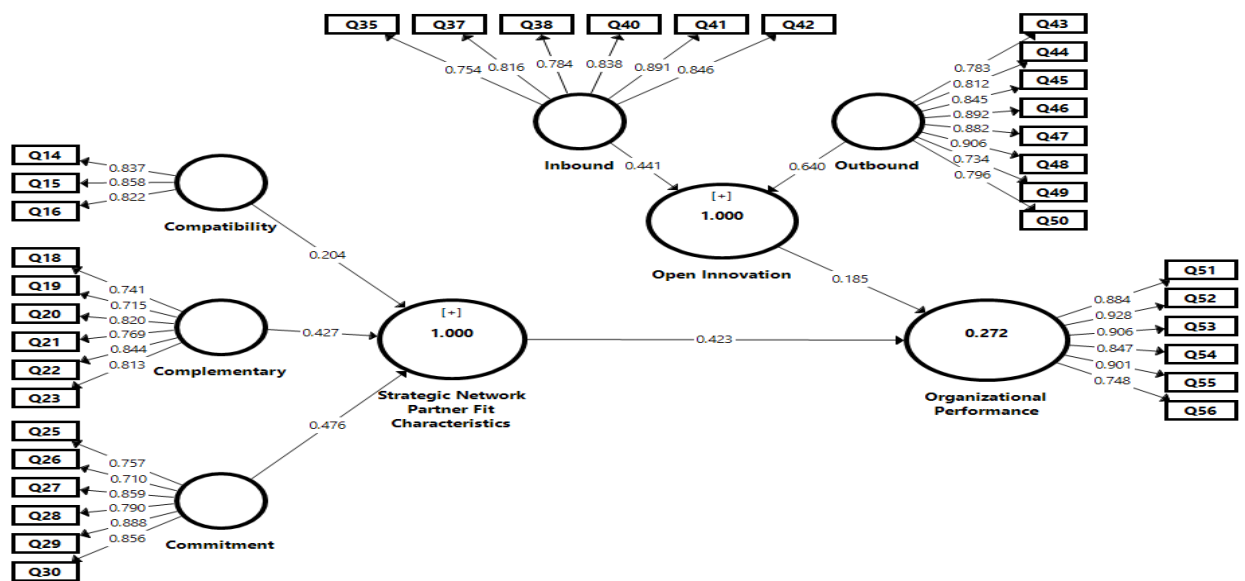
Figure 4.1
Structural Model Before Moderating Interaction of Open Innovation

The R^2 of 0.272 in Figure 4.1 specifies that the Strategic Network Partner Fit (exogenous variable) and the Open Innovation (moderator variable) explain 27.2% of the variance in SMEs Performance. The structural model illustrates before the moderating interaction of open innovation took place. The path coefficient, observed t-statistics and the significant level of the variables are shown in Table 4.10.

Table 4.10
Path Coefficient, Observed T-Statistic, Significant Level before Moderating Interaction of Open Innovation

Independent Variables	Dependent Variables	Path Coefficient (β)	Observed T-Statistics	Significant Level
Strategic Network Partner Fit Characteristics (SNPFC)	SMEs Performance (SP)	0.423	5.536	0.000
Open Innovation (OI)	SMEs Performance (SP)	0.185	2.102	0.036

The bootstrapping function is used to generate the t-statistical values. The next structural model includes open innovation as a moderator. In this study, bootstrapping

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produced 5000 samples from 123 cases. Figure 4.2 depicts the structural model's output.
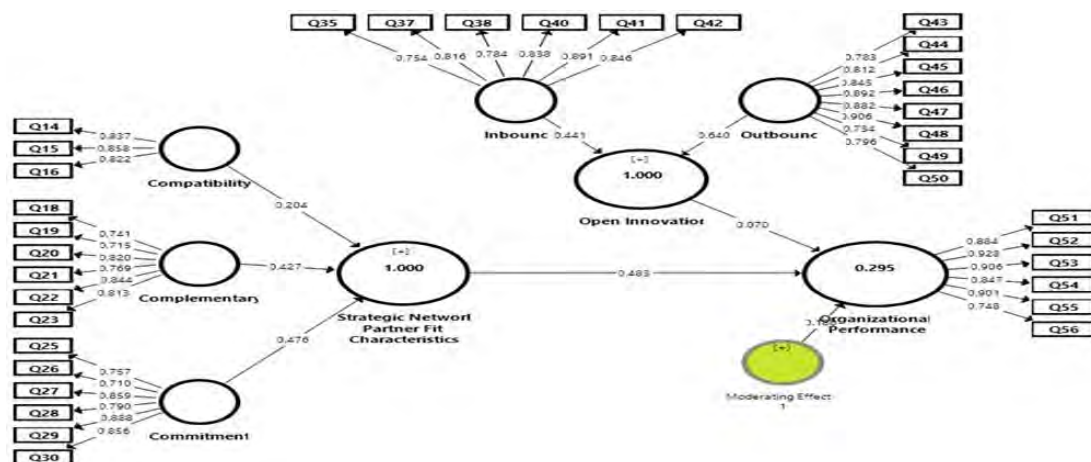
Figure 4.2
*The moderating effect of strategic network partner fit characteristics * open innovation*

Referring to Figure 4.2, strategic network partner fit characteristics (SNPFC) moderated by open innovation (OI) explained 29.5% of the variance in SMEs performance (SP). Generally, the R² values of 0.75 is large, 0.50 is moderate and 0.25 as weak (Hair et al., 2017). On the other hand, Hair et al (2019) explain that acceptable R^2 values are determined by the context of the research study itself. They further explained that in some cases R^2 is accepted and considered satisfactory even though the value is 0.10. A paper reviewed by Henseler & Ringle (2009), covering international marketing and management areas using PLS-SEM, cited Chin (1998) who portrays R^2 values of 0.67, 0.33, and 0.19 in PLS path models as substantial, moderate, and weak respectively. Meanwhile Cohen, (1988), under the principle of behavioural science describes R^2 values of substantial, moderate and weak as of 0.26, 0.13 and 0.02 respectively. In this study, considering all three authors, the R² value 0.295 indicates that interaction term value (SNPFC*OI) is acceptable.

Table 4.11
Path Coefficient, Observed T-Statistic, Significant Level after Moderating Interaction
of Open Innovation

Variables	Dependent Variables	Path Coefficient (β)	Observed T-Statistics	Significant Level
Strategic Network Partner Fit Characteristics (SNPFC)	SMEs Performance	0.483	5.649	0.000
Open Innovation (OI)	SMEs Performance (SP)	0.070	0.592	0.554
Moderating Effect	SMEs Performance (SP)	0.180	2.023	0.043

Note: t-value > 1.96 and p-value <0.05

4.4.3 Effect Size f^2

In moderation analysis, the R^2 change is an essential issue. The R^2 before and after
moderation shows the difference of 0.023. This indicates with the addition of the
interaction term (SNPFC*OI) the R^2 changed about 2.3% (additional variance). Next,
is to calculate the effect size (f^2) as the following:

$$f^2 = \frac{0.295 - 0.272 = 0.031}{1.00 - 0.295}$$

Cohen (1988) advocate that the interpretation of the f^2 when values are 0.02, 0.15 and
0.35 represents small, medium and large respectively.

Table 4.12
The Effect Size (f^2)

	Included	Excluded	f-squared	Effect Size
R-squared	0.295	0.272	0.031	Small

Therefore, based on the f^2 of 0.031 (Table 4.12), it is concluded that the effect size is
small. Nevertheless, Chin et al (2003) argued that low effect size f^2 does not suggest
that moderator effect is unimportant. As they quote, **"Even a small interaction effect**

can be meaningful under extreme conditions, if the resulting beta changes are meaningful, then it is important to take these conditions into account".

At the primary phase, the main effect of both independent variables SNPFC and open innovation towards SMEs performance resulting coefficient of determination ($R^{2)}$ = 0.272. This denotes that SNPFC and open innovation as independent variables, explain 27.2% of the variance in SMEs performance and the rest are explained by other variables. Next is, when to find out if open innovation moderates the relationship between SNPFC and SMEs performance, the interaction term in the model has to be generated. The following R^2 results showed 0.295 or 29.5% indicating, with the interation term of (SNPFC*OI), there was an increase by 0.23 shown on the main effect. This means that the effect of SNPFC on SMEs performance depends upon the levels of open innovation as a moderator, even though the effect size is small.

4.4.4 Predictive Relevance (Q^2)

The Q^2 value of latent variables can be obtained using SmartPLS application known a blindfolding. The blindfolding method enables to examine the PLS path model's predictive accuracy. Q2 should be greater than zero (0). Small, medium, and large are represented by values greater than 0, 0.25, and 0.50, respectively (Ali et al., 2018; Hair et al., 2019).

Predictive relevance (Q^2) values for strategic network partner fit characteristics shows (Q^2 = 0.515), open innovation (Q^2 = 0.579) and SMEs performance is (Q^2 = 0.207). Predict Relevance ($Q^{2)}$ values larger than zero (0), indicate that the model has qualified

Q^2. Table 4.13 portrays predictive relevance (Q^2) with result from the blindfolding test utilising cross validation redundancy.

Table 4.13
Blind Folding Outcome

	SSO	SSE	Q^2 (=1-SSE/SSO)
Compatibility	369	369	
Complementary	738	738	
Commitment	738	738	
Inbound	738	738	
Outbound	984	984	
Strategic Network Partner Fit Characteristics	1845	894.918	0.515
Open Innovation	1722	725.612	0.579
SMEs Performance	738	595.429	0.207

4.4.5 Moderation Analysis

In moderation analysis not only that the R^2 becomes an important issue, the form of condition specifying whether it increases or decreases a relationship between two variables is also crucial (Dawson, 2014).

The SmartPLS bootstrap feature is used to confirm the moderation model. Based on the result, in Table 4.11 the moderator is significant at p-value = 0.043 <0.05. The bootstrapping analysis also showed β = 0.180 > 0 value, indicating a positive relationship and it is significant with t-value of 2.023 > 1.96. The R^2 of the interaction model SNPFC*OI 0.295, (Figure 4.2), indicates that 29.5% of the variation in the outcome explained the dependent variables. There has been an increase about 2.3% (additional variance) from the R^2 of the main effect model (Figure 4.1)

4.4.6 Hypotheses Testing

A hypothesis is characterized by each path connecting two latent variables within a structural model. Through the structural model assessment, it allows the researcher to approve or disapprove each hypothesis developed. It also comprehends the power of the relationship of dependent variable and independent variable. By using the SmartPLS algorithm output, relationships between independent and dependent variables were examined.

Assessment of the path coefficient can be referred in Table 4.11 and p-value show support for the hypotheses. According to the analysis, supported hypotheses are significant at least at 0.001, expected sign direction (i.e., positive) and consist of a path coefficient value (β) ranging from 0.070 to 0.483.

Thus, the accepted hypotheses are explained below:

H1= path coefficient (known as beta) 0.483 with t value 5.649 and p-value > 0.00 therefore H1 is supported

H2 = path coefficient (known as beta) 0.070 with t value 0.592 and p-value < 0.554 therefore H2 is not supported

H3= path coefficient (known as beta) 0.180 with t value 2.023 and p-value > 0.043 therefore H3 is supported

4.5 Summary

This section portrays outcomes of this dissertation. All research questions, objectives and three hypotheses have been addressed with the support of prior studies. Based on results obtained, strategic network partner fit characteristics has a substantial beneficial relationship with SMEs performance. As an independent variable, open innovation has a significant connection with the performance of SMEs. Open innovation also moderates the relationship between the strategic network partner fit characteristics and organisational performance. Research results support hypotheses H1 and H3 but does not support H2. An overview of this study and the concluding comments can be obtained in the next chapter.

CHAPTER 5

CONCLUSION AND RECOMMENDATIONS

5.1   Introduction

This chapter explains the deduction of how this study corresponds to the research objectives postulated at the preparatory stage of this research. The research concept and practicable contribution were deliberated, followed by research constraints and future study suggestions. Lastly, there is a summary that ends this dissertation.

5.2 Addressing the Research Questions

In line with the objectives and hypotheses developed, this section delivers feedbacks to the research questions that were posited earlier. The three research questions are:

Research Question 1. Does strategic network partner fit characteristics have significant relationship with SMEs performance?

The outcome of this research shows that strategic network partner fit characteristics have an important and beneficial assembly with SMEs' performance. This is shown by the path coefficient or beta (β) value of 0.483, the t-statistics value of 5.649, and the p value of $0.05 > 0.000$. The paths of independent and dependent variables are significantly related. In this research, the predictors of SMEs' performance are indicators of strategic network partner fit characteristics, comprising compatibility, complementarity, and commitment. These dimensions have a positive relationship with the performance of SMEs. Consequently, the research question and hypothesis are supported.

Basing on the statistical results, the influence of commitment (β = 0.476, Figure 4.2) exhibits a higher impact on SNPFC as compared to complementarity (β = 0.427, Figure 4.2) and compatibility (β = 0.204, Figure 4.2).

This finding suggests that network partners' willingness to commit resources, make long-term investments, demonstrate loyalty, share expertise, and build an enduring strategic network influences the characteristics of a strategic network. It posits that, strategically, SMEs are smaller organisations, but having a network alliance with strong commitment features delivers a higher magnitude of characteristics for network partners.

In addition, complementarity, which is also considered another important dimension of SNPF, It has a path coefficient of 0.427, indicating that the weight of impact is less than the commitment of 0.476. It assists SNPFC in influencing the performance of small and medium-sized enterprises. The essential indicator criteria of complementarity for SNPFC involve unique competencies, technical capabilities, market coverage, diverse customers, a quality distribution system, and forming synergies.

The compatibility component showed β = 0.204 or has the least impact on SNPFC. Despite having the lowest impact as compared to complemetarity and commitment, the path coefficient of compatibility has a direct effect on strategic network partner fit characteristics. Indicators of compatibility include organisational culture, objectives, and management styles, all of which play some role in enhancing SNPFC.

Overall, it can be interpreted that the construct variable SNPFC is a predictor for the performance of SMEs in Malaysia, which supports other studies by Ahmad Abuzaid (2014). Ahmad Abuzaid (2014) investigated the influence of strategic alliance partner characteristics, namely partner complementarity, partner commitment, and partner compatibility, on a firm's innovation. This dissertation replicated Ahmad Abuzaid's research with a little modification after observing some of the researchers' deliberations on the significance of these alliance characteristics. Variations were done on the concept, sample frame, and method. Ahmad Abuzaid's sample frame focused on a specific sub-sector involving pharmaceutical companies only by using the descriptive method, whereas this research focused on multiple sub-sectors of manufacturing and services using PLS-SEM. Similar to Ahmad Abuzaid's findings, the recent test indicated a similar result wherein strategic network partner fit characteristics have a significant relationship with SMEs' performance.

Inter-organisational ties have existed for many years and are still important, even from a higher perspective. As to what most of the Malaysian SMEs are facing today, an inter-organisational network is suitable for dynamic and turbulent contexts. In such a situation, choosing the appropriate partners from their multi-sector networks allows for flexible strategies that act quickly in response to these accelerating developments. SME owners or managers must understand the significance of selecting the right network partners. Before deciding on an appropriate partner, they should consider the characteristics of several network partners that match the firm's business or project requirements. Based on this thesis, the three qualities of complementarity, commitment, and compatibility are relatively prominent. In addition, the partner characteristics are not static. From time to time, SMEs should go along, recognising

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the characteristics revolution according to the environment, types of projects, duration of projects, and status of network partners.

According to the findings of this study, the strategic network partner fit characteristics had a significant impact on the performance of SMEs. All three dimensions, namely commitment, complementarity, and compatibility, collectively impacted SNPFC and influenced the performance of SMEs.

Research Question 2. Does open innovation have significant relationship with SMEs performance?

Open innovation (OI) has significant connection with the dependent variable (β=0.185 t= 2.102 and p 0.036 < 0.05), as a predictor (Figure 4.1). This was proven at the first stage of main effect structural model testing. The dimensions of open innovation include inbound and outbound open innovation.

The path coefficient of open innovation involves inbound and outbound. The elements of inbound comprise the inflow of external knowledge, sources, and resources received by small and medium-sized enterprises (SMSEs), such as ideas, personnel, technology, and research and development (R&D). In contrast, outbound open innovation explains the complementary activities directed towards internal practises and then exploiting innovation results by expanding (commercializing and/or transferring) them to external markets (Chesbrough & Crowther, 2006). The inbound OI path coefficient value was β=0.441, which is moderately impacting open innovation. On the other hand, outbound OI showed β=0.640 indicating a stronger relationship with open innovation. Collectively, inbound OI and outbound OI were the dimensions for the

construct variable OI with a path coefficient of 0.185 and were found to have a significant relationship with SMEs' performance.

Despite SMEs in Malaysia suffering from low open innovation performance and struggling to get success in OI innovation adoption (Hameed et al. 2018), the outcome shows that the enterprises are either consciously or unconsciously practising open innovation in their business routine. Malaysian SMEs tend to prioritise inbound activities, particularly soliciting ideas from customers and the private sector. The average mean for inbound OI was 3.88, as compared to outbound OI, which showed an average mean of 3.26 (refer to Appendix J). Thus, this signifies that Malaysian SMEs are susceptible to inbound open innovation. This research scenario is consistent with studies by Chesbrough and Crowther (2006). Except that this dissertation was based on quantitative methods, an extensive qualitative interview with top business leaders was undertaken by Chesbrough and Crowther (2006) to identify recurring themes and patterns in each company's adoption, use, and promotion of the ideas of open innovation inside their respective organisations. Twelve companies were interviewed, and Chesbrough and Crowther (2006) found that all of them practised inbound and a few outbound. This research investigation seemed to have a similar pattern to Chesbrough and Crowther (2006), whereby SMEs in Malaysia were more susceptible to inbound OI than outbound OI. Chesbrough and Crowther (2006) were enlightened by the fact that through their investigation, evidently, they came to the understanding that today, a company's competitive advantage often results from the practise of exploiting others' discoveries (inbound open innovation). Firms do not have to rely solely on their own R&D.

SMEs in Malaysia use both inbound and outbound methods to construct the variable of open innovation that contributes to their performance. The results show that there are still opportunities for SMEs to explore inbound and outbound activities to enhance their businesses for better performance.

Research Question 3. Does open innovation moderate the relationship between strategic network partner fit characteristics and SMEs performance?

The study found a positive relationship between SNPFC and SMEs' performance (β=0.483, t=5.649, p 0.000<0.05). This finding substantiates the study conducted by Ahmad Abuzaid (2014). According to Ahmad Abuzaid's (2014) findings, the elements with the highest degree of importance of strategic alliance partner characteristics, from largest to smallest, were complementarity capabilities, followed by compatibility and commitment, in that order. This research found a similar result in terms of the importance of network partner characteristics for SMEs in Malaysia when assessed through average means. SME owners' or managers' preferences for a partner's characteristics in sequence include complementarity, compatibility, and commitment, with average means values of 4.21, 4.15, and 4.05, respectively (refer to Appendix K).

The theoretical model for this research underlies open innovation as a moderating variable between SNPFC and the performance of SMEs. At the initial stage, main effect of SNPFC and SMEs performance, the $R2 = 0.272$ specifies SNPFC (exogenous variable) and the open innovation (moderator variable) explain 27.2% of the variance in SMEs performance. After assessing R2 in the interaction effect model, the R2 results showed 0.295, indicating that 29.5% of the variance explained the performance. There is a difference of 0.23 from the main effect. This means that with the addition

of one interaction term, the R2 changed by about 2.3% (additional variance). The effect size is 0.031 (Table 4.12), which is considered small (Cohen, 1988). However, according to Chin et al. (2003), even though it is a slight change, it is very impactful in certain conditions. The small effect size of the main effect and simple effect of 0.031 of the structural models confirms the research report by the National Survey of Innovation 2012, Malaysian Science and Technology Information Centre (MASTIC) MOSTI, in which, irrespective of companies' sizes, a lower rate of open innovation is being practised by the manufacturing and services sectors in Malaysia. Furthermore, if policymakers support and encourage producers and service traders, the level of OI practise is likely to rise.

Through this research, the interaction effect between SNPFC and open innovation (β=0.180, t=2.023, p 0.05> 0.043, Table 4.11) shows a positive direction. This can be interpreted as there being a positive relationship between SNPFC and the performance of SMEs, and that the link would be stronger when open innovation is highly practised or moderates the connection. Another study showing the positive interaction effect of open innovation on firms' performance was conducted by Mazzola et al. (2015). Their study focused on the interaction of two concepts that have a big impact on new product creation: (i) networks' (centrality and structural holes) position gives the business the information content, and (ii) open innovation flow describes how the firm uses that content. The interaction of the two network positions with the open innovation flow results in a positive impact on the development of new products.

According to this study, SMEs' business activities revolve around leveraging strategic alliances and networking. Even though SNPFC is new, however, SMEs in Malaysia

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have shown a good indication of applying SNPFC and OI as their business's strategic focus. As Malaysia is moving towards being a higher-income nation with a focus on innovation, this research has demonstrated and added to the corpus of knowledge, especially in helping SMEs perform better in supporting the national economy. This study therefore indicates that open innovation modifies the relationship between strategic network partner fit characteristics and the performance of SMEs in Malaysia, thereby addressing the third research question.

5.3 Theoretical Contribution

A framework was conceptualized for an empirical study to relate strategic network partner fit characteristics, open innovation and SMEs performance. This study is the first to contribute the body of knowledge, extending illustrations in the connection of strategic network partner fit characteristics, open innovation and performance of SMEs in the context of small and medium sized enterprises in Malaysia.

The framework concept is reinforced by inter-organisational relationship theory (IORT) together with resource-based theory (RBT). Both theories show the association constructs of strategic network partner fit characteristics and open innovation towards SMEs performance. This study hypothesized the outcome of the IORT in cooperative relationships between SME companies with their inter-firm networks prior to choosing the right partners with fitting characteristics to benefit superior performance. This provide a similar approach if SMEs were to practice open innovation because inter-organisational relations and networking are important dimensions of open innovation. Resource based theory rests on the SMEs strategic focus to exchange resources and

capabilities with their multiple business network partners in order to also create competitive advantage.

Therefore, this study supports the existing concepts of IORT and RBT using new predictor variable called strategic network partner fit characteristics that was interacted with open innovation and SMEs performance. By introducing open innovation, as the moderator role, new inclusive concept has been developed. The concept demonstrates open innovation moderates strategic network partner fit characteristics and SMEs performance. Subsequently, this dissertation promotes to supplement literature and supports Chung, Singh and Lee (2000) who highlighted that theory on partner selection within inter-organisation collaboration is understudied and requires more research for the advantage of superiors in context.

5.4 Practical Contribution

a) Small and Medium Enterprises

The results of this study contribute valuable information to business firms, especially small and medium enterprises (SMEs) to strategize and maximize the use of their limited resources through network partner's selection and open innovation. With this new knowledge, SMEs can focus to apply strategic network partner fit characteristics (partner's commitment, complementarity and compatibility) and practice open innovation (inbound and outbound) in a dynamic and creative way to achieve better organisational performance.

SMEs can utilize the basis outcome of this research by focusing on each of the dimension (commitment, complementarity and compatibility) from the established conceptual model and use them as practical guidelines in the management of their

internal assets and processes to gain superior performance as well as competitive advantage. Although the results are emphasized on enterprises of small and medium sized, but it can also be practically used by micro and large businesses sized companies in Malaysia or other developing countries.

The finding of this research may guide SMEs to which strategic network partner fit characteristics (SNPFC) need to be implemented vibrantly in the organisation. Network partner fit characteristics is essential for firms to strategize in any project collaborations in order to fully utilize limited resources. Well planned collaboration with network partners that starts from the right selection of ally can help SMEs to alleviate expenses as well as reducing all kinds of risks, local or international arising from the turbulence market change.

Meanwhile, open innovation is also a vital resource for SMEs in enriching superior performance. Despite the low effect size ($f^{2)}$ =0.031 of open innovation as a moderator towards SNPFC and organisational performance, appropriate promotions to SMEs in higher practising open innovation and SNPFC may propagate their growth and performance. SMEs in Malaysia are aware the used of strategic network partner fit characteristics and open innovation but less attention is given on the vitality of these variables, thus, have not fully utilized the practices. The lacking of open innovation used, can be seen in the report studied by National Survey of Innovation 2012, Malaysian Science and Technology Information Centre (MASTIC) MOSTI.

The open innovation dimensions (inbound and outbound) have been found to have significant relationship with SMEs only when they were assessed as independent

variables. This can be referred to Figure 4.1, Table 4.10 when path coefficient of OI, beta (β) value of 0.185, t-statistics value 2.102 and p value 0.05 > 0.036. Therefore, this study guides SMEs owners to enhance their focus on inflow and outflow of external knowledge and to improve internal business process, introduce new products/services, to use creative ideas in commercialisation and to exploit new marketing activities to the external market. Awareness and understanding of the inter-firm collaboration and open innovation concept could lead business firms toward a strategic change of business model to increase in their performance.

This study somehow provides new knowledge not only to SMEs alone but also to their stakeholders. Stakeholders are groups that are able to influence a firm or that could be impacted by firms' activities. Identified stakeholder primary groups in SMEs (Freeman, 2010) are customers, employees, competitors, government and suppliers. They can also be part of the collaborative and cooperative network partners towards business firms. Subsequent to the achievement of firms in sustaining their competitive advantage and performance in practicing both open innovation and strategic network partner fit characteriistics, these groups could benefit via the following: -

b)   Consumers

Presently, customer-business firm relationship has significantly changed. Especially, after the Covid 19 pandemic. Customer-centricity has always been vital, yet eversince then, it has been perceived to even a higher regard. For SMEs, consumers need and wants are the primary driving force to take action of what new products or services they need to provide. In strategizing the selection of new network partners as well as being open to connect externally, SMEs are able to get new information, nurture new ideas, explore new opportunities and more efficient used of innovation. This leads to the production of new products and services into the market with short life cycle of

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firms' products, generate profits, expand business activities and meet growing consumers' demand.

c) Employees

While being important major internal stakeholders, most employees do not have direct influence over business decisions. Despite being the key primary internal stakeholders, most employees lack direct control over business decisions. Nevertheless, they have the power to affect company strategy and governance, or even directly affect output, by choosing not to work. When SMEs manage to perform and achieve superior output through the concept of strategic network partner fit characteristics employees and open innovation, employees gain confidence in their job security and career path. Besides, they might also be given the chance to advance new roles by initiating transfer of knowledge or skills within their own company's workplace and towards the organisations of the firm's network partners.

d) Supplier

When SMEs are able to strengthen their business capacity and operate better, suppliers benefit from increased orders to outfit and supply stock for firms' new outlets as well as from recommended business networks. This would lead suppliers to increase their profits. Nevertheless, it is also risky as a company may turn to other suppliers if suppliers are unable to meet with increased demand. The sustainability of one component has an impact on all others in the supply chain, which is interconnected with the company being supplied. The supply chain which is a network between suppliers and businesses supports firms in their production system and enhance the distribution channels of goods and services to consumers.

e)   Policy makers

In a government, there are many policy makers who sets plans to be pursued by individual or group that is directly or indirectly, formally or informally, affiliated with or affected by the policy process at any stage. Through effective strategic network partner fit characteristics and openness, SMEs get access to numerous resources, skills and technique to enhance their innovativeness and performance. The interactive collaboration and cooperation of actors ancitipated in the marketplace is foreseen by policy makers as that SMEs would be creating more new jobs and would further stimulating the economic growth. Due to the requirement that businesses function within a regulatory framework, authorities have the expert to hold businesses accountable, impose taxes on them, and even forbid them from operating altogether if they violate moral and legal standards.

5.5 Limitation and Future Research

This study is not without its limitations. These limitations may be essential to be addressed in   future research work that requires to focus on studying the relationships among constructs found in this study, or in any related areas of research.

5.5.1 Low Response Rate

Malaysia's Movement Control Order (MCO) that commenced in March 18 to 31 March 2020, mandated non-critical businesses to temporary cease operations. At the same time, prohibition on mass movements nationwide was also implemented to curb the Covid-19 outbreak. This situation had greatly distressed SMEs business operation. SMEs had been reported to suffer a 50% dropped in their business. Due to this scenario, SMEs' owners were emotionally affected and were not so responsive to

participate in answering the survey questionnaire. Some selected companies were called to check on the email addresses when the questionnaires were not responded even after reminders were sent. Consequently, this is when researcher found that some of the companies were dissolved. The researcher's task was time-consuming, tedious, and expensive. However, these steps were required to ensure survey participation.

During MCO, online survey was the most relevant and safest communication channel during the Covid-19 virus outbreak period to gain higher response rate (Che Omar et al., 2020). In any ordinary situation, there are several ways to address owners or managers of SMEs to participate in anwering survey questions. Saleh and Bishta (2017) suggested eleven (11) ways to increase response rate. The recommendations was generated from their analyzing factors influencing participants' email survey esponse rate. Nevertheless, only a few methods were suggested suitable to intensify the response rate among SMEs participants. Saleh and Bishta, (2017) focused on educational research with participants amongst graduate students. For future research, the followings are recommended to increase the response rates among SMEs participants:

1. Solicit the assistance of authorities, well-known individuals, or organisations that serve the target demographic to distribute the survey (when possible).

2. Offer an incentive for completing the survey.

3. Personalize and professionalise invitations to participate in the study.

4. Explain how the collected data will be handled, how the data will be stored and/or disposed of after the study is completed.

5. Author agrees to share results with participants if the output is useful to them.

5.5.2 Constraints in Dimensions of Strategic Network Partner Fit Characteristics

In this study, the researcher started this debate by addressing only three (3) dimensions-complementarity, compatibility and commitment of the strategic network partner fit characteristics (SNPFC) and hence, other related dimensions, that have been used to influence SMEs performance (Pullen et al. 2010; Pansiri, 2008; Shah & Swaminathan, 2008; and Chen et al., 2009) were neglected. Since research on the strategic network partner fit with characteristics of the three criteria of partner selection in Malaysia was rarely studied, the researcher was motivated to conduct this investigation to gain first-hand knowledge. Future research can also include other relevant SNPFC variables that could give impact to the SMEs performance; such as integrity, payoff investment, reputation, control and goals.

5.5.3 Research Design

The main data collection for this research was cross-sectional, hence long-term effect was not being assessed. A cross-sectional study includes viewing data from a population at one particular point of time. Since this research was missing the dynamisms and richness of time justification, the next critical step in further research would be the collection of longitudinal data with time gaps between variables.

5.5.4   Other Theoretical Concepts

Since this research is a first-hand study in Malaysia, the researcher found there was a lack of literature on network partner fit characteristics covering Malaysian scenarios. This dissertation grew out of Ahmad Abuzaid's (2014) research investigation and Zhao's (2014) recommendation for future research. In conjunction, the theoretical concept of this current research can be further expanded. For example, Zhao (2014)

broadened the strategic alliance study from a single theoretical perspective of resource-based (Das and Teng, 2000a) and network theory (Gulati, 1998) in his research initiatives. Zhao (2014), which then combined the theories to prove the crucial role of alliances in improving the entrepreneurial and innovation capacities of SMEs and used knowledge attributes as the moderator. Zhao (2014) added that the multidimensional nature of multilateral interactions in strategic alliances of SMEs should be further explored in future studies, which should be able to establish more precise frameworks. us, researchers who plan to further contribute in this area can expand on other relevant theories. Another prospect of future research is to look into the mediating variable of this concept study. The finding in this particular research saw that open innovation as moderator variable supports the the relationship between strategic network partner fit characteristics and SMEs performance. However, OI as a mediator in a similar research context has not been spotted yet (Osman et al. (2018). Future research might take these considerations into account.

5.5.5 Participants

The initiation of participants for this research only covered owners or managers of small and medium sized enterprises. (SMSEs). In the future, similar research could include to examine other size categories of SMEs as well, for example micro and/or large firms.

5.6 Recommendations

The following subsections highlight recommendations to SMEs as well as policy makers.

5.6.1 Small and Medium Enterprises

SMEs, besides being a key player in the economy, also play an important role in achieving the Sustainable Development Goals (SDGs) of a country. Even though SMEs are lacking in resources and capabilities, their contributions rely on them. The resources and capabilities include skills, knowledge networks, finance, and public investments in areas such as education and training, innovation, and infrastructure. As a result, one common way for SMEs to obtain more resources is to form alliances to share resources. Inter-firm collaboration within networks is now by far the most essential means of knowledge sharing and resource exchange.

5.6.1.1 Prepare traits specifications for the selection of firm partners

Based on the results achieved, this study recommends that SMEs strategically network and select business partners with appropriate traits that align with their project goals. As discussed in an earlier chapter, complementarity and compatibility have always been the main basic criteria in assessing the right partners, followed by the partner's commitment. Even though, through this research, complementarity appeared to be the most significant component of SMEs, the ones with a lesser magnitude (compatibility and commitment) must also be considered. This is because all three components are equally important.

For a fundamental start-up guide, SMEs could write up a checklist of indicators that fall under these three components to examine their potential partners. It is also worth noting that these components are not static. Rather, as SMEs' network relationships change over time, the level of complementarity, compatibility, and commitment may

evolve. Since the link is likely to change, SMEs should continue to investigate other possible dimensions of characteristics for a dynamic result.

This study assumes that prior to the selection of partners, trustworthiness relationships between SMEs and their strategic network partners have already existed; however, in certain situations, trust can also be spontaneous.

5.6.1.2 SMEs mind-set changed for the practice of open innovation

Open innovation interactions are also an increasing phenomenon between firms and some organisations compromising for innovation process. Organisations include public and private universities, private and public research laboratories, consultancy providers and technical services, government agencies, suppliers, and consumers. To be effective at open innovation, SMEs must have strong collaboration ties with network partners.

Malaysian small and medium-sized businesses should use internal innovation while incorporating outside information. This would not be easy, but it has to be initiated by the SMEs' owners or the top-level management and cascade down to the lower level. For the adaptation of a new business concept, it is crucial for the whole organisation to change their mindset. A similar process can be used when SMEs are ready to accept the orientation of openness. The success of practising open innovation depends broadly on employees' attitudes, as their resistance may distort the whole process and the effectiveness of open innovation. As discussed earlier, employees' attitudes of "not invented here," "not shared here," or "not sold here" and their inability to cooperate with outsiders are some examples of factors that may hinder the implementation of

open innovation. SMEs can provide specialised mind-set-changed training on innovation and creativity based on the hierarchy to motivate the entire organisation to accept open innovation practices. The exposure assists SMEs in dealing with business challenges while encouraging openness.

The current study shows SMEs need to alert and explore further the opportunities gain in practising open innovation to maintain growth.

5.6.2 Policy recommendations

The National Entrepreneurship Policy 2030 (DKN 2030) launched on 11 June 2019, chart the direction towards creating a holistic and conducive entrepreneurial eco system to support the equitable and sustainable socio-economic. The government has made the right decision to shift from the traditional to a new economic strategy.

TRADITIONAL ECONOMY	NEW ECONOMY
Resource Focus	Knowledge Information
Labour intensive	High Skilled Talents
Requires Control	Requires Collaborations
Vertical Trust Orientation	Horizontal trust orientation
Mass production	Mass customization
Proximity is Important	Location Less Significant
Rigid	Flexible
capitalist	Profit sharing
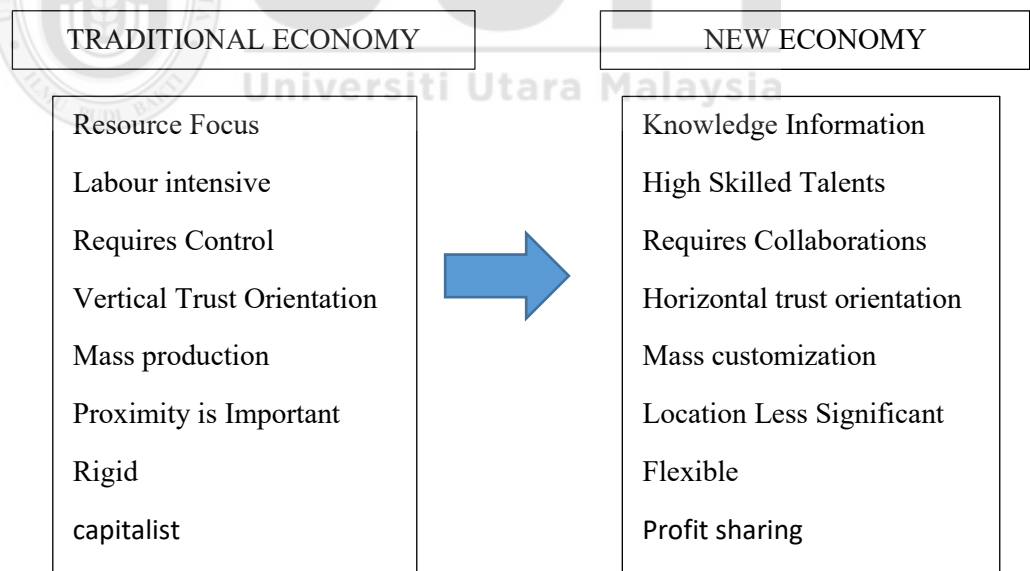
Figure 5.1
Transformation from Traditional to New Economy

The New Economy seems more collaborative, less dependent on material sources, more knowledge-intensive and requires highly skilled talents. The policy shows the

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significance of collaboration vertically, horizontally, and laterally which implies that SMEs require innovative networks to accelerate development and diversification to sustain growth in the global and unpredictable market.

Moreover, policies that have been implemented and resulting good practice should sustain, meanwhile more new strategies should be created with emphasis to encourage SME owners to adapt open innovation practices in their business operations. Policies should also embed specifically the importance of inbound open innovation. Regulations could be changed to assist and persuade the owners of SMEs, such as by creating networks of collaboration and commercial partnerships through tax advantages.

Other recommendations that policy makers should consider include:

- Information about networking opportunities can be easily accessible for SMEs and be improved continuously. At this level, it is also necessary to encourage all stakeholders' cooperation to support and assist in correcting deficiencies in existing information. Regular roundtable discussions should be held among the involved parties so that international connections between national and regional hubs of information flow become stronger.

- enriching SMEs participation in research networks and technology markets regionally, nationally and globally. Policy makers to promote the emergence and maintenance of local actors in implementing innovative clusters strategies by providing schemes to motivate collaboration between networks.

- enhancing SMEs' alertness and knowledge of the intellectual property eco-system by strengthening the integration of intellectual property issues in programmes and policy initiatives aimed at fostering innovation in SMEs.

These include SMEs and stakeholders who must recognise the distinctions and articulate them using correct terminology, such as utility models, patents, trade secrets, trademarks, copyrights, industrial designs, copyrights and related rights, plant varieties, and non-original databases. Therefore, there is a need to strengthen the teaching of intellectual property at universities and training institutions for entrepreneurs, engineers, scientists, designers, and business managers.

In order to achieve the above recommendations, there would be a requirement for superior interaction between intellectual property offices, SME support institutions, business associations, and national, regional, and local governments.

5.7 Summary

The conclusion and recommendations made in this chapter's last section are based on the research's informational output. The goals of this inquiry were once again stated in the chapter's beginning. Theoretical and practical elements were also covered in detail. To clear the way for future research in the areas of strategic network partner fit characteristics, open innovation, and SMEs' performance, study limitations and suggestions for future research were also identified. Finally, suggestions were made to policymakers and SMEs.

SMEs are acknowledged as the foundation of the economy and the growth of the country. It is crucial for policymakers to have pertinent programmes and strategies in place to support the development of SMEs' performance. Likewise, through appropriate selection and setting of the right partners' characteristics for collaboration

and open innovation, business firms may gain competitive advantages subsequently superior performance.

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APPENDICES

A SURVEY ON STRATEGIC NETWORK PARTNER FIT CHARACTERISTICS, OPEN INNOVATION AND ORGANIZATIONAL PERFORMANCE OF SMALL MEDIUM ENTERPRISES (SMEs) IN MALAYSIA

This survey is regarding the strategic network partner characteristics, open innovation and organizational performance of SMEs in Malaysia. The survey is designed to study your experience in selecting the characteristics of strategic network partners, your practices of open innovation and if they affect the organizational performance. Your cooperation is important to feature the preparation set for your company's business activities. The findings of this survey will be useful to provide suggestions to relevant parties.

You will be asked questions regarding your business practices and performance during three (3) consecutive years, from 2017 to 2019 (before covid19 pandemic occurred). This survey will take approximately twenty (20) minutes to complete. I rest assure that all information provided would be treated as 'STRICTLY CONFIDENTIAL' and will be used for this research purpose only. It is important for you to answer each question as sincerely as possible to reflect your company's situation.

Who can respond to this survey? The owner of the company or anyone relevant in assisting to make the company's decision. Your responses are very important.

Thank you very much for your time and support.

Che Asniza Binti Osman
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KAJIAN HUBUNGAN CIRI-CIRI KESESUAIAN RAKAN JARINGAN STRATEGIK, INOVASI TERBUKA DAN PRESTASI PKS DI MALAYSIA

Kajian ini adalah berkaitan ciri-ciri kesesuaian rakan jaringan strategik, inovasi terbuka dan prestasi PKS di Malaysia. Soal selidik ini disesuaikan untuk mengkaji pengalaman anda dalam memilih ciri-ciri strategi rakan jaringan dalam perniagaan, amalan inovasi terbuka dan jika kedua-dua mempengaruhi prestasi pencapaian syarikat. Kerjasama anda sangat penting untuk memperlihatkan persediaan aktiviti perniagaan syarikat. Hasil kajian ini sangat berguna sebagai cadangan kepada pihak-pihak tertentu.

Anda akan ditanya soalan berkenaan amalan perniagaan serta pencapaian tiga (3) tahun berturut-turut 2017 sehingga 2019 (sebelum berlaku pandemik covid 19). Soal selidik ini dijangka mengambil masa selama dua puluh (20) minit untuk dilengkapkan. Saya memberi jaminan bahawa segala maklumat adalah SULITdan digunakan hanya untuk kaji selidik ini sahaja. Ia adalah sangat penting untuk anda menjawab soalan dengan ikhlas untuk menggambarkan situasi sedia ada.

Siapa yang boleh memberi maklum balas? Pemilik syarikat atau siapa jua yang diberi kuasa untuk membuat keputusan untuk syarikat. Jawapan anda adalah sangat penting.

Terima kasih atas sokongan dan masa anda.

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DEMOGRAPHIC *(DEMOGRAFIK)*	
Please tick (☐) only ONE (1) answer of the following questions:	
Sila tandakan (☐) SATU(1) sahaja jawapan kepada soalan-soalan berikut:	
Q1	Your current job position in the company.
	Tugas jawatan semasa anda di dalam syarikat.
	☐ SME Owner
	Pemilik PKS
	☐ Managing Director
	Pengarah Urusan
	☐ Strategic/Planning Manager
	Pengurus Perancangan/ Strategik
	☐ Other. Please specify…..
	Lain-lain. Sila nyatakan…..
Q2	Our company is identified as:
	Syarikat kami dikenali sebagai:
	☐ Sole Proprietorship
	Hak milik Tunggal
	☐ Partnership or Limited Liability Patnership
	Perkongsian atau Perkongisan Liabiliti Terhad
	☐ Limited Liability
	Sendirian Berhad (Liabiliti terhad)
Q3	Our company has the following number of full time employees:
	Bilangan pekerja sepenuh masa di syarikat kami ialah:
	☐ 5 - 74
	☐ 75 - 200
	☐ > 200
Q4	Our company's annual sales turnover is:
	Perolehan jualan tahunan syarikat kami ialah:
	☐ RM300,000 less than RM 3 million
	RM300,000 kurang daripada RM3 juta
	☐ RM3 million less than RM15 million
	RM 3 juta kurang daripada RM15 juta
	☐ RM15 million to RM50 million
	RM 15 juta sehingga RM50 juta
Q5	Our length of business operation:
	Perniagaan telah beroperasi selama:
	☐ < 2 years
	< 2 tahun
	☐ 2 - 4 years
	2 - 4 tahun

	☐ 5 - 7 years *5 - 7 tahun*
	☐ 8 - 10 years *8 - 10 tahun*
	☐ > 10 years *> 10 tahun*
Q6	Our company main sector is: *Sektor utama syarikat kami ialah:*
	☐ Manufacturing (Go to No. 7, then 9 and so on) *Pembuatan (Terus ke No. 7, kemudian ke 9 dan seterusnya)*
	☐ Services and Other Services (Go to No. 8 and so on) *Perkhidmatan dan Lain-lain perkhidmatan (Terus ke No. 8 dan seterusnya)*
Q7	For Manufacturing-Our category of sub-sector is **(Please select the main sub-sector only)** *Untuk Pembuatan-Kategori sub-sektor kami ialah* **(Tandakan sub sektor utama sahaja)**
	☐ Food product and beverages *Produk makanan dan minuman*
	☐ Textiles, Weaving, Apparels, Leather and Footwear *Tekstil, tenunan,pakaian, kulit dan alas kaki*
	☐ Fabricated metal products *Rekaan produk logam*
	☐ Wood, Furniture, Paper Products and Printing *Kayu,Perabot, Produk Kertas dan Percetakan*
	☐ Machinery and Equipment *Kelengkapan dan mesin*
	☐ Rubber and Plastic products *Produk getah dan plastik*
	☐ Non-Metalic Mineral Products, Basic Metal and Fabricated Metal Products *Bahan Mineral Bukan Logam, Logam Asas dan Produk Rekaan Logam*
	☐ Electrical and Electronic Products *Produk Electrikal dan Elektronik*
	☐ Transport Equipment *Peralatan Pengangkutan*
	☐ Chemical and chemical Products *Kimia dan Produk Kimia*
	☐ Pharmaceutical Products *Produk farmaseutikal*
	☐ Other. Please Specify:.... *Lain-lain. Sila Nyatakan:…..*
Q8	For services - Our category of sub-sector is (Please select the main sub-sector only):

		Untuk Perkhidmatan-Kategori sub-sektor kami ialah **(Tandakan sub sektor utama sahaja)**
	☐	Wholesale and retail trade *Perdagangan Borong dan Runcit*
	☐	Food product and beverages *Produk makanan dan minuman*
	☐	Professional Scientific and Technical Services *Saintifik Profesional dan Perkhidmatan Teknikal*
	☐	Administrative and Support Service *Perkhidmatan Pentadbiran dan Sokongan*
	☐	Human Health and Social Work *Kesihatan Manusia dan Kerja Sosial*
	☐	Art Entertainment and Recreation *Hiburan Seni dan Rekreasi*
	☐	Real Estate Activities *Aktiviti Hartanah*
	☐	Education *Pendidikan*
	☐	Transport and Storage *Pengangkutan dan Penyimpanan*
	☐	Transportation - Automotive and Repair *Pengangkutan- Otomotif dan Pembaikan*
	☐	Paper and Printing *Kertas dan Percetakan*
	☐	Information and Communication *Maklumat dan Komunikasi*
	☐	Other. Please specify……… *Lain-lain. Sila Nyatakan………*
Q9		We collaborate with other network partners of various sub-sectors to achieve our company's goals. *Kami berkolaborasi dengan rakan jaringan daripada pelbagai sub-sektor untuk mencapai matlamat syarikat.*
	☐	Yes/ *Ya*
	☐	No/*Tidak*
Q10		The number of our local network partners for business: *Bilangan jaringan rakan perniagaan tempatan ialah:*
	☐	None *Tiada*
	☐	Fewer than 4 *Kurang daripada 4*
	☐	4 to 6 *4 hingga 6*
	☐	7 to 9

		7 hingga 9
	☐	More than 10
		Lebih daripada 10
Q11	The number of our international network partners for business:	
	Bilangan jaringan rakan perniagaan luar negara ialah:	
	☐	None
		Tiada
	☐	Fewer than 4
		Kurang daripada 4
	☐	4 to 6
		4 hingga 6
	☐	7 to 9
		7 hingga 9
	☐	More than 10
		Lebih daripada 10
Q12	Type of common linkage with network partner.	
	Kebiasaannya, jenis hubungan jaringan rakan ialah:	
	☐	Formal (Eg: All transactions require official documents)
		Rasmi (Cth: Semua transaksi memerlukan dokumen rasmi)
	☐	Informal (Eg: Verbal communication/No official documents)
		Tidak Rasmi(Cth: komunikasi lisan/tiada dokumen rasmi)
	☐	Formal and Informal
		Rasmi dan Tidak Rasmi
Q13	Our firm's three (3) most common types of collaboration with network partners?	
	Tiga (3) cara biasa syarikat berkolaborasi dengan rakan jaringan?	
	☐	Strategic alliance
		Pakatan strategik
	☐	Joint venture
		Usahasama
	☐	Licencing arrangement
		Perjanjian perlesenan
	☐	Subcontracting
		Subkontrak
	☐	Joint R&D
		R&D bersama
	☐	Joint marketing activities
		Aktiviti pemasaran bersama
	☐	Other. Please Specify…………
		Lain-lain. Sila Nyatakan……………

NETWORK PARTNERS' CHARACTERISTICS (CIRI RAKAN JARINGAN)

Please choose only ONE (1) accordingly to the scale given:
Sila pilih SATU (1) sahaja mengikut skala yang diberi:

- 1= Strongly Disagree, 2= Disagree, 3=Neutral,4=Agree, 5=Strongly Agree
- *1= Sangat Tidak Setuju, 2=Tidak Setuju, 3=Neutral. 4= Setuju 5= Sangat Setuju*

Compatibility (Keserasian)

	Our company choose our network partner because…. *Syarikat kami memilih rangkaian rakan niaga kerana …*	1	2	3	4	5
Q14	of organizational culture compatibility *kerasian budaya organisasi*					
Q15	our strategic objectives were compatible *keserasian matlamat strategik*					
Q16	our management styles were compatible *keserasian gaya pengurusan*					
Q17	of an approximately similar size and strength. *kekuatan dan saiz syarikat adalah lebih kurang sama*					

Complementarity *(Saling Melengkapi)*

	Our company network partner has … *Jaringan rakan syarikat kami ada….*	1	2	3	4	5
Q18	unique competencies that we need *kecekapan unik yang kami perlukan*					
Q19	higher level of technical capabilities that we need *kemampuan teknikal tahap tinggi yang kami perlukan*					
Q20	wider market coverage *liputan pasaran yang luas*					
Q21	diverse customer *pelbagai pelanggan*					
Q22	the quality distribution system *sistem pengedaran berkualiti*					
Q23	shown synergies when working together *menunjukkan sinergi apabila bekerjasama*					
Q24	complementary assets we require *aset yang boleh melengkapi keperluan syarikat*					

Commitment *(Komitmen)*

	Our network partner is/has …. *Rangkaian rakan syarikat kami…*	1	2	3	4	5
Q25	willing to dedicate whatever resources to make their alliance a success *sedia mendedikasikan apa sahaja sumber untuk kejayaan rakan berniaga*					
Q26	willing to make long-term investment in the alliance *bersedia untuk melabur dalam jangka masa panjang*					
Q27	a strong sense of loyalty to the alliance *mempunyai kesetiaan rakan berniaga yang sangat kuat*					
Q28	willing to share expertise *bersedia untuk berkongsi kemahiran*					
Q29	likely to continue with the strategic network *berkemungkinan untuk meneruskan jaringan strategik*					
Q30	selected each other because we are committed to our relationship *memilih antara lain kerana hubungan yang komited.*					

		1	2	3	4	5

OPEN INNOVATION (INOVASI TERBUKA)

Please choose only ONE (1) accordingly to the scale given:
Sila pilih SATU (1) sahaja mengikut skala yang diberi:

- 1= Strongly Disagree, 2= Disagree, 3=Neutral,4=Agree, 5=Strongly Agree
- *1= Sangat Tidak Setuju, 2=Tidak Setuju, 3=Neutral. 4= Setuju 5= Sangat Setuju*

Inbound *(Masuk)*

		1	2	3	4	5
	Our company gets IDEAS from …. *Syarikat kami mendapat IDE daripada…...*	1	2	3	4	5
Q31	Public sector (E.g.: university, government agency and/or research institution) *Sektor awam (Cth.: universiti, agensi kerajaan atau institusi penyelidikan)*					
Q32	Private sector (E.g.: business of different nature, competitors, consultants, research institutions and/or university). *Sektor swasta (Cth: syarikat perniagaan berlainan bidang, pesaing, konsultan, institusi penyelidikan dan/atau universiti)*					
Q33	customer *pelanggan*					
Q34	supplier *pembekal*					
	Our company gets R&D initiatives from… *Syarikat kami mendapat inisiatif R&D daripada…*	1	2	3	4	5
Q35	Public sector (E.g.: university, government agency and/or research institution) *Sektor Awam (Cth.: Universiti, agensi kerajaan atau institusi penyelidikan)*					
Q36	Private sector (E.g.: business of different nature, competitors, consultants, research institutions and/or university) *Sektor swasta (Cth.: syarikat perniagaan berlainan bidang, pesaing, konsultan, institusi penyelidikan dan/atau universiti)*					
	Our company integrates technology with or without license of intellectual property from… *Syarikat kami bergabung teknologi beserta atau tanpa lesen hartamilik intelekual daripada…*	1	2	3	4	5
Q37	Public sector (E.g.: university, government agency, research institution *Sektor awam (Cth: universiti, agensi kerajaan dan/or institusi penyelidikan).*					
Q38	Private sector (E.g.: business of different nature, competitors, consultants, research institutions and/or university,) *Sektor swasta (Cth.: syarikat perniagaan berlainan bidang, pesaing, konsultan, institusi penyelidikan dan/atau university).*					
Q39	supplier *pembekal*					
	Our company gets personnel initiatives from… *Syarikat kami mendapat sumber kemahiran kakitangan daripada…*	1	2	3	4	5
Q40	Public sector (E.g.: university, government agencies, and/or research institution) *Sektor awam (Cth: universiti, agensi kerajaan atau institusi penyelidikan)*					

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Q41	Private sector (E.g.: business of different nature, competitors, consultants, research institutions and/or university) *Sektor swasta (Cth: syarikat perniagaan berlainan bidang, pesaing, konsultan, institusi penyelidikan dan/atau universiti)*					
Q42	supplier *pembekal*					
Outbound *(Keluar)*						
Q43	Our company **commercializes** internal idea and knowledge initiatives into new markets *Kami **mengkomersialkan** inisiatif ide dan pengetahuan syarikat ke pasaran baharu*					
Q44	Our company **transfers** internal developed idea and knowledge initiatives to **external market** (Local and/or global). *Kami **berkongsi** inisiatif ide baharu dan pengetahuan syarikat ke pasaran luar (Tempatan dan/atau antarabangsa)*					
Q45	Our company **commercializes** internal developed R&D **initiatives** into the **market** (local and/or global). *Kami **mengkomersialkan inisiatif** penyelidikan dan pembangunan syarikat.ke dalam **pasaran** (Tempatan dan/atau antarabangsa) .*					
Q46	Our company **transfers** internal developed **R&D initiatives** to the **external market**. *Kami **berkongsi** inisiatif penyelidikan dan pembangunan syarikat ke **pasaran luaran**.*					
Q47	Our company **commercializes** internal developed technology initiatives into the new market. *Kami **mengkomersialkan** inisiatif teknologi baharu syarikat ke dalam **pasaran baharu**.*					
Q48	Our company **transfers** internally developed technology initiatives to the **external market**. (Local and/or global) *Kami membuat **perkongsian** inisiatif teknologi baharu syarikat ke **pasaran luar** (Tempatan dan/atau antarabangsa)*					
Q49	Our company **license-out** internally developed initiatives (e.g. IP and technology) to other organisations. *Kami mengeluarkan **lesen** bagi inisiatif baharu (Cth.: hartamilik intelek dan teknologi syarikat) kepada organisasi lain.*					
Q50	Our company **transfers** internally developed personnel initiatives to external organisation. *Kami **berkongsi** inisiatif kemahiran kakitangan syarikat dengan organisasai luar.*					

SMEs PERFORMANCE *(PRESTASI PKS)*					
Please choose only ONE (1) accordingly to the scale given: *Sila pilih SATU (1) sahaja mengikut skala yang diberi:* • 1= Strongly Disagree, 2= Disagree, 3=Neutral,4=Agree, 5=Strongly Agree • *1= Sangat Tidak Setuju, 2=Tidak Setuju, 3=Neutral. 4= Setuju 5= Sangat Setuju*					

From year 2017 to 2019… *Daripada tahun 2017 hingga 2019…*	1	2	3	4	5

Q51	our revenue growth rate improved *kadar tumbuhan hasil syarikat kami meningkat*					
Q52	our sales increased *jualan syarikat meningkat*					
Q53	our company's profit consistently increased *keuntungan syarikat meningkat secara konsisten*					
Q54	the number of our employees increased *bilangan pekerja bertambah*					
Q55	our market growth increased *pertumbuhan pasaran kami meningkat*					
Q56	Customers' satisfaction on our product and/or service quality have increased. *Kepuasan pelanggan terhadap produk dan/atau kualiti perkhidmatan kami meningkat*					

OPEN INNOVATION: ADJUSTMENT ON QUESTIONS (PG 110)

Construct variable	Dimension variable	Adjustment	Item
Open Innovation	(c) Inbound (12)		
.	31INB1	BEFORE	Our company gets ideas from public university, government agency and/or public research institution
		AFTER	Our company gets ideas from the public sector (E.g.: university, government agency and/or research institution)
	32INB2	BEFORE	Our company gets ideas from business of different nature, competitors, consultants, private research institutions and/or private university.
		AFTER	Our company gets ideas from the private sector (E.g.: business of different nature, competitors, consultants, research institutions and/or university).
	35INB5	BEFORE	Our company gets R&D initiatives from public university, government agency and/or public research institution
		AFTER	Our company gets r&d initiatives from the public sector (E.g.: university, government agency and/or research institution).
	36INB6	BEFORE	Our company gets R&D initiatives from business of different nature, competitors, consultants, private research institutions and/or private university
		AFTER	Our company gets R&D initiatives from the private sector (E.g.: business of different nature, competitors, consultants, research institutions and/or university).

	37INB7	BEFORE	Our company integrates technology from public university, government agency, public research institution
		AFTER	Our company integrates technology with or without license of intellectual property from the public sector (E.g.: university, government agency, research institution).
	38INB8	BEFORE	Our company integrates technology from business of different nature, competitors, consultants, private research institutions and private university
		AFTER	Our company integrates technology with or without license of intellectual property from the private sector (E.g.: other business different nature, competitors, consultants, research institutions and/or university).
	40INB10	BEFORE	Our company gets personnel initiatives from business of different nature, competitors, consultants and private research institutions
		AFTER	Our company gets personnel initiatives from the public sector (E.g.: university, government agencies, and/or research institution).
	41INB11	BEFORE	Our company gets personnel initiatives from business of different nature, competitors, consultants and private research institutions
		AFTER	Our company gets personnel initiatives from the private sector (E.g.: business of different nature, competitors, consultants, research institutions and/or university).

COMPANIES DEMOGRAPHIC INFORMATION

JOB POSITION

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	SME Owner	85	69.1	69.1	69.1
	Managing Director	23	18.7	18.7	87.8
	Managerial	15	12.2	12.2	100.0
	Total	123	100.0	100.0	

SALES

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	RM300,000 less than RM 3 million	102	82.9	82.9	82.9
	RM3 million less than RM15 million	13	10.6	10.6	93.5
	RM15 million to RM50 million	8	6.5	6.5	100.0
	Total	123	100.0	100.0	

COMPANY TYPE

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Sole Proprietorship	65	52.8	52.8	52.8
	Partnership or Limited LiabilityPartnership	14	11.4	11.4	64.2
	Limited Liability	44	35.8	35.8	100.0
	Total	123	100.0	100.0	

BUSINESS YEARS

	Frequency	Percent	Valid Percent	Cumulative Percent
< 2 years	18	14.6	14.6	14.6
2 - 4 years	25	20.3	20.3	35.0
5 - 7 years	20	16.3	16.3	51.2
Valid 8 - 10 years	19	15.4	15.4	66.7
> 10 years	41	33.3	33.3	100.0
Total	123	100.0	100.0	

SECTOR

	Frequency	Percent	Valid Percent	Cumulative Percent
Manufacturing	46	37.4	37.4	37.4
Valid Services	77	62.6	62.6	100.0
Total	123	100.0	100.0	

MANUFACTURING SECTOR

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid		66	53.7	53.7	53.7
	Biotechn	1	.8	.8	54.5
	Chemical	1	.8	.8	55.3
	craft me	1	.8	.8	56.1
	Electric	1	.8	.8	56.9
	Food pro	8	6.5	6.5	63.4
	Kayu, Pe	4	3.3	3.3	66.7
	makanan	1	.8	.8	67.5
	Manufact	4	3.3	3.3	70.7
	Na	1	.8	.8	71.5
	not appl	1	.8	.8	72.4
	Percetak	1	.8	.8	73.2
	Petrol S	1	.8	.8	74.0
	Printing	1	.8	.8	74.8
	produk b	1	.8	.8	75.6
	Produk B	2	1.6	1.6	77.2
	Produk E	1	.8	.8	78.0
	Produk f	1	.8	.8	78.9
	Produk m	13	10.6	10.6	89.4
	produk p	1	.8	.8	90.2
	Security	1	.8	.8	91.1
	Service	1	.8	.8	91.9
	Servis a	1	.8	.8	92.7
	Tekstil,	6	4.9	4.9	97.6
	Textiles	2	1.6	1.6	99.2
	Wood, Fu	1	.8	.8	100.0
	Total	123	100.0	100.0	

SERVICE SECTOR

		Frequency	Percent	Valid Percent	Cumulative Percent
		28	22.8	22.8	22.8
	Administ	2	1.6	1.6	24.4
	aircond	1	.8	.8	25.2
	Binaan	1	.8	.8	26.0
	Cleaning	1	.8	.8	26.8
	Construc	3	2.4	2.4	29.3
	cosmetic	1	.8	.8	30.1
	Dandanan	1	.8	.8	30.9
	Design &	1	.8	.8	31.7
	Educatio	1	.8	.8	32.5
	Food pro	8	6.5	6.5	39.0
	Human He	5	4.1	4.1	43.1
	Informat	5	4.1	4.1	47.2
	Kecantik	1	.8	.8	48.0
	Kerja So	1	.8	.8	48.8
	Kertas d	1	.8	.8	49.6
	makanan	1	.8	.8	50.4
	OPTOMETR	1	.8	.8	51.2
Valid	Paper an	4	3.3	3.3	54.5
	Pembuata	1	.8	.8	55.3
	Pengangk	1	.8	.8	56.1
	Perabot	1	.8	.8	56.9
	Perhiasa	1	.8	.8	57.7
	Perkhidm	7	5.7	5.7	63.4
	Perniaga	3	2.4	2.4	65.9
	Pharmace	1	.8	.8	66.7
	Pharmacy	1	.8	.8	67.5
	Produk m	12	9.8	9.8	77.2
	Professi	5	4.1	4.1	81.3
	Security	1	.8	.8	82.1
	Seni Hib	1	.8	.8	82.9
	Servis a	1	.8	.8	83.7
	Tourism	1	.8	.8	84.6
	Transpor	6	4.9	4.9	89.4
	Utility	1	.8	.8	90.2
	Wholesal	12	9.8	9.8	100.0
	Total	123	100.0	100.0	

COLLABORATE

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	YES	109	88.6	88.6	88.6
	NO	14	11.4	11.4	100.0
	Total	123	100.0	100.0	

LOCAL NETWORK

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	None	18	14.6	14.6	14.6
	<4	34	27.6	27.6	42.3
	4-6	23	18.7	18.7	61.0
	7-9	7	5.7	5.7	66.7
	>10	41	33.3	33.3	100.0
	Total	123	100.0	100.0	

INTERNATIONAL_NETWORK

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	None	67	54.5	54.5	54.5
	<4	30	24.4	24.4	78.9
	4-6	17	13.8	13.8	92.7
	>10	9	7.3	7.3	100.0
	Total	123	100.0	100.0	

TYPE OF COLLABORATION

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strategic alliance	33	26.8	26.8	26.8
	Joint venture	17	13.8	13.8	40.7
	Licencing	11	8.9	8.9	49.6
	Subcontracting	20	16.3	16.3	65.9
	Joint R&D	9	7.3	7.3	73.2
	Joint marketing activities	30	24.4	24.4	97.6
	Retail services	2	1.6	1.6	99.2
	None	1	.8	.8	100.0
	Total	123	100.0	100.0	

COMMON LINKAGE

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Formal	30	24.4	24.4	24.4
	Informal	23	18.7	18.7	43.1
	Formal and Informal	70	56.9	56.9	100.0
	Total	123	100.0	100.0	

NORMALITY TEST: NUMERICAL Z VALUE OF SKEWNESS AND KURTOSIS METHOD

Strategic Network Partner Fit Characteristics

			Statistic	Std. Error
MEANSNPFC	Mean		4.1033	.05383
	95% Confidence Interval for Mean	Lower Bound	3.9967	
		Upper Bound	4.2099	
	5% Trimmed Mean		4.1281	
	Median		4.0588	
	Variance		.356	
	Std. Deviation		.59696	
	Minimum		2.53	
	Maximum		5.00	
	Range		2.47	
	Interquartile Range		.82	
	Skewness		-.435	.218
	Kurtosis		-.245	.433

-.435/.218=-1.99

-.245/.433=-0.56

Open Innovation

			Statistic	Std. Error
MEANOINNOV	Mean		3.3154	.07187
	95% Confidence Interval for Mean	Lower Bound	3.1732	
		Upper Bound	3.4577	
	5% Trimmed Mean		3.3047	
	Median		3.2500	
	Variance		.635	
	Std. Deviation		.79703	
	Minimum		1.50	
	Maximum		5.00	
	Range		3.50	
	Interquartile Range		1.05	
	Skewness		.155	.218
	Kurtosis		-.287	.433

.155/.218= 0.711

-.287/.433= -0.663

Organisational Performance

			Statistic	Std. Error
MEANORGLPERF	MEAN		3.6707	.08357
	95% Confidence Interval for Mean	Lower Bound	3.5053	
		Upper Bound	3.8362	
	5% Trimmed Mean		3.7093	
	Median		3.8333	
	Variance		.859	
	Std. Deviation		.92685	
	Minimum		1.17	
	Maximum		5.00	
	Range		3.83	
	Interquartile Range		1.33	
	Skewness		-.419	.218
	Kurtosis		-.330	.433

-.419/.218= -1.92

-.330/.433 = -.076

COMMON METHOD VARIANCE

Communalities

	Initial	Extraction
MEANSNPFC	.329	.594
MEANOINNOV	.261	.387
MEANORGLPERF	.253	.374

Extraction Method: Principal Axis Factoring.

Total Variance Explained

Factor	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	1.889	62.966	62.966	1.355	45.168	45.168
2	.621	20.695	83.662			
3	.490	16.338	100.000			

Extraction Method: Principal Axis Factoring.

Factor Matrix[a]

	Factor 1
MEANSNPFC	.771
MEANOINNOV	.622
MEANORGLPERF	.611

Extraction Method:
Principal Axis Factoring.
a. 1 factors extracted. 14
iterations required.

COLLINEARITY VARIANCE INFLATION FACTOR

		MEAN ORGLPERF	MEAN SNPFC	MEAN OINNOV
Pearson Correlation	MEANORGLPERF	1.000	.472	.379
	MEANSNPFC	.472	1.000	.480
	MEANOINNOV	.379	.480	1.000
Sig. (1-tailed)	MEANORGLPERF	.	.000	.000
	MEANSNPFC	.000	.	.000
	MEANOINNOV	.000	.000	.
N	MEANORGLPERF	123	123	123
	MEANSNPFC	123	123	123
	MEANOINNOV	123	123	123

MEASUREMENT MODAL ANALYSIS

Factor Loading

	Commitm	Compatib	Complem	Inbound	Moderatir	Organizati	Outbound	
Q14		0.837						
Q15		0.858						
Q16		0.822						
Q16								
Q18			0.741					
Q19			0.715					
Q20			0.82					
Q21			0.769					
Q22			0.844					
Q23			0.813					
Q25	0.757							
Q26	0.71							
Q27	0.859							
Q28	0.79							
Q29	0.888							
Q30	0.856							
Q35				0.754				
Q37				0.816				
Q38				0.784				
Q40				0.838				
Q41				0.891				
Q42				0.846				
Q43							0.783	
Q44							0.812	
Q45							0.845	
Q46							0.892	
Q47							0.882	
Q48							0.906	
Q49							0.734	
Q50							0.796	
Q51						0.884		
Q52						0.928		
Q53						0.906		
Q54						0.847		
Q55						0.901		
Q56						0.748		

STRUCTURAL MODEL BEFORE MODERATING INTERACTION OF OPEN INNOVATION
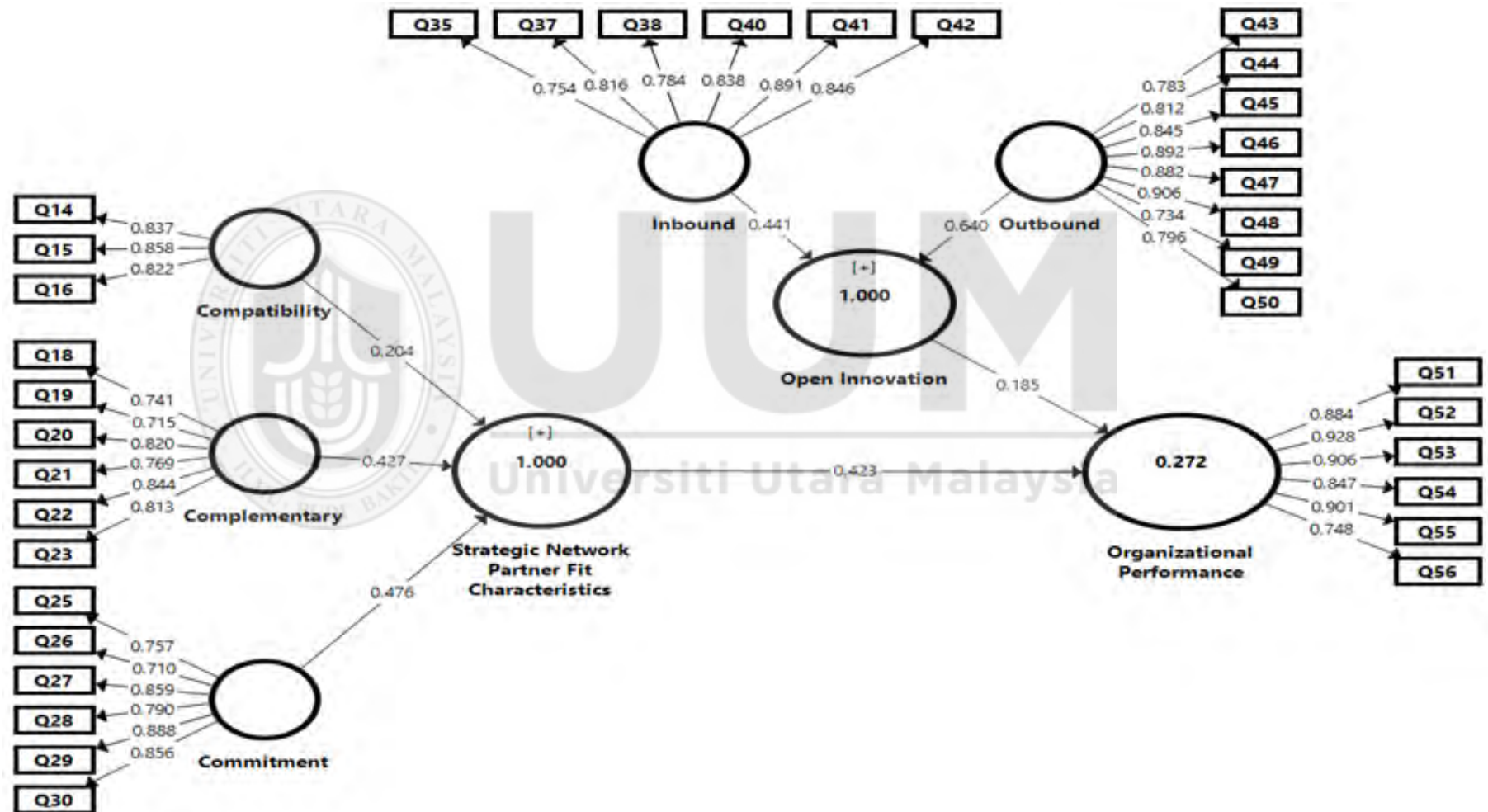
STRUCTURAL MODEL AFTER MODERATING INTERACTION OF OPEN INNOVATION
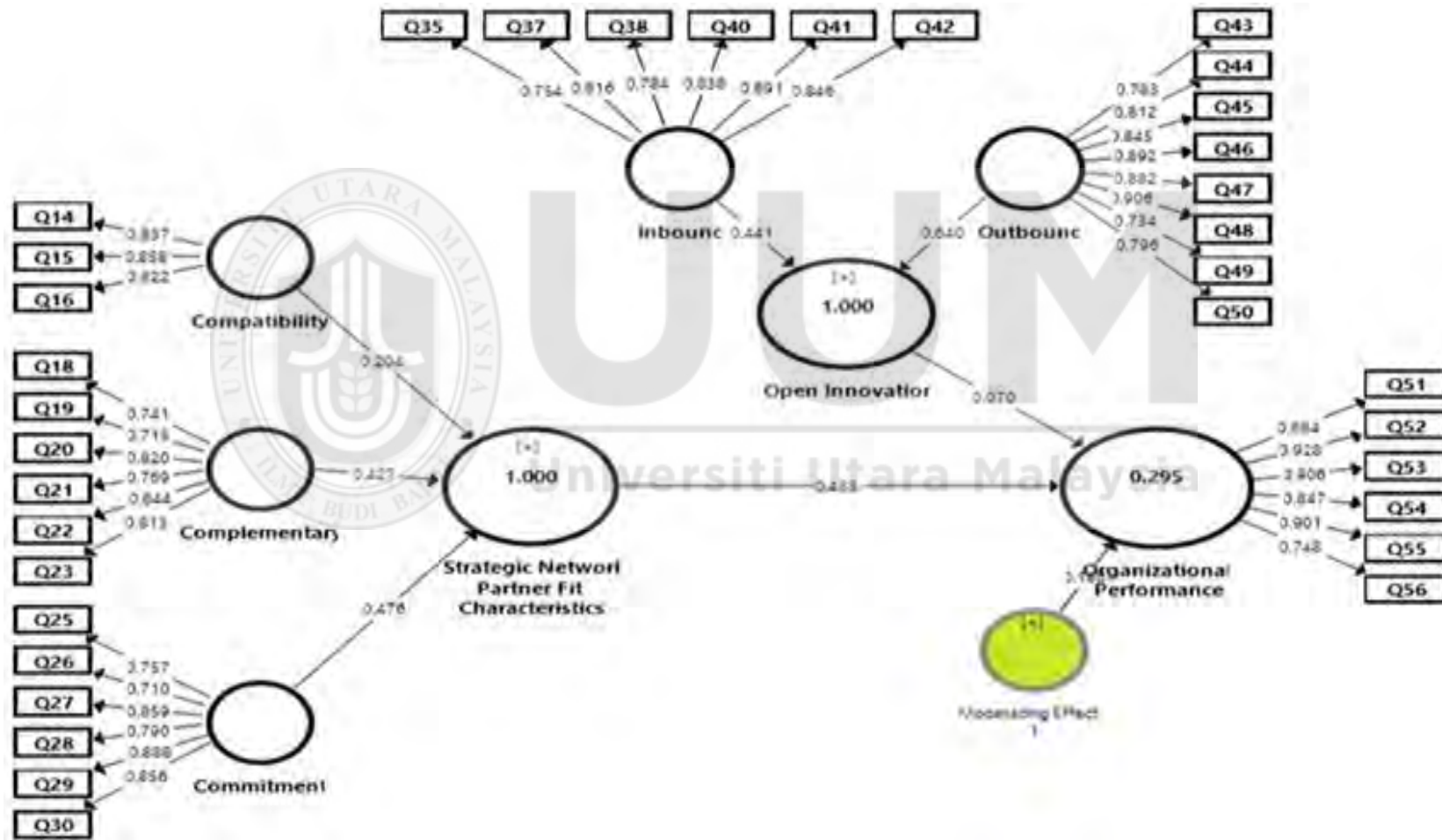
DESCRIPTIVE STATISTICS: AVERAGE MEAN FOR INBOUND

	N	Minimum	Maximum	Mean		Std. Deviation	Variance
	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Statistic
Q31	123	1.00	5.00	3.4390	.10653	1.18146	1.396
Q32	123	1.00	5.00	3.9268	.08575	.95102	.904
Q33	123	1.00	5.00	4.1301	.07567	.83920	.704
Q34	123	1.00	5.00	3.6585	.09647	1.06993	1.145
Q35	123	1.00	5.00	3.0407	.10352	1.14804	1.318
Q36	123	1.00	5.00	3.2114	.10659	1.18219	1.398
Q37	123	1.00	5.00	3.1057	.10694	1.18607	1.407
Q38	123	1.00	5.00	3.3984	.09502	1.05380	1.110
Q39	123	1.00	5.00	3.3252	.10097	1.11984	1.254
Q40	123	1.00	5.00	2.8862	.11499	1.27526	1.626
Q41	123	1.00	5.00	3.0650	.10814	1.19932	1.438
Q42	123	1.00	5.00	3.0244	.11280	1.25099	1.565
Valid N (listwise)	123						
Total Ave Mean				3.88			

DESCRIPTIVE STATISTICS: AVERAGE MEAN FOR OUTBOUND

	N	Minimum	Maximum	Mean		Std. Deviation	Variance
	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Statistic
Q43	123	1.00	5.00	3.6667	.09426	1.04542	1.093
Q44	123	1.00	5.00	3.4715	.10282	1.14036	1.300
Q45	123	1.00	5.00	3.4878	.10667	1.18298	1.399
Q46	123	1.00	5.00	3.1789	.11547	1.28058	1.640
Q47	123	1.00	5.00	3.4146	.11189	1.24088	1.540
Q48	123	1.00	5.00	3.1870	.11449	1.26976	1.612
Q49	123	1.00	5.00	2.6748	.11801	1.30883	1.713
Q50	123	1.00	5.00	3.0163	.11012	1.22128	1.492
Valid N (listwise)	123						
Total Ave Mean				3.26			

DESCRPTIVE STATISTICS: AVERAGE MEAN FOR COMPATIBILITY

	N	Sum	Mean		Std. Deviation	Variance
	Statistic	Statistic	Statistic	Std. Error	Statistic	Statistic
Q14	123	508.00	4.1301	.08078	.89589	.803
Q15	123	530.00	4.3089	.06337	.70281	.494
Q16	123	493.00	4.0081	.07701	.85407	.729
Q17	123	438.00	3.5610	.10206	1.13185	1.281
Valid N (listwise)	123					
Total Ave Mean			4.15			

DESCRIPTIVE STATISTICS: COMPLEMENTARITY

	N	Sum	Mean		Std. Deviation	Variance
	Statistic	Statistic	Statistic	Std. Error	Statistic	Statistic
Q18	123	533.00	4.3333	.06895	.76466	.585
Q19	123	511.00	4.1545	.07661	.84961	.722
Q20	123	515.00	4.1870	.07944	.88104	.776
Q21	123	507.00	4.1220	.08047	.89246	.796
Q22	123	511.00	4.1545	.07485	.83010	.689
Q23	123	537.00	4.3659	.06456	.71596	.513
Q24	123	511.00	4.1545	.08166	.90565	.820
Valid N (listwise)	123					
Total Ave Mean			4.21			

DESCRIPTIVE STATISTICS: COMMITMENT

	N	Sum	Mean		Std. Deviation	Variance
	Statistic	Statistic	Statistic	Std. Error	Statistic	Statistic
Q25	123	490.00	3.9837	.07997	.88692	.787
Q26	123	459.00	3.7317	.09096	1.00876	1.018
Q27	123	498.00	4.0488	.07557	.83816	.703
Q28	123	497.00	4.0407	.07948	.88149	.777
Q29	123	511.00	4.1545	.07304	.81011	.656
Q30	123	531.00	4.3171	.06664	.73904	.546
Valid N (listwise)	123					
Total Ave Mean			4.05			