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The Role of Social Capital and Entrepreneurial Orientation in Innovation Capability

by

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the degree of Doctor of Philosophy

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Signed: Date:

Arie Restu Wardhani

"*Indeed, in the creation of the heavens and the earth and the alteration of the night and the day are signs for those of understanding (3:190); Who remember Allah while standing or sitting or [lying] on their sides and give thought to the creation of the heavens and the earth, [saying], "Our Lord, You did not create this aimlessly; exalted are You [above such a thing]; then protect us from the punishment of the Fire (3:191).*"

~ Al-Imran 3:190-191 ~

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~This thesis is dedicated with love to my late parents, Nuskah Abdul Rofiq and Nanik Yuliani~

CONTENTS

LIST OF FIGURES

LIST OF TABLES

ABSTRACT

Many researchers and practitioners believe that innovation is a key business process. It is also the competitive advantage in supporting organisational capability. This competitive advantage distinguishes the company to become unique and different from the others. It directs the company to be a success in the fluctuation of a dynamic market. To reach the competitive advantage, the company should manage the innovation capability. However, it is not easy to manage innovation capability. It needs the good configuration of resource and innovation capability.

Many previous studies focused on tangible resources such as machine, technology, and financial can enable innovation. Then, the researchers realised that intangible resources have more advantages such as more valuable, unique, difficult to be imitated, and thus it can support competitive advantage. The mixed result from previous studies explains that intangible resource in the context of SME's could be the driver or hinder of innovation capability inspired the researcher to identify what kind of intangible resource could affect innovation capability and how does it affect innovation capability. Some gaps attained from literature review sections such as (1) the limited study focused more in effect between intellectual capital and innovation capability in developing country; and (2) the limited study was investigating the additional of mediating variable in bolstering innovation capability. In this case, the researcher found the advantage of entrepreneurial orientation (risk-taking, proactiveness, and openness) as the organisational behaviour which can support innovation capability.

Based on the gaps found, the researcher builds the conceptual model upon the theory of resource-based view and innovation management literature. This study fills this gap by conducting an empirical study in the context of ICT-SMEs in developing country, i.e., Indonesia. This research tests the hypothesis based on the empirical study which collected the primary data, i.e., 297 respondents from 132 Information and Communication Technology of Small and Medium Entreprises (ICT-SME) in Indonesia. In addition, this research analyses the primary data by using statistical analyses, i.e., Confirmatory Factor Analysis (CFA), Exploratory Factor Analysis (EFA) and Structural Equation Modelling (SEM).

The findings indicate that human capital could improve radical as well as incremental innovation capability whereas social capital could reduce radical as well as incremental innovation capability. When SMEs have entrepreneurial orientation, their human capital will enhance their radical and incremental innovation. On the other hand, SMEs' entrepreneurial orientation with openness in working with others reduces the relationship between social capital and radical/incremental innovation capability. The differences in the findings may be because of the influence of national culture. Since the culture can interpret the behavioural preference of individual or team in the organisation such as entrepreneurial behaviour (Hayton et al., 2002), the researcher evaluates the pros and cons among the findings by using Hofstede Model.

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(451 words)

KEYWORDS

HC : Human Capital

SC : Social Capital

EO : Entrepreneurial Orientation

RI : Radical Innovation

II : Incremental Innovation

SMEs : Small and Medium Enterprises

ICT : Information and Communication Technology

SEM : Structural Equation Modelling

EFA : Exploratory Factor Analysis

CFA : Confirmatory Factor Analysis

CHAPTER 1 INTRODUCTION

- Background and motivation
- Context: Developing country - Indonesia
- Research question and research objective
- Thesis structure

Next: Chapter 2 Systematic Literature Review

This chapter will present the background to and motivation for this research, which underlies the problem identified in this study. Furthermore, the researcher will present the developing country as the context of the study, the research questions, and the research objective. Finally, the chapter will end by outlining the thesis structure.

1.1 Background and motivation

Over the last decades, small and medium enterprises (SMEs) have faced various challenges in the business environment. These challenges are often hard for SMEs to survive; however, the development of capabilities would likely help SMEs to survive, gain competitiveness over competitors and enhance innovation performance. Furthermore, scholars have indicated that high-technology companies are experiencing phenomenal growth in the previous decade (Bruton and Rubanik, 2002; Hitt et al., 2004), and that companies-specific knowledge resources and capabilities could boost innovation and enhance performance (Sundbo, 2001; Sher and Yang, 2005). Capabilities, refer to an 'organisation's ability to assemble, integrate and deploy valued resources, usually in combination or co-presence'(Bharadwaj, 2000).

For SME managers, an important task is to identify, organise and implement limited intangible resources in unique ways (Stringer, 2000) to increase innovation

capability and thereby improve business performance. Although the basic link between resources and innovation is, on the whole for tangible resources (Hall, 1993; Hurley and Hult, 1998; Camps and Marques, 2014), we have limited understanding of the extent to which intangible knowledge resources lead to innovation capability in SMEs (Saunila and Ukko, 2014). As such, the objective of this research is to close this gap by studying how intangible resources might enhance the innovation capabilities of SMEs.

Tangible resources include funds, technologies, and tools; these have been widely investigated in the field of innovation (Coleman, 1988; Sok and Cass, 2011; Saunila and Ukko, 2014). Intangible resources entail tacit knowledge, which is valuable, unique, difficult to be imitated, and non-substitutable, and thus supports competitive advantage (Leonard and Sensiper, 1998; Surroca et al., 2010; Martínez-Cañas et al., 2012). Some SMEs have achieved world-class status in terms of tangible and intangible resources development in management, marketing, manufacturing and technological development (OECD, 2005a; Cousins and Menguc, 2006; Saarenketo et al., 2008; Acur et al., 2010). The knowledge level of these SMEs does not compare well to some large high-technology companies. The implementation of new forms of the intangible resource may be needed before they can affect innovation capability.

Building upon theoretical work on the Resource-Based View of firms and innovation management, this research attempts to refine and extend understanding of the link between intangible resources and innovation capability. This PhD examines how the development of intangible resources such as skills and the knowledge allow some SMEs to convert their knowledge resources into capabilities, while others fail to develop this innovation capability. Consistent with Damanpour (2010) and Vaccaro et al. (2012), this research considers capabilities and resources at a firm-level, and defined as the implementation of intangible resources such as human and social capital which could be embedded in the individual or team ability, which could be a state-of-the-art and is expected to extend innovation objectives. A misjudgment in implementing skills can lead to rigidities that hinder innovation capability. For example, in Hewlett Packard, many personal computer design projects were inhibited by limited skill and knowledge after they implemented the “next bench” system (Leonard-Barton, 1992). Under this system, the new design and manufacturing

decisions were made by the engineer sitting on the bench next to the designer. The design of personal computers under this system may therefore not meet customers' needs, as the design depends on the subjective decision of the engineers (Leonard-Barton, 1992).

Drawing from Subramaniam and Youndt (2005), this PhD research distinguishes among two sets of intangible resources: human capital and social capital. Human capital refers to the skills and knowledge that are embedded in individuals (Schultz, 1961; Subramaniam and Youndt, 2005; Beach, 2009). Social capital is the knowledge that is embedded within a team; it is implemented in the interaction between people and their relationship networks (Nahapiet and Ghoshall, 1998; Subramaniam and Youndt, 2005; Carmona-Lavado et al., 2010). The relational aspect in social capital could influence the effect of trust and shared vision to the process of knowledge sharing within intra-firm and inter-firm. The social capital within intra-firm can be shown by the liaison specifically in sharing knowledge between managers and employees, as well as the coordination and collaboration between department. Meanwhile, the coordination, communication, collaboration in sharing knowledge and idea, could be emerge from social capital inter-firm. For example, the companies utilise crowdsourcing to attain the idea from the community and public to develop the new product. It requires sharing knowledge which includes in intangible resources.

This PhD develops a model to explain how these intangible resources in SMEs are associated with the development of innovation capability, which is necessary to obtain radical innovation and to achieve or sustain incremental innovation. SMEs need to develop entrepreneurial decisions and actions (Dess et al., 1997; Gnizy et al., 2014; Khedhaouria et al., 2015) in order to survive and be competitive. As such, the entrepreneurial orientation of SMEs is important to transfer their resources into the capabilities.

The conceptual model in this research allows answering two important questions. The first relates to the understanding of why high-technology SMEs differ in their ability to convert their intangible knowledge into capabilities. The second examines the types of intangible resources that facilitate the development of capability, which leads to radical innovation and incremental innovation, and how SMEs foster entrepreneurial orientation with capability. This research offers insights on how to

deploy intangible resources most effectively at a firm-level, and also assistance to SME managers about the types of intangible resource portfolios to build, given that resources can be double-edged: some intangible knowledge resources enhance the development of capability, whilst others only advance capabilities after entrepreneurial orientation.

With respect to research on innovation management, this PhD develop upon a growing management debate about how when firms implement intangible resources could lead to the development and fostering of capabilities. Additionally, it examines an important mediating role of entrepreneurial orientation between the two intangible resources, and two firm capabilities namely radical and incremental innovation. In this study, the interpretation of intangible effect on innovation can be analised by considering the effect of national culture such as the utiisation of hofstede model.

The hypotheses are tested using data collected from 297 respondents from 132 Information and Communication Technology of Small and Medium Entreprises (ICT-SME) in Indonesia. This thesis analysed data based on Confirmatory Factor Analysis (CFA), Exploratory Factor Analysis (EFA) and Structural Equation Modelling (SEM).

1.2 The Hofstede Model

Knowledge and innovation in the country can be influenced by culture (Phene, Fladmoe-lindquist and Marsh, 2006). Innovation can be developed by risk-taking, independent thinking, and national culture (Hayton et al., 2002), as well as social capital (Turkina and Thai, 2013; Zhang and Wu, 2013; Ruvio et al., 2014; Oparaocha, 2016). Few researchers found that some national characteristics are likely to impact on innovation motivation on the national level as well as firm level (Lundvall, 2007; Fagerberg and Srholec, 2008). Lundvall (2007) underlined the necessity of better allocation of power, to better understanding of innovation openness in developing countries. Also, few authors stated how some factors affect on National Innovation Systems for example openness to interact with other in innovating, governance structures, political system (Fagerberg and Srholec, 2008). These important factors in line with the cultural dimensions identified by (Geert Hofstede et al., 2010). Therefore, this PhD includes the model of national culture to explain the effect of intellectual capital and entrepreneurial orientation on innovation capability.

In the Hofstede Model, there are six dimensions to describe national culture based on the collective mental model of people in each country. These six dimensions are power distance, individualism, masculinity, uncertainty avoidance, long-term orientation, indulgence. Power distance is related to the formal and informal gap between different members of the organisation, particularly between those at different levels of seniority. With the higher level of power distance, people accept and expect the control from the senior (Hofstede, 1984, 2011). Decision making authority and social status in organisations with a high power distance remains within people in positions of high seniority (e.g., Owner, CEO, senior managers). In these organisations, people at lower levels of the hierarchy tend to expect and accept following the directives set by their senior managers. Managers as seen as superiors and expected to give orders to subordinates, who in turn are expected to comply with these orders.

Another dimension of Hofstede model is individualism. Individualism refers to the tendency for the individual in the group to work independently (Efrat, 2014). It also shows the strength or loose ties between the individual and people. The higher level of individualism the looser ties between people. In contrast, the lower level of individualism means the individual prefers to work collectively. It is also known as collectivism which has the strong ties between people.

The masculinity dimension indicates the cultures that demonstrate a high degree of assertiveness and focus on wealth (Hofstede, 2011). The high degree of the masculinity dimension is reflected by the greater emphasis on building the relationship and overall quality of life.

Uncertainty avoidance is related to the degree of acceptability for the change and the preference to take the risks that characterise people from different cultures and organisations. A high degree of uncertainty avoidance is reflected in people's dislike for change and low desire to take risks. People with a low degree of uncertainty avoidance are more accepting of change and willing to take risks.

Long-term orientation refers to the extent to which people prioritise on long-term goals and ambitions rather than short-term gains. There are two groups of societies with the different goals. Normative societies have a low score against this dimension (ITIM International, 2017) and people tend to perceive that the present is

more important than the future. Pragmatic societies are encouraged by the effort to increase knowledge and information to anticipate the future (ITIM International, 2017). In this group, people have a future and long-term orientation, with a focus on learning to adapt to changes in the environment.

Indulgence is the extent to which people are driven by the desire to enjoy life and have fun (Hofstede, 2011). This dimension was added later as part of the research on happiness undertaken by (Hofstede, 2011). A low level of indulgence, namely restraint, shows a degree of gratification in enjoying life restricted by norms.

Hofstede studied the role of national culture to evaluate the behaviours, values, and notion of people from R&D departments across over 50 countries (Hofstede, 1984; Hofstede, 2011). In the study of culture and innovation, Tekin and Tekdogan (2015) compare the innovation activities in the developed and developing countries based on Hofstede's model. They resulted that the countries with higher innovation capabilities are characterised by the lower score of power distance and uncertainty avoidance and the higher score of individualism and long-term orientation.

Figure 1.1 shows the comparison of national culture scores based on Hofstede's model in five countries including Indonesia, Turkey, Taiwan, United States and the United Kingdom. Indonesia and Turkey are the developing countries which have almost similar characteristics of national culture except for the uncertainty avoidance and the long-term orientation. For example, power distance is high for Indonesia and Turkey. It means that the power of leader is centralised and the employees are being dependent. This characteristic contrasts to The United Kingdom and The United States which have the lower score by 35 and 40 respectively. On the other hand, Taiwan has similar characteristics to Indonesia, except for uncertainty avoidance. In this case, Indonesian characteristic is almost the same with Americans in uncertainty avoidance. It is because Indonesians and Americans believe that the future can not be known. The dynamic situation of the future cause people to adapt quickly to the volatile environment.

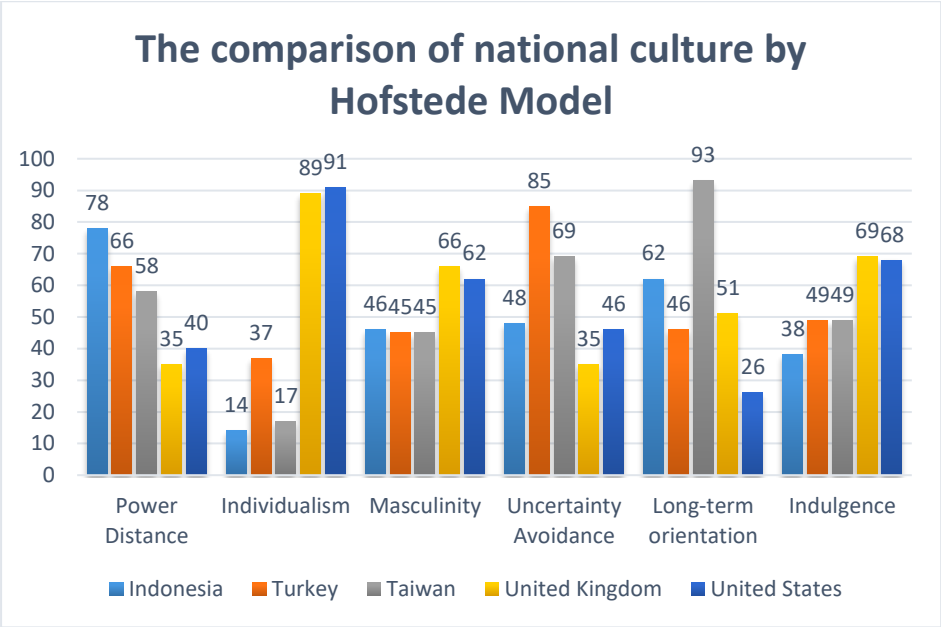


Figure 1. 1 The comparison of national culture
Adopted from ITIM International (2017)

1.3 Context: Developing country- Indonesia and ICT-SMEs

There have been researches looking into the link between intangible resources and innovation capability in SMEs in developed countries (Subramaniam and Youndt, 2005; Wu et al., 2008; Camps and Marques, 2014; Saunila and Ukko, 2014). There is a lack of research studying the link between intangible resources and capabilities in the context of developing countries where we may learn many new insights.

In all businesses, both large companies and small and medium enterprises (SMEs), the correct allocation of firm resources can enhance innovation outcomes (Chaminade and Roberts, 2002; Soosay et al., 2008). Larger companies tend to have a higher level of capability and resource investment than SMEs. SMEs often struggle with a lack of investment, which can also constrain their ability to innovate, and lower efficiency in utilising the resources they do have (Mourougane, 2012; Janita and Chong, 2013; Wales et al., 2013). This weakness can mean that companies are at risk of exhausting their internal resource (Thornhill and Amit, 2003). For this reason, SMEs must manage their resources and capabilities well to avoid bankruptcy and to attain competitive advantage (Thornhill and Amit, 2003).

The scale of an industry can influence its ability to innovate (Garengo et al., 2005). For example, in a large scale multinational company, innovation capability is the key to obtaining competitive advantage (Fan, 2006). However, SMEs face obstacles to innovation that arise from both internal and external factors. Furthermore, in the process of creating ideas, SMEs are inclined to exploit their existing resources within the company, and rarely explore new ideas from outside of the company. Macpherson and Holt (2007) agree that knowledge influences the growth of SMEs.

According to Hadjimanolis (1999), the internal barriers to innovation include resource management, and internal barriers to innovation include internal financial ability, technical knowledge, time efficiency, culture, accountancy systems, social capital, risk-aversion, and leadership behaviour. The external barriers to innovation arise due to factors including customers, government policy, and the market, which are difficult to control (Hadjimanolis, 1999). Another external barrier is the difficulties in managing strategies and capabilities. For example, poor strategic planning is shown by an informal decision-making process, influences the proactiveness of the company's activities (Garengo et al., 2005). Moreover, difficulties in absorbing technological information can be a barrier to innovation for SMEs (Hadjimanolis, 1999).

On the other hand, SMEs have an advantage in their flexibility, as they can more easily adapt to a fast-changing business environment due to less formal bureaucracy (Saunila and Ukko, 2014). The less formal organisational structure of SMEs gives them the potential ability to drive and regenerate competitive advantage, which is associated with business growth (Miller, 1983; Branzei and Vertinsky, 2006). This lack of bureaucracy can enable SMEs to develop their creativity. Therefore, SMEs should develop and improve their internal and external capabilities to enhance the innovation outcome and to adapt to the fluctuation of the changing environment (Hadjimanolis, 1999; Branzei and Vertinsky, 2006).

The definition of SMEs may vary among the countries world wide (Eniola and Entebang, 2015). Eniola and Entebang (2015), though they frequently make reference to the number of employees and total financial assets. According to the OECD (2005a), SMEs are independent companies that utilise the minimum number of workers. The European Commission also defines SMEs as having the minimum of workers, which

it clarifies as being less than 250 (Kraus, 2013). Some countries limit the number of employees to 200, and the US defines SMEs as companies that have less than 500 workers (OECD, 2005a; Firoozmand et al., 2015). 'Micro companies' are those with between 5 and 10 employees (OECD, 2005a). According to European Commision (2015), a "small" company has between 11 to 50, and a medium size company has between 51 to 250. The large companies have more than 250 employees. Table 1.1 shows the definition of SMEs by financial performance (European Commision, 2015).

Table 1. 1 The definition of SME regarding financial performance

Adopted from European Commission (2015)

The Category of Firm	**Annual Work Unit (AWU)**	**Turnover per year**	**Balance sheet total per year**
Medium-sized	< 250	≤ EUR 50 Million	≤ EUR 43 Million
Small-sized	< 50	≤ EUR 10 Million	≤ EUR 10 Million
Micro	< 10	≤ EUR 2 Million	≤ EUR 2 Million

The definition of SMEs in Indonesia is based on Central Bureau of Statistics and the State Ministry of Cooperative and SMEs (Tambunan, 2008) which is shown in Table 1.2. It reveals that the number of employees for SME is 100. However, in this research, follows the definition of SMEs by European Commission which was shown at Table 1.1. The researcher chose this definition because it is also the same as the definition of SMEs from the World Bank's International Finance Corporation (IFC). It mentions that SMEs is 'registered businesses with less than 250 employees' (Ardic et al., 2011), which is the same numbers with the European Commission.

Table 1. 2 The definition of SME in Indonesia based on Central Bureau of Statistics and the State Ministry of Cooperative and SMEs

Adopted from (Kartiwi, 2006; Tambunan, 2008; Janita and Chong, 2013; Kusumawardhani, 2013)

The Category of Firm	Annual Work Unit (AWU)	Turnover per year	Balance sheet total per year
Medium-sized	< 100	≤ Rp 50 bil (± US $ 3.53 mil)	≤ Rp 10 bil (± US $ 610,799)
Small-sized	< 20	≤ Rp 2.5 bil (± US $ 152,699)	≤ Rp 500 mil (± US $ 30,539)
Micro	< 5	≤ Rp 300 mil (± US $ 18,323)	≤ Rp 50 mil (± US $ 3,053.9)

Worldwide SMEs can contribute more than 90 percent to the economic growth (Thong, 1999; O'Hara et al., 2005). In Indonesia, businesses are dominated by SMEs with 57.9 Million SMEs or approximately 99 percent of the total businesses in Indonesia (Janita and Chong, 2013). Even though the number of SMEs is overwhelming in Indonesia, the rank of innovation capability is very low. Indonesia's rank of innovation is 88 over 128 countries in the world and ranks 13 across South East Asia, East Asia, and Oceania Countries (Cornell University et al., 2016). This low ranking could be because of lower levels of human capital, which may cause lower ability to innovate.

In Indonesia, the development of innovation and human capital have become a key point of Master Plan for the Acceleration and Expansion of Indonesia's Economy Growth for the period 2011-2025 (*Masterplan Percepatan dan Perluasan Pembangunan Ekonomi Indonesia,* MP3EI*)*. This plan is focused on a 15-year economic growth plan. This strategy prioritises SMEs across sectors including creative industry such as ICT (Information and Communication Technology), art and antiques, craft, design, fashion, architecture, and music (Paseng, 2011). Besides, the lack of skilled obstacles faced by SMEs in Indonesia includes high energy costs, limited infrastructure and internet access, corruption and political instability, and lack of skilled workers (Mourougane, 2012). Some of these problems can be eliminated through effective government policy implementation. However, the complex geography of Indonesia can often cause difficulties in managing and controlling

consistent policy implementation, which results in some regions being underdeveloped due to inadequate infrastructures such as transportation and internet access.

The human capital in Indonesia as one of the driving factors of innovation is considering low based on the Global Enterprises Index (GEI-2011), which means a shortage of highly skilled people that the economy needs to innovate and grow. The low rank of innovation capability based on the Global Innovation Index (GII-2015) supports this argument.

Based on the path of the digital ecosystem, Indonesia is included in the 'break out' cluster, which comprises countries that have lower digitalisation, but higher potential to evolve. Figure 1.2 shows the digital ecosystem path for 60 countries, including Indonesia. ICT in Indonesia is growing, but its performance is weak. This indicates that the country has a weak infrastructure and weak institutional quality (Chakravorti et al., 2014, 2017). Through innovation capability, such weaknesses can be overcome, and enhanced firm performance can be attained (Lawson and Samson, 2001). From the data above, it can be observed that the low levels of innovation capability cause SMEs to fail in promoting innovation (Siahaan, 2017). Therefore, research on innovation capability in ICT-SMEs in developing countries is needed to identify the factors that drive innovation, so that findings can be implemented to enable innovation.

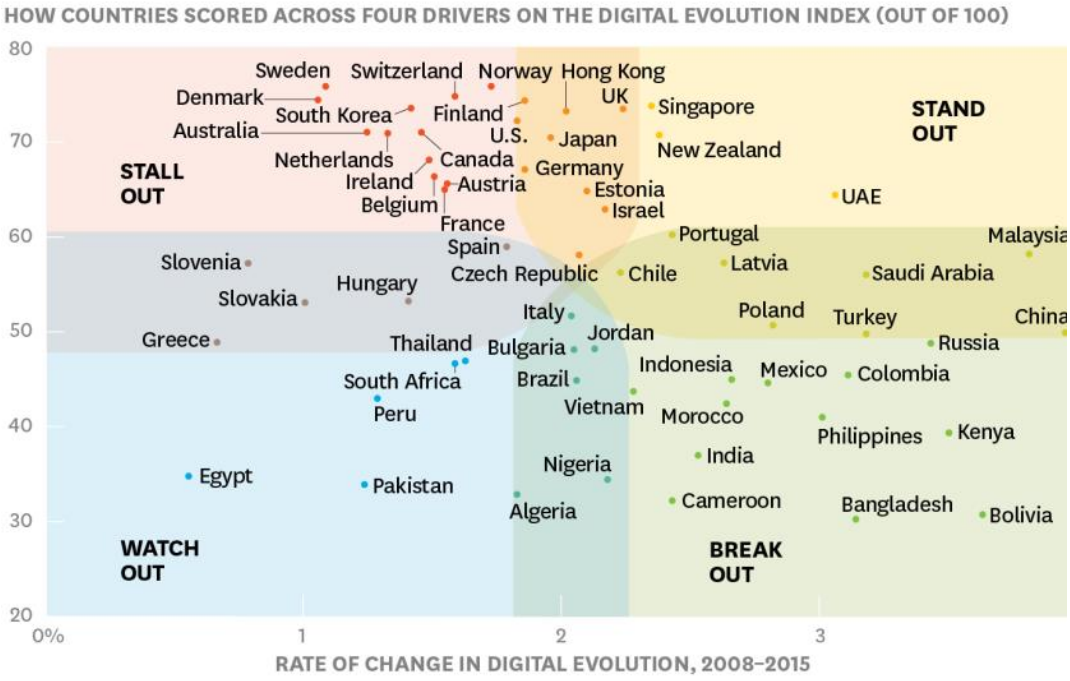


Figure 1. 2 The digital evaluation index 2017
Adopted from Chakravorti, Bhalla and Chaturvedi (2017)

In Indonesia, the growth of innovation is slower than in neighbouring states, such as Malaysia (Cornell University et al., 2016). To stimulate innovation, the government is attempting to improve technology-based sectors such as ICT. To reinforce ICT sectors, the Indonesian government continues to improve its infrastructure for example by developing the project of ring palapa. This project aims to reach all of the areas (including remote areas) to have access to internet, information, and telecommunication.

The development of ICT-SMEs, besides solving social problems such as poverty alleviation and unemployment, it can solve transportation and farmers' issues. For example, Gojek (motorcycle taxis online) can utilise its service to minimise traffic jam problem, and Regopantes (a social network for farmers and e-commerce for farm products) can support farmers to have appropriate pricing for agriculture products. Usually, farmers sold their products through intermediaries resulting in prices that were not always fair to the farmers. Regopantes helps farmers to sell the product directly at an affordable price. Therefore, if the government focuses on the

development of ICT, this can increase national development (Sein and Harindranath, 2004).

According to Laforet (2011) SMEs are struggling to manage resource and capability to enable innovation. This also occurs in SMEs in Indonesia. Even though the Indonesian population is more than 250 million (Negara, 2014), it should be adequate for the companies in Indonesia to have sufficient intangible resources such as knowledge and skill. However, the low rank of innovation in Indonesia maybe because of the process of producing knowledge and skill in insufficient to yield innovation.

1.4 Research question and research objectives

This research aims to provide a comprehensive understanding of intangible resources and the innovation capability of ICT-SMEs in Indonesia. Specifically, the objective of this research is to understand the extent to which intellectual capital and entrepreneurial orientation affect the innovation capability of ICT-SMEs in Indonesia. Therefore, the research question is: "*In the context of ICT-SMEs* in *developing country, how do intangible resources affect innovation capability?*"

The research question can be broken down into two more specific questions, as follows:

1. To what extent do intellectual capital and entrepreneurial orientation affect innovation capability?
2. To what extent does entrepreneurial orientation mediate the relationships between intellectual capital and innovation capability?

1.5 Thesis structure

This thesis comprises of seven chapters, as follows:

- **Chapter 1: Introduction**

The initial chapter has provided the background and motivation to the research, the problem statement, research question, and research aims. This chapter has also explained the limitations of the research and the thesis outlined.

- **Chapter 2: Systematic Literature Review**

This chapter will present a systematic literature review which reviews the previous studies on intangible resources and innovation capability. In addition, this chapter will explain the systematic review process. At the end of the literature review, the research gaps and the research question that guide the research will be clarified.

- **Chapter 3: Development of the Research Model**

This chapter will present the underlying theory of this research, and provide an overview of the conceptual model, and the fundamental theory on which it is based. The researcher will then explain the relationship between each variable, i.e., human capital, social capital, risk taking, proactiveness, openness, radical innovation capability, and incremental innovation capability.

- **Chapter 4: Research Philosophy and Methodology**

This chapter will explain the research paradigm, research methodology, and the techniques used in this research. It will explain the nature of the research, the research design, research paradigm, research methodology, and research techniques and instruments used.

- **Chapter 5: Research Design**

Chapter 5 will describe the selected research approach, and the quantitative method used. Then, the selected data collection and analysis methods will be discussed. The construction of the questionnaire, pilot study, and data collection are also explained. The Structural Equation Modelling (SEM) procedure will be described, and the validity of the questionnaire and the content validity will be assessed. Ethical approval was granted by the Design, Manufacture and Engineering Management (DMEM) department at the University of Strathclyde.

- **Chapter 6: The Data Analysis and Result**

This chapter will present the quantitative findings of the statistical analysis. The results of measurements including validity and reliability, exploratory factor analysis (EFA), confirmatory factor analysis (CFA), Structural Equation Modelling (SEM), nested model tests, Sobel mediator testing, and bootstrapping are also presented.

- **Chapter 7: Discussion and Conclusion**

This chapter will present the key findings based on the results of the analysis. It will then explain the implications of research on intellectual capital, entrepreneurial orientation, and innovation capability. The context of the study, namely ICT-SMEs in Indonesia will be summarised. Then, the contribution of this research to both knowledge and industrial practice will be identified. Finally, the researcher will explain the limitations of the study and make recommendations for future research.

CHAPTER 2 THE SYSTEMATIC LITERATURE REVIEW

- Introduction
- Part 1: The Definition: Innovation, Innovation Capability, Intangible resource, SMEs
  - Definition
- Part 2: The Systematic Literature Review Procedure
  - Planning the systematic review
  - Conducting a systematic review
  - The evolution of intangible assets and innovation capability literature
  - Innovation Evolution
  - Innovation category
  - Synthesising and analysing the material
- Part 3: Finding and the gaps
  - The gaps in innovation capability
  - Conclusion
  - Summary

Next: Chapter 3 The Development of a Research Model

2.1 Introduction

In the era of globalisation and highly competitive markets, companies need to develop a competitive advantage to survive. Many researchers and practitioners believe that innovation is a way for companies to attain competitive advantage and thus survive (Lawson and Samson, 2001; Adams et al., 2006; Hogan and Coote, 2014). If a company does not seek to innovate, it will not be competitive (Salaman and Storey, 2002).

The fast changing of business environment cause the current businesses to respond the change. According to Klára Antlová (2009), the ability to respond quickly the changes can be the competitive advantage of small and medium enterprises

(SMEs), although they also struggle with limited resources, and a lack of efficiency in utilising the resources they do have (Wales et al., 2013). SMEs can be at risk of exhausting their internal resource, then fail in managing their investment of resources and capabilities (Thornhill and Amit, 2003). For this reason, SMEs must manage their resources and capabilities well to avoid bankruptcy and to attain competitive advantage (Thornhill and Amit, 2003).

According to some scholars, Saunila, Ukko and Rantanen (2014), Skuras, Tsegenidi and Tsekouras (2008), and Barney (1991), company resources comprise both tangible and intangible resources. Tangible resources include funds, technologies, and tools; these have been widely investigated in the field of innovation (Coleman, 1988; Sok and Cass, 2011; Saunila and Ukko, 2014). More recently, the focus of innovation management research has shifted toward studying the impact of intangible resources on innovation (Subramaniam and Youndt, 2005; Huang et al., 2011; Inkinen, 2015). Previous studies have demonstrated the importance of intangible resources, such as knowledge, skills, and culture (Hall, 1993; Hurley and Hult, 1998; Camps and Marques, 2014), which become core enablers of innovation (Terziovski, 2007). Intangible resources entail tacit knowledge, which is valuable, unique, difficult to imitate, and non-substitutable, and thus supports competitive advantage (Martínez-Cañas et al., 2012).

Some scholars Leitner (2011), and Teixeira and Tavares-Lehmann (2014) argue that intangible resources such as skills will strengthen the knowledge aspect of innovation management process. The more skilled and more knowledgeable employees are the more innovative the company (Gómez and Vargas, 2012). For example, in sharing an idea, knowledge, and information can emerge the diversity of ideas which can cause conflicts. These conflicts should be managed well to create innovation (Sundaramurthy et al., 2014).

In contrast, miscalculation of managing resource and capability such as the development of the idea and creativity in Xerox company without commercialised (Davila et al., 2006), can cause the company failed to harness the value of the creativity to be innovation. In addition, Villalonga (2004), and Leonard-Barton (1992) identified a negative effect of intangible resource on innovation. The rigidity of creativity process such as in the department of R&D in Hewlett Packard company can cause

misjudgement in identifying the need of the customer. The other previous authors such as Subramaniam and Youndt (2005) yields the mixed result of intangible resources, i.e. human capital, and social capital to innovation capability. The negative impact of human capital on radical innovation was caused by mistrust in sharing the idea with the other colleagues. However, social capital positively affected innovation capability, i.e. radical innovation and incremental innovation.

Since there are mixed results regarding the relationship between intangible resources and innovation capabilities, this literature review will focus on the following research question: "What types of intangible resources can affect innovation capability?" To answer this question, a systematic literature review was undertaken to analyse and synthesise evidence from research published in the last three decades (1985-2017) on intangible resources and innovation capability. Furthermore, the review will identify any relevant gaps in the existing research.

This chapter comprises three sections. First, the terms innovation, innovation capability, intangible resource, and SMEs will be defined. The second section will explain the methodology of a systematic literature review. The third section will present the findings of the literature review, and identify the research gaps.

PART 1: THE DEFINITION OF INNOVATION, INNOVATION CAPABILITY, INTANGIBLE RESOURCE, AND SME

2.2 Definitions

2.2.1 Innovation

The term innovation originates from the Latin 'innovationem', with the noun 'Innovare' (Hagelin, 2011). 'Innovare' means 'to change.' This is combined with the term 'novous' means 'new' (Hagelin, 2011). Linder, Jarvenpaa and Davenport (2003) describe innovation as "implementing new ideas that create value". Based on this understanding, the innovation has various dimensions (Leskovar-Spacapan and Bastic, 2007), depending on the process and the outcome (Crossan and Apaydin, 2010).

In terms of technological innovation, Schumpeterian definition describes innovation as the process of creative destruction (Tidd and Bessant, 2009). Schumpeter divides innovation into types, i.e., new products, new processes, new markets, new sources of supply, and new forms of organisation. Then, in the 1970s, innovation management became a popular subject of discussion amongst academics, government, and practitioners (Roberts, 1998). Drucker (1985) includes innovation within a concept of entrepreneurship. According to Atherton and Hannon (1995), and Drucker (1985), innovation comprises the business process which organises the resource and capability to create the wealth.

In this study, innovation is understood to be the implementation of a new or significantly improved product (goods, or service), or process, a new marketing method, or a new organisational method in business practices, workplace organisation, or external relations (OECD, 2005b). Innovation is not only about creating new ideas, but also the mechanisms by which to exploit new ideas, process knowledge, and commercialisation of the new product. Therefore, the definition of innovation is broken down further, based on its objective/mechanism, as shown in Table 2.1 below.

Regarding the first cluster, many previous studies argue that innovation is not only about new ideas, but also utilising new ideas to create new products or new processes, as well as introducing them. A study by Covin and Miles (1999), and Koellinger (2008) reference the subjectivity of definitions of innovation related to economic activity. Coming up with new ideas without realising and implementing these within new products cannot be considered innovation. Inventing new ideas, processing new ideas to become a new product or process, and then introducing these to the customer are complex processes in innovation and ones which require both internal and external drivers such as resources and capabilities. In utilising resources and capabilities, companies can be imitative companies, which tend to exploit their resources to produce new products or processes by improving existing products. Companies also can choose to explore new ideas to disrupt the existing product.

The second cluster includes innovations that result from the utilisation of knowledge. Siguaw, Simpson and Enz (2006) explained that the process of innovation includes knowledge, skill, and process learning in order to create new value. This notion aligns with the findings of other scholars (Cohen and Levinthal, 1990; Nahapiet

and Ghoshall, 1998) that innovation can be achieved by combining knowledge and learning processes, such as the process of absorptive capacity. In the incremental innovation, know-what and know-how in technical innovation helps to improve the development of existing products.

Table 2. 1 The definition of innovation based on the objective or mechanism

Objective/ Mechanism	Definition
Utilizing creative idea to introduce something new	Innovation refers to "the generation, acceptance and implementation of new ideas, processes, products or services." (Erdil et al., 2004). "Innovation refers to the introduction of a new product, process, technology, system, technique, resource, or capability to the firm or its markets." (Covin and Miles, 1999) "Innovation is the implementation of a new or significantly improved product (good or service), or process, a new marketing method, or a new organisational method in business practices, workplace organisation or external relations." (OECD, 2005b) "Innovation is intrinsically about identifying and using opportunities to create new products, services, or work practices" (Subramaniam and Youndt, 2005). Innovation is the process of product, program, or practice in the initial phase of implementation and acceptance in the industry (Kimberly and Evanisko, 1981; Bantel and Jackson, 1989). "Innovation is production or adoption, assimilation, and exploitation of a value-added novelty in economic and social spheres; renewal and enlargement of products, services, and markets; development of new methods of production; and establishment of new management systems" (Crossan and Apaydin, 2010)
Knowledge building	Innovation comprises specific technical knowledge about how to undertake better than the existing knowledge (Teece, 1986). Innovation orientation can be viewed as relating to the multidimensional nature of knowledge structure, which consists of learning philosophy, strategic management and action to promote innovation. (Siguaw et al., 2006)

2.2.2 Innovation Capability

Companies must adapt to highly competitive and fluctuating markets. One strategy of coping with a fluctuating market is to identify company capabilities, such as innovation capability (Lawson and Samson, 2001). This capability holds the key to innovation and is important to promote innovation success (Lawson and Samson, 2001; Saunila and Ukko, 2013). However, the ability to innovate is very difficult to manage.

Lawson and Samson (2001) explain that innovation capability is related to the ability in processing knowledge to be innovation. This could involve the integration of several capabilities. For example, Zawislak et al. (2012) suggest the integration of technology-driven capabilities and business-driven capabilities, which include innovation capability. Lawson and Samson (2001) proposed the ability of the companies to innovate can be from the combination of multiple capabilities, such as internal capability and external capability of the companies. The process to produce innovation capability can be from the integration of manufacturing process or mainstream and the new idea of technological aspect created by R&D department or the new-stream. Subramaniam and Youndt (2005) divide innovation capabilities into radical innovation capability and incremental innovation capability; where radical innovation capability is defined as the ability to create innovations that radically change existing products or services, while incremental innovation capability is the ability to create innovations that refine existing products or services. The different definitions of innovation capability are shown in detail in Table 2.2.

This research defines two clusters of innovation capability. First, innovation capability is the integration of various abilities to create innovation. This model of innovation harnesses resources such as knowledge, skills, and competencies, and integrates these with innovation processes to bring about innovation outcomes (Adams et al., 2006; Ngo and O'Cass, 2009; Zawislak et al., 2012). Adams, Bessant and Phelps (2006) similarly define innovation capability as the ability to create and operate process innovation to achieve innovation benefit.

Second, innovation capability can be understood as the ability to produce innovation by employing knowledge. Several scholars Lawson and Samson (2001)

and Branzei and Vertinsky (2006) define innovation capability as the ability to produce innovation outcomes by transforming and processing knowledge.

Table 2. 2 The definition of innovation capabilities

Cluster	Definition
(1) Innovation capability is the integration of various firm abilities to create innovation	"Innovation capability as a firm's ability, relative to its competitors, to apply the collective knowledge, skills, and resources to innovation activities related to new products, processes, services, or management, marketing, or work organisation systems, to create added value for the firm or its stakeholders." (Hogan et al., 2011) "The innovation capability can be seen as an overall capability encompassing the ability to absorb, to adapt and to transform a given technology into specific management, operations and transaction routines that can lead one firm to Schumpeterian profits, i.e., innovation." (Zawislak et al., 2012) Innovation capability as the ability to create and operate process innovation to capture innovation benefit. (Adams et al., 2006) "Innovation capacity refers to the availability of resources, collaborative structures, and processes to solve problems." (Laforet, 2011)
(2) Innovation capability is the ability to process knowledge to produce innovation	Innovation capability is "the ability to continuously transform knowledge and ideas into new products, processes, and systems for the benefit of the firm and its stakeholders." (Lawson and Samson, 2001) "Product innovation capability is the ability to acquire and assimilate external knowledge, transform it into a novel, unique competencies, and ideas, and then harvest these ideas by first generating and then effectively commercialising new or improved products." (Branzei and Vertinsky, 2006)

2.2.3 Intangible resource

The intangible resource can be defined as "all non-material factors that contribute to the performance of firms in the production of goods or the provision of services, or that are expected to generate future economic benefits to the entities or individuals that control their deployment" (Eustace, 2000; Arrighetti et al., 2014). All

non-material material such as knowledge, skill, and competence is difficult to be imitated. This benefit can cause the companies to sustain and to succeed in the tight competition. In this case, Kaplan and Norton (2004) and Huang, Lai and Lin (2011) define intangible resources as ‘‘knowledge that exists in an organisation to create differential advantage” and emphasise the value creation in innovation capability.

According to Hall (1993), intangible resource dimensions consist of assets and skill. The assets comprise intellectual properties, databases, network and reputation. Skill or competence comprises know-how, cognitive and behaviour, and also culture. Teece, Pisano and Shuen (1997), Tepic et al. (2013), Hall (1993), and Xiaobo Wu and Sivalogathasan (2013), investigate the classification of the intangible resource as intellectual capital and reputation. Other studies identify intangible resources as motivation, knowledge and firm culture (Lawson and Samson, 2001; Saunila and Ukko, 2014). Arrighetti, Landini and Lasagni (2014) mentioned intangible resource can be measured by the expenditure of R&D such as training and innovation process.

PART 2: THE SYSTEMATIC LITERATURE REVIEW PROCEDURE

A systematic literature review is a well-known research technique in the medical field. However, in the field of management, this technique has been used to improve the traditional reviews, which are flawed in terms of their relevance due to the biased approach (Becheikh et al., 2006). The key objective of undertaking a systematic literature review is to identify the main contributions to the knowledge and practice, in order to determine the current state of research and identify gaps in the previous studies. The methodology utilises a systematic method, as well as inclusion and exclusion criteria to gather robust results from previous, high-quality studies. The systematic review is conducted since it is a clear, replicable, and explicit procedure that can yield robust and unbiased results (Denyer and Tranfield, 2009).

For this study, a systematic literature review of previous peer-reviewed journal articles published between 1985 and 2017 on the topic of innovation capability. Table 2.3 outlines the steps undertaken to identify research gaps in the previous studies regarding innovation capability process and drivers. The systematic literature review

procedure used followed the three-stage Tranfield procedure: planning the review; conducting the systematic review; reporting and dissemination.

In the planning process, the researcher plans the systematic review protocol, which includes determining the aim, research question, and the scope. In this stage, the researcher identifies the keywords to be used and the bibliography databases to be searched. Then, the researcher determines the inclusion and exclusion criteria that will be used to identify high-quality journal articles.

For this literature review, the research question was: "What types of intangible resources can affect innovation capability?" To answer the research question, the literature review aimed to identify gaps in the existing knowledge, to provide a novel contribution to knowledge, and to obtain a clear picture regarding the relationship between intangible resources and innovation capability. The whole systematic review process implemented in this research is illustrated in Table 2.3 below:

Table 2. 3 The phases of systematic literature review process

Adapted from (Tranfield et al., 2003; Pittaway et al., 2004; Denyer and Tranfield, 2009; Lim et al., 2015)

Phase 1: Planning the systematic review This process involves establishing the aims, research question, and the scope of the research interest.	Step 1. Justifying the aims, research question, and the scope of research. Step 2. Determining the search keywords. **Output: the systematic review protocol**
Phase 2: Conducting the systematic review This phase aims to ensure a transparent process of searching for previous studies. In addition, the papers were synthesised and extracted from the selected relevant papers. Then, statistical analysis was conducted to map the results and to identify the gaps.	Step 1. Searching papers Step 2. Mitigating the papers based on inclusion and exclusion criteria Step 3. Data synthesis and data extraction Step 4. Analyse the data via descriptive analysis **Output: The number of relevant papers, and descriptive analysis**
Phase 3: Reporting Result In this phase, the systematic review report was presented in a replicable and transparent way. In addition, the reporting result interprets and report the gaps and future research agenda.	Writing the report, which details the whole systematic review process. **Output: research themes; and research gaps**

2.3 Phase 1: Planning the systematic review

This stage is the initial phase of the systematic literature review. It comprises preparing the protocol which consists of aims, research questions, key search and

bibliographic database. The protocol is created to identify the possibility of error or default so that the researcher can anticipate error or default (Denyer and Tranfield, 2009).

There are some alternatives to strings as the keyword search implemented in this literature review. The researcher used the method recommended by Soomro et al. (2016) to determine the search keywords. In Soomro et al. (2016) study, some key search was employed to clarify the aims of the topic of literature review and to ensure that important papers were not missed. Soomro et al. (2016) utilise four different alternatives topics to formulate the string of key-search.

In this study, three alternative strings were used for the keyword search to explore the relevant selected papers. The first string was *"("Innovation capability") AND (technology OR new product OR process OR R and D) AND strategy"*. The first alternative string was used to capture the drivers of innovation capability and strategy, as recommended by Akman and Yilmaz (2008). The first alternative of string was conducted to depicting the driver of innovation capability and strategy. By using the first alternative strings, the researcher found most of the previous studies analysed internal assets such as knowledge and tools.

Since intellectual capital also includes knowledge, the researcher in this study used *"Intellectual capital" and "Innovation outcome"* as the second alternative string, as recommended by Subramaniam and Youndt (2005) and Crossan and Apaydin (2010). Further, the researcher used a final alternative string, inspired by other researchers (Subramaniam and Youndt, 2005; Adams et al., 2006; Akman and Yilmaz, 2008), which was *("Innovation capability") AND ("Intellectual Capital") OR ("Human Capital" OR "Social Capital") OR Innovativeness AND Strategy AND Business Performance OR Innovation Performance OR Radical OR Incremental AND (Technology OR New Product OR Process) AND SME*. Table 2.4 shows the number of journal papers selected following a search process based on the string alternatives above.

After determining the keyword searches and alternative strings, the researcher then identified bibliographic databases as online tools for searching journal papers. These databases provide access to many journals from various publishers, such as ProQuest and Web of Science. Some bibliographic databases also provide earlier

journal papers from a particular publisher, such as ScienceDirect (Elsevier Publisher), and Emerald (Emerald Publisher).

For this study, the researcher utilised four bibliographic databases: ABI/INFORM of ProQuest; ScienceDirect; Emerald; and, the Web of Science. Both ABI/INFORM of ProQuest and ScienceDirect are databases commonly used in the area of management, industry, and economics (Becheikh et al., 2006). The Web of Science is a database commonly used in the area of management and innovation. Emerald was used to extending the search to the area of business and management. Emerald also has a significantly higher impact factor, of approximately 72% (Thomson Reuters, 2015; Emerald, 2017). ScienceDirect covers more general topics in management.

The next step was determining the relevant papers by inclusion and exclusion criteria. There are three inclusion criteria implemented. Firstly, the previous papers utilised was from the last three decades (1985 to 2017). The researcher-initiated 1985 as the year in attaining the previous papers since the researcher requisite to identify the evolution of innovation capability. Some study such as Coleman (1988) and Kline and Rosenberg (1986) recognise the involvement of intangible resources in innovation. Landau and Rosenberg, 1986 and Kline and Rosenberg (1986) depicted the conceptual model of innovation process which was driven by technological change, economic and social environment, knowledge and potential market.

The second inclusion criteria implemented is the article papers which have the impact factor more than 1 based on Scimagojr website. For this research, the Scimagojr website was a tool that was used to identify the impact factor of journal papers to satisfy the quality criteria for inclusion. Journal impact factor becomes the inclusion requirements because it shows how many journal papers cited by other authors. The researcher used JIF>1 because the grade of 1.0 means at least one paper cite such journal articles during one or two years (Mingers and Yang, 2017). Therefore, the higher impact factor is the better quality of journal papers (Mingers and Yang, 2017).

Thirdly, the researcher utilised the rank of journal papers from ABS Academic Journal Guide 2015. The researcher used 3rd and 4th rank from ABS Academic Journal Guide 2015. ABS Academic Journal Guide is the guidance which indicates the grade and rank of peer-reviewed journal papers (Mingers and Yang, 2017). In this research,

the exclusion criteria were: conference papers; papers in non-English language; and papers relevant to other fields, such as health, bioengineering, and the environment.

2.4 Phase 2: Conducting a systematic review

When conducting a systematic review, the researcher searches for relevant papers using the systematic review protocol the researcher undertakes a searching and screening process on previous papers in order to minimalise bias. According to Denyer and Tranfield (2009), managing the knowledge to be rigorous and reliable entail the justification for the evidence to yield the robust and the high-quality research.

For this study, the researcher searched for previous papers in the area of innovation resource and capability published over three decades (1985-2017). The researcher eliminated irrelevant papers by applying inclusion and exclusion criteria, in order to identify highly qualified and the most relevant papers. Then, the researcher identified themes and gaps in the literature by selecting, mapping, and synthesising the papers' content. In selecting the articles, the researcher specifically focused on the topics of intangible resource and innovation capability.

In the searching stage, the selected papers were required to be peer-reviewed journal papers collected from ABI/INFORM of ProQuest, ScienceDirect, Emerald, and the Web of Science. The previous journal papers were selected if the research scope included intellectual capital, human capital, social capital, innovativeness, strategy, business performance, innovation performance, or innovation capability. Then, the researcher employed a Boolean search process, as follows: OR; AND; *; and parentheses ( ). Three alternatives keyword searches were used in this study, as shown in Figure 2.1.

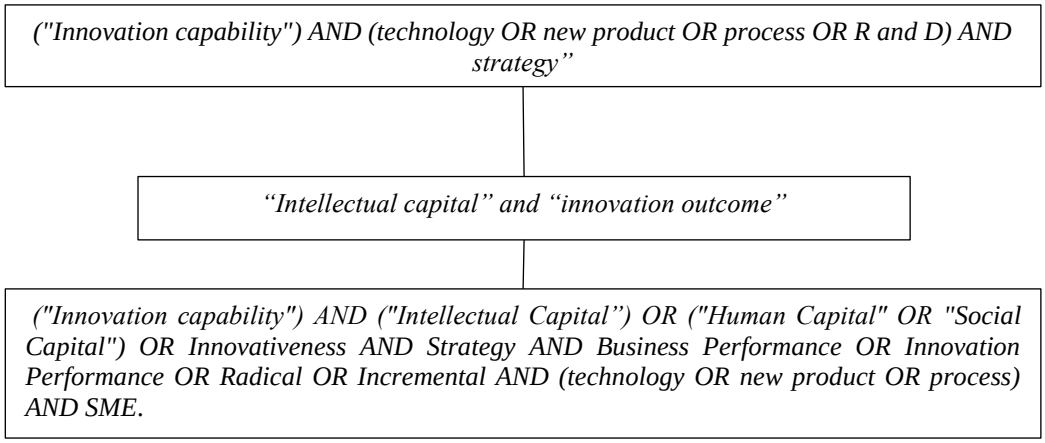


Figure 2. 1 Keyword search alternatives

In the screening process, relevant papers were selected by filtering the field, journal type, language, and year of publication. In addition, the abstracts of the papers were screened to identify their relevance within the scope of research. Further, the selected relevant papers were then only accepted if the themes mentioned in the abstract included intellectual capital, human capital, social capital, entrepreneurship, innovation, and SMEs.

A summary of the results of the searching and screening processes is provided in Table 2.4. The total number of identified papers was 175,542 papers. The inclusion and exclusion criteria were applied to identify the most relevant papers. The abstracts of the papers were also screened, and duplicate papers identified. Then, the researcher selected the most relevant papers after reading the contents of the papers, until 118 relevant papers had been identified. Finally, these papers were evaluated to map the themes of the area of intangible resource and innovation capability. After undertaking the process of searching for papers, the researcher analysed and presented the using a histogram and descriptive analysis.

In the first alternative, zero papers were identified from the Emerald database; this is because most of the papers had an impact factor of less than 1 or a grade rank of below 3. In the first alternative, 4 relevant papers were obtained.

The second alternative was intended to build an understanding of the most important intangible resource, which, according to Terziovski (2007), is intellectual capital. Several other topics are related to innovation capabilities, such as innovation outcome and entrepreneurial orientation, as mentioned by Drucker (1985), previous

papers dealing with these themes were also identified. From the second alternative keyword search, 59 papers were obtained.

Then, the third alternative keyword search has narrowed the topic by adding the dimensions of intellectual capital, strategy, performance, innovation outcome, and SMEs. The researcher added SMEs because the context of this research is SMEs. From the third alternatives, 55 relevant papers were identified.

Table 2. 4 The number of relevant papers in searching and screening process

Key search	Bibliography Database	Total journal paper	Inclusion criteria based on year duration	Total journal paper	Exclusion criteria: Exclude (animal, health, politics, non-fiction, historical)	Total journal paper		Duplicate paper	Total Relevant literature
				Impact factor above 1 and 4th and 3th ABS magazine rank		Total Relevant literature in intangible resource	Refine relevant abstract and title		
("Innovation capability") AND (technology OR new product OR process OR R and D) AND strategy	Sciencedirect	1328	765	569	104	28	9	6	3
	ABI Proquest	2,936	2,724	101	90	16	2	1	1
	Web of Science	153	146	15	15	3	0	0	0
	Emerald	550	392	0	0	0	0	0	0
Sub Total		**4,967**	**4,027**	**685**	**209**	**47**	**11**	**7**	**4**
Intellectual capital and entrepreneurial orientation and innovation outcome	Sciencedirect	909	771	388	108	48	26	3	23
	ABI Proquest	9,117	3,276	756	388	48	32	0	32
	Web of Science	33,871	33,492	84	54	27	4	1	3
	Emerald	796	792	3	20	1	1	0	1
Sub Total		**44,693**	**38,331**	**1,231**	**570**	**124**	**63**	**4**	**59**
("Innovation capability") AND ("Intellectual Capital") OR ("Human Capital" OR "Social Capital") OR Innovativeness AND Strategy AND Business Performance OR Innovation Performance OR Radical OR Incremental AND (technology OR new product OR process) AND SME	ScienceDirect	12,488	1,149	96	66	23	23	2	21
	ABI Proquest	75,534	1,149	619	566	27	22	3	19
	Web of Science	36,045	2,049	94	72	14	12	0	12
	Emerald	1,815	201	37	10	3	3	0	3
Sub Total		**125,882**	**4,548**	**846**	**714**	**67**	**60**	**5**	**55**
Total		**175,542**	**46,909**	**2,762**	**1,493**	**238**	**134**	**16**	**118**

2.5 The evolution of intangible assets and innovation capability literature

After filtered the journal articles, the researcher evaluated the top ten journal papers, the growth of journal papers, and the distribution of research methodologies which are used by the previous papers.

2.5.1 Classification of journal papers

There are a large number of journal papers that have been published in the area of innovation. A systematic literature review can refine the papers by implementing inclusion and exclusion criteria. By using these criteria, the research can ensure the quality of selected papers is robust. For this literature review, in total, papers were identified from 35 different journals. Of 118 identified papers, 67.8% were categorised as being published in the top ten most cited journals, as illustrated in Table 2.5 below. Of the top ten journals, Small Business Economics and Research Policy are the two leading journals, by 17.8 % and 11 % of the relevant journal papers gathered.

Table 2. 5 The top ten of most cited journals

Journal	Scope	Total Number	% Cited	Impact Factor	Grade/ Rank
Small Business Economics	Entrepreneurship, SME and innovation	21	17.80%	2.21	3
Research Policy	Innovation, technology or research	13	11.02%	4.495	4
Journal of Business Research	Business decisions, processes and activities	9	7.63%	3.354	3
Technovation	Technological innovation	8	6.78%	3.265	3
Strategic Management Journal	Strategic management	7	5.93%	7.651	4
Journal of Business Venturing	Entrepreneurship	6	5.08%	5.774	4
Industrial Marketing Management	Industrial and business-to-business markets	5	4.24%	3.166	3
Technological Forecasting & Social Change	Social, environmental and technological factors.	5	4.24%	2.652	3
Academy of Management Journal	Management practice	3	2.54%	7.417	4
International Journal of Operations & Production Management	Operations Management	3	2.54%	3.339	4

2.5.2 The growth of journals in the scope of innovation capabilities

This systematic literature reviews reviewed papers published during the last three decades (1985-2017). Figure 2.2 shows the trend in a number of papers published in the areas of intellectual capital, entrepreneurship, and innovation from 1985 to 2017. The trend of the growth of the paper was started from 1989. This indicates that the topic of this research began to come into focus in 1989. Based on Figure 2.2 below, the growth in research in the area of drivers of innovation capability is significantly increased. For the first decade (1985-1995), only two papers in this area were published. This increased in the next decade (1996-2005) when 21 papers were published on these topics. Between 2006 and 2017, the total number of papers increased significantly, at 95 papers.

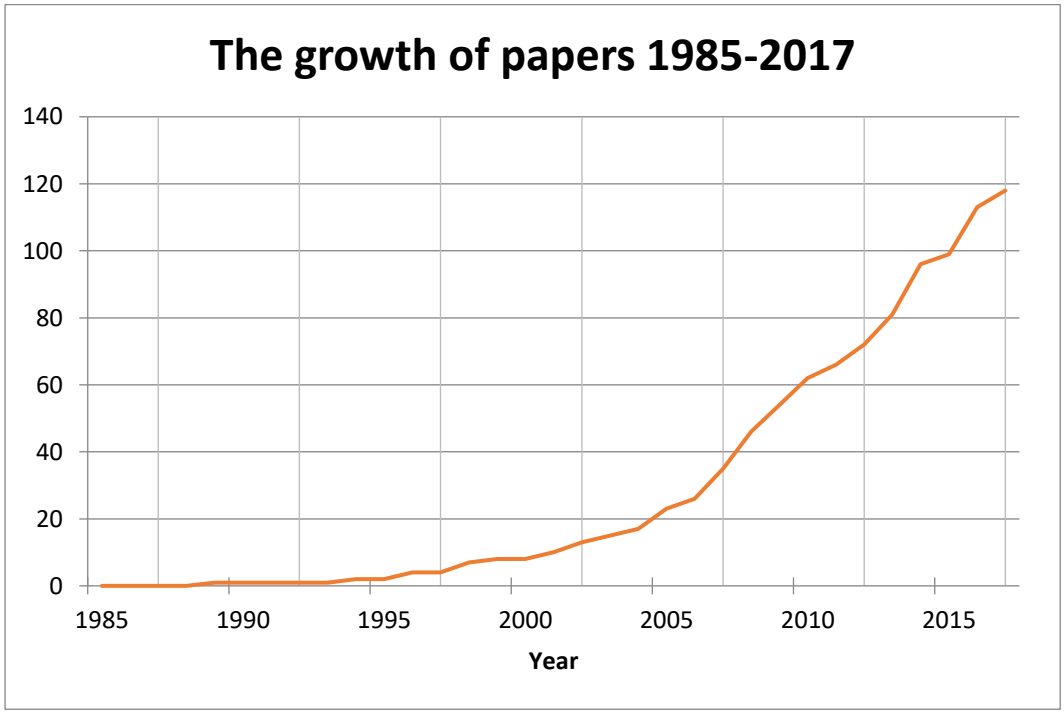


Figure 2. 2 The growth of the driver of innovation capabilities papers

Figure 2.3 shows the trend in themes every five years, which begins with social capital from 1985-1990. Then, in 1991-1995, the topics discussed social networks which include the effect of ties on organisational performance. In 1996-2000, the previous papers discussed the organisational characteristics, entrepreneurial

orientation and social capital. Furthermore, from 2001 until 2017 intellectual capital, entrepreneurial orientation and organisational capabilities are discussed. Mostly, the papers discussed the driver or the antecedent of innovation. As well as, they studied the effect of innovation on firm performance.

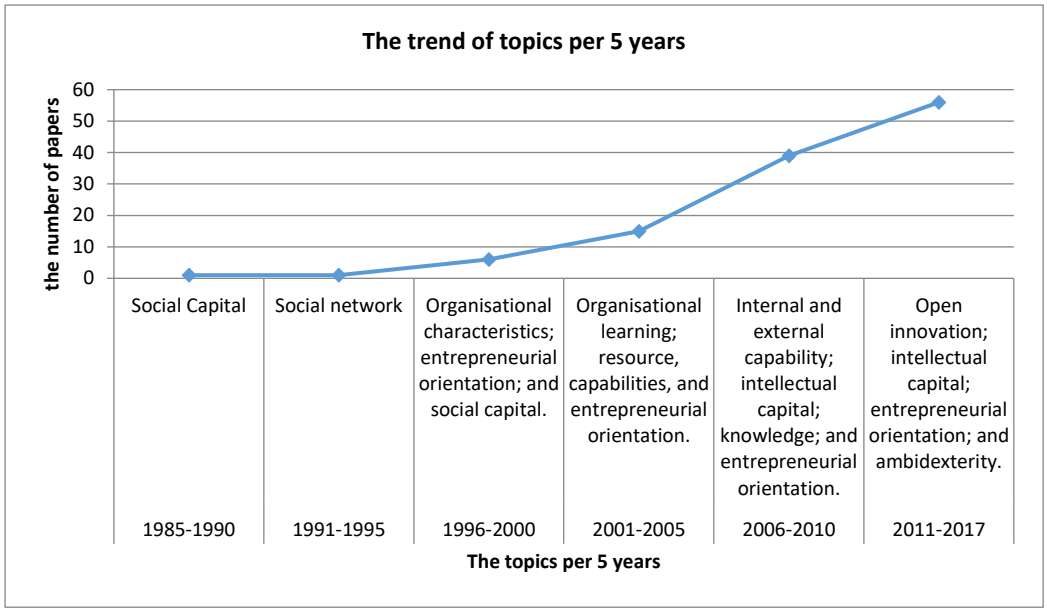


Figure 2. 3 The trend of topics every five years

2.5.3 The distribution of the methods in the previous studies

There were primarily two types of previous studies. The first being empirical studies, which analyse a problem by observing data. This group of studies utilised either a quantitative method, qualitative method or mixed methods. The studies that used quantitative methods employed statistical analysis, graphs, and charts, to explore, present, depict, and study relationships, effects, and trends (Saunders et al., 2007). Quantitative methods obtain data via surveys, and questionnaires as data collection instruments. This type of method produces data that can be generalised. From the data gathered, most of the previous studies analysing the data by using the quantitative method. Majority of the previous studies employing structural equation modelling as the statistical tool. Then, the regression analysis was the second priority which was utilised by the previous studies.

The qualitative method is used to analyse qualitative data, which is collected through interviews. The qualitative method has several advantages and some disadvantages. Transcripts of interviews, for example, produce a large volume of non-numeric data (Bryman and Bell, 2003; Saunders et al., 2007). Another method is a mixed method. Mixed methods research combines techniques and analytical procedures to interpret both quantitative and qualitative data. From the data gathered, only 4 papers that were using the mixed method to analyse the data.

Of the previous studies, the total number of papers that relied on quantitative was 97, which was more than any other method and accounted for most of the papers. This means that the trend toward using statistical analysis in the area of intangible resources and innovation capability is significant. Most of the studies analyse the relationship between the variable, or driver, and innovation capability. Other studies identify the drivers of innovation capability. In the qualitative studies, most of the researchers propose a comprehensive framework that can be implemented in particular single or multiple companies (Lawson and Samson, 2001). Table 2.6 shows the number of papers that implemented particularly.

Table 2. 6 The distribution of the methods

Method	Analytical tools	The number of papers
Quantitative Method	Regression linear analysis	24
	ANOVA	3
	Post Hoc analysis	1
	Hypothesis testing	4
	Ordinary least square	8
	Logistic regression	6
	Multivariate analysis	3
	Correlation analysis	2
	Network analysis	1
	Linear modelling	3
	Econometric analysis	3
	Confirmatory Factor Analysis (CFA)/ Exploratory Factor Analysis (EFA) / Structural Equation Modeling (SEM)	41
Total quantitative method		**96**
Mix method	Mix method	4
Total mix method		**4**
Qualitative method	Interview	5
	Case study	4
Total qualitative method		**9**
Literature review	Meta-analysis	2
	Content analysis	1
	Contingency approach	1
	Systematic literature review	2
	Traditional literature review	3
Total literature review		**9**
Total all papers		**118**

2.6 Innovation Evolution

According to Rothwell (1992), new products and new technology are rapidly changing, alongside the innovation process itself. The evolution of the innovation process is illustrated by Rothwell (1994) in a model of fifth generation innovation, which specifies the characteristics of innovation. Recently, some scholars have begun to describe the sixth generation, from different perspectives. For example, Chaminade and Roberts (2002) propose a focus on intangible resources, such as social capital, as

the main source of innovation. Other scholars describe the sixth generation as 'innovative milieux', which takes account of environmental circumstance and geographical factors in promoting innovation (Marinova and Phillimore, 2003). According to Boehm and Fredericks (2010), the sixth generation of innovation is the innovation network. Table 2.7 presents the characteristics of the six generations of innovation.

Table 2. 7 The sixth generation of innovation

Adapted and modified from Barbieri and Álvares (2016), Terziovski (2007), and Nattaka Yokakul (2010)

Generation	Model	Period	Characteristics	Author
First generation innovation (1G)	Technology push	(the 1950s — mid-1960s)	Innovation emerged with new, technologically advanced products and production processes. The products were pushed to the market.	(Rothwell, 1994)
Second generation innovation (2G)	Market pull or need pull	(The mid-1960s — early-1970s)	Innovation shifted to market/customer needs, which required a technological response.	
Third generation innovation (3G)	Coupling model	(The early 1970s — mid-1980s)	In this generation, the defining feature of innovation was the combination of push and pull models, which were complementary.	
Fourth generation innovation (4G)	Integrated model	(The early 1980s— early 1990s)	In this generation, the coupling model was improved by deriving information and knowledge from business networks and supply chains.	
Fifth generation innovation (5G)	System integration and networking model	The 1990s	This generation developed an integrated model with an emphasis on continuous improvement, flexibility, and speed of development.	
Sixth generation innovation (6G)	Focus on intangible resources	The 2000s	In this generation, the model of innovation focuses on intangibles resources as the main source of value.	(Chaminade and Roberts, 2002)
	'Innovative milieux'		Innovation is viewed based on environmental circumstances and geographical factors.	(Marinova and Phillimore, 2003)
	Innovation network		The sixth phase of innovation is network integration.	(Boehm and Fredericks, 2010)

The first generation, or the technology push, is also known as the "linear" or "neoclassical model" (Chaminade et al., 2012). Here, the process of innovation was

concentrated on producing new products through a fixed process by using new knowledge. This process has also been referred to as the "black box" (Chaminade and Roberts, 2002) since it employs new knowledge and new technology to develop innovation from within the company. In this era of scientific advance, industrial innovation and technology were believed to support innovation (Rothwell, 1994), and thus the focus on process and market was limited. The second generation was known as the market pull or needs pull model (Rothwell, 1994; Chaminade and Roberts, 2002). In this generation, innovation emerged from the market pull, which was determined by customer requirements and needs. In the third generation, innovation occurred via the "interactive model" in 1980s The combination of technology push and market pull produced a communication pathway to generate a feedback loop of internal input (ideation, new technology, etc.) and external input (customer needs, social needs, etc.) to produce innovation (Yokakul, 2010). The fourth generation, which emerged in the 1980s, focused on integration between technology push and market pull by using new knowledge and existing knowledge to generate innovation; this model was also known as the "integrated model" (Rothwell, 1994; Chaminade and Roberts, 2002). The separation of activities into different departments (such as R&D, manufacture, finance, quality, etc.) overlapped to create innovation. The fifth-generation integrated the process of innovation and network, where interaction between the company and partners was facilitated by knowledge-sharing with internal or external sources with a view to innovate. The fifth generation utilised information and communication technologies, i.e. ICT tools, to transform and connect internal and external sources in the company (Rothwell, 1994; Chaminade and Roberts, 2002).

In addition to Rothwell (1994) model of the generations of innovation, other scholars have different perspectives on the sixth generation. For instance, Chaminade and Roberts (2002) focus on intangible resources as the strategy to attain competitive advantage. Organisational learning was the driver of innovation. The more rapidly the company can learn, the quicker the company can respond to a fast-changing market. Learning is also the primary driver of innovation. The utilisation of all types of knowledge strengthens the link between the actors involved in creating innovation. In this generation, innovation process can be integrated and networked. Marinova and Phillimore (2003) describe the sixth generation innovation model as the 'innovative

milieux', and claim that different regions or countries have different characteristics of innovation**.** Boehm and Fredericks (2010) discuss the strategy of the sixth generation innovation model, which is innovation networks. In their typology, the technology strategy is integrated with the business process. Similarly, the involvement of customer and market values is also a focus of this generation.

2.7 Innovation category

There are various categories of innovation outcome. Crossan and Apaydin (2010) classify innovation type based on referent, form, magnitude, type, and nature. The referent dimension is related to the degree of newness in market, firm, or industry. The type comprises administrative or technical innovation. The form consists of business model/product/process/service innovation. Finally, the magnitude dimension includes incremental innovation and radical innovation.

Table 2.8 shows the definition of each innovation category used in previous studies. Technical innovation refers to innovation in the products, processes, or activities of the company. This type of innovation is considered to be at the centre of the company's activities (Bantel and Jackson, 1989), and includes the production and inspection processes, which use technological tools and machines. Another type of innovation, administrative innovation, is innovation in the management of companies, which is related to the organisational structure, employees, and top management.

In the category of magnitude, radical innovation and incremental innovation are distinguished by the radicalness of innovation. Radical innovation includes all processes of innovation, which can disrupt or change the organisation, and could render an existing product from a competitor obsolete (Subramaniam and Youndt, 2005). Incremental innovation can refine, improve, and reinforce an established product or service, even though it is only a minor change (Siguaw et al., 2006). In the other category, product, process, and service innovation are related to the innovation outcome.

Table 2. 8 Innovation categories

Category		Definition	Author
Type	Technical Innovation	Technical innovations are related to products, services, production processes, and operations as the core of organisational activities.	(Bantel and Jackson, 1989)
		"Technical innovations include products, processes, and technology used to produce a product or render services directly related to the basic work activity of an organisation."	(Crossan and Apaydin, 2010)
	Administrative Innovation	"Administrative innovations pertain to changes in the organisational structure and the people who populate the organisation; these innovations are assumed to originate in the more peripheral, administrative cores of organisations."	(Bantel and Jackson, 1989)
		"Administrative innovations are indirectly related to the basic work activity and more directly related to its managerial aspects such as organisational structure, administrative processes, and human resources."	(Crossan and Apaydin, 2010)
Magnitude	Radical Innovation	"Radical innovation induces fundamental changes and a clear departure from existing practices in the organisation."	(Crossan and Apaydin, 2010)
		"Radical innovations are major transformations of existing products, services, or technologies that often make the prevailing product/ service designs and technologies obsolete."	(Subramaniam and Youndt, 2005)
		"Radical innovations redefine the market and cause disruptive change within the organisation."	(Siguaw et al., 2006)
	Incremental Innovation	"Incremental innovation represents a variation in existing routines and practices."	(Crossan and Apaydin, 2010)
		"Incremental innovations refine existing products, services, or technologies and reinforce the potential of established product/service designs and technologies."	(Subramaniam and Youndt, 2005)
		"Incremental innovations are minor changes stemming from an orderly, natural progression in knowledge."	(Siguaw et al., 2006)

Table 2. 8 Continued

Category		Definition	Author
Form	Product Innovation	"Product/service innovation is the novelty and meaningfulness of new products introduced to the market in a timely fashion."	(Crossan and Apaydin, 2010)
		"Product innovation capability is the ability to introduce new and meaningful products to the market in a timely fashion."	(Camps and Marques, 2014)
		Product innovation introduces a new or significantly improved product.	(McGuirk et al., 2015)
	Process Innovation	"Process innovation is the introduction of new production methods, new management approaches, and new technology that can be used to improve production and management processes."	(Crossan and Apaydin, 2010)
		"Process innovation capability is the ability to introduce new production methods, new management approaches, and new technology that can be used to improve production and management processes."	(Camps and Marques, 2014)
		Process innovation is introducing innovation within the company, such as the new idea, processes, activities, that are intended to improve work procedures.	(McGuirk et al., 2015)
		"The process of innovation is defined as the development and implementation of new ideas by people who, over time, engage in transactions with others within an institutional context."	(Ven, 1986)
	Service Innovation	Service innovation is defined as the introduction of a new or developed service.	(McGuirk et al., 2015)

2.8 Synthesising and analysing the material

At this stage, the researcher synthesised the filtered papers, analysed the research themes, and identified the research gaps. When synthesising the papers, the researcher identified themes based on the topic, title, keywords, and abstract. It is important to classify the papers by the same themes in order to depict the pattern of existing research and to identify gaps in the knowledge. In this research, papers where the topic, title, keywords, and abstract mentioned human capital, social capital, knowledge, skill, and CEO behaviour were included under the intellectual capital theme.

The process of identifying and classifying papers according to their themes and theoretical perspective is known as the mapping process. The mapping process focuses on the attributes of the papers, such as what journal they were published in, and what the mechanism of action is (Cooper, 2016). Assessing and identifying the themes in

the papers was achieved by reading the content. After reading the content of previous papers, the themes were classified as shown in Table 2.9.

The mapping process was intended to cluster the papers according to the domain of research, which denotes the sub-subject or sub-topic. By classifying various topics, the researcher can map the pattern of current topics and identify the gaps in knowledge. Table 2.10 shows that there are four major groups of themes, which are related to the effect of intangible resources on innovation capability: (1) entrepreneurship; (2) entrepreneurial orientation; (3) intellectual capital; (4) strategy and innovation.

Table 2. 9 Research themes

No	Themes	Authors	Issues
1	Entrepreneurship	(Lipparini and Sobrero, 1994; Jones, 2005; Koellinger, 2008; Marcati et al., 2008; Samuelsson and Davidsson, 2009; Tajeddini, 2010; Arrighetti et al., 2014; Chen et al., 2014; Schott and Sedaghat, 2014; Huggins and Thompson, 2015; Walter and Block, 2016; Lee et al., 2016; Nordman and Tolstoy, 2016; Wurmseher, 2017)	The social network of entrepreneurs can emerge innovation capability especially in the network in the work environment. The social network of entrepreneurs in the sphere of family company hinders innovation. Intrapreneurs and entrepreneurs are the significant drivers of innovation.
2	Entrepreneurial Orientation	(Lumpkin and Dess, 1996; Avlonitis and Salavou, 2007; Stam and Elfring, 2008; Wiklund et al., 2009; Williams and Lee, 2009; Zeki Simsek et al., 2010; Clausen and Korneliussen, 2012; Anderson and Eshima, 2013; Su and Lee, 2013; Wales et al., 2013; Kreiser et al., 2013; Cao et al., 2015; Khedhaouria et al., 2015; Semrau et al., 2016; Shan et al., 2016; Zhang et al., 2016; Kör, 2016; Mickiewicz et al., 2016; Mthanti and Ojah, 2017; Miao et al., 2017)	The moderation effect of intangible asset Entrepreneur, owner behaviour; scientist Entrepreneur, leaders' personality, absorptive capacity, the expertise and knowledge
3	Intellectual Capital	(Bantel and Jackson, 1989; Nahapiet and Ghoshall, 1998; Tsai; and Ghoshal, 1998; Cooke and Wills, 1999; Lee et al., 2001, 2005; Yli-Renko et al., 2001; Davidsson and Honig, 2003; Dakhli and Dirk De Clercq, 2004; Hayton, 2005; Moran, 2005; Subramaniam and Youndt, 2005; Presutti et al., 2007; Batjargal, 2007; Luk et al., 2008; Wu et al., 2008; Chen, 2008; Akçomak and ter Weel, 2009; Hsu and Fang, 2009; Kang and Snell, 2009; Kor and Sundaramurthy, 2009; Molina-morales and Martinez-Fernandex, 2010; Teixeira and Fortuna, 2010; Wincent et al., 2010; Morris and Snell, 2011; Laursen et al., 2012; Robson et al., 2012; Soriano and Castrogiovanni, 2012; Santarelli and Tran, 2013; Bastie et al., 2013; Tsai et al., 2013; Arrighetti et al., 2014; Debrulle et al., 2014; Honjo et al., 2014; Sundaramurthy et al., 2014; Camps and Marques, 2014; Chen et al., 2014, 2016; Delgado-Verde et al., 2016; Vlaisavljevic et al., 2016)	In this theme, the previous studies highlight the necessities of intellectual capital in new product development, the relationship between intellectual capital and innovation outcome, the ambidextrous learning. Economic growth, strategy orientation innovation performance, and firms' performance Top management team, entrepreneur's ability Innovation enabler; innovation outcome; organisational innovativeness Social network, the structural embeddedness Trust, internal R&D, and external knowledge The study on intellectual capital and the radicalness of innovation was yielding mixed result
4	Strategy and innovation	(Tsai, 2009; Leiponen, 2008; Andries and Czarnitzki, 2014; Forés and Camisón, 2016; Hatak et al., 2016; Oke, Burke and Myers, 2007; Eggers, Kraus and Covin, 2014; Alpkan et al., 2010; Lau et al., 2008; Das and Joshi, 2007; Crossan and Apaydin, 2010; Laursen and Salter, 2014; Lawson and Samson, 2001; Poorkavoos et al., 2016; Subramanian and Nilakanta, 1996; Fukugawa, 2006; Skuras, Tsegenidi and Tsekouras, 2008; Martínez-Román, Gamero and Tamayo, 2011; Hervas-Oliver, Sempere-Ripoll and Boronat-Moll, 2014; Ruvio et al., 2014; Hu, 2008; Ahn, Minshall and Mortara, 2017; Wu, Lin and Chen, 2013; Kemelgor, 2002; García-Morales, Lloréns-Montes and Verdú-Jover, 2007; Sok and Cass, 2011; Moilanen, Østbye and Woll, 2014; Chen and Hung, 2014; Romijn and Albaladejo, 2002; Pandza et al., 2003; Hurley and Hult, 1998; Calantone, Tamer Cavusgil and Zhao, 2002; Hsueh and Tu, 2004; Branzei and Vertinsky, 2006; Siguaw, Simpson and Enz, 2006; Oke, 2007; Leskovar-Spacapan and Bastic, 2007; Simonen and McCann, 2008; Su, W.K.Tsang and W.Peng, 2009; Talke, Salomo and Rost, 2010; Chang et al., 2012; Boh, Evaristo and Ouderkirk, 2014; Nordman and Tolstoy, 2016; Camison and Villar-Lopez, 2011; Gómez and Vargas, 2012)	The strategy such as internal capability (entrepreneurship, culture, organizational learning and market orientation) and external capabilities such as absorptive capacity and social network) can be the driver of innovation capability. Product innovativeness; process innovativeness; organisational innovativeness, new product development; innovation ambidexterity; radical and incremental innovation

2.8.1 Entrepreneurship

Entrepreneurship refers to the comprehensive act and actor that built/ create something does not available before (Johnson, 2001). Entrepreneurial activities include pursuing the opportunity and are influenced by the degree of risk. In an entrepreneurial organisation, the process begins with creating an idea and then exploiting or configuring the available resources to create something new. According to Johnson (2001), 'intrapreneurship' disperses entrepreneurship and the corporate venture is the form of corporate entrepreneurship. Intrapreneurship creates entrepreneurial new venture in the organisation. For example, Zara as the fashion company, utilise their designer to catch the opportunity to predict the trend of fashion. Disperse entrepreneurship is developing a culture which supports innovation. Corporate venturing includes building the innovative capacity to create the close network.

Another important element of entrepreneurship is the actors, i.e. entrepreneurs (human capital and social capital), and intrapreneurs (Jones, 2005). In this case, the entrepreneurs and human capital become the drivers of innovation (Marcati et al., 2008; Huggins and Thompson, 2015). The abilities of entrepreneurs such as skills, knowledge, and attitudes influence their willingness to take a risk in their decision making. It is because, in the decision making, individual behaviour such as risk-taking is required. It can drive innovation and firm performance (Camps and Marques, 2014).

In the corporate venturing, the social network between entrepreneurs becomes effective in the weak ties of work environment in the public sphere (Schott and Sedaghat, 2014). According to Schott and Sedaghat (2014), strong ties in the family businesses can harm innovation. This might be because the individuals are reluctant to take risks. In turn, less conflict in the family's businesses can also harm innovation. Some studies believe that more conflict leads to greater creativity and innovation (Rost, 2011; Schott and Sedaghat, 2014). However, Coleman (1988) argues that a family network of entrepreneurs leads to trust in transferring information.

An intrapreneur is different from an entrepreneur. If an entrepreneur is an individual who is the decision-maker and has their own business with which to create

innovation, the intrapreneur is the employee who has a responsibility to create new products. According to Calisto and Sarkar (2017), intrapreneurs are employees who proactively network with the intention to increase innovation. If the intrapreneurial initiative is controlled by managers, innovation becomes ineffective (Calisto and Sarkar, 2017). This is because the managers control the decision-making in innovation management, preventing the intrapreneur from conveying their creativity and their ideas. This can happen within a small firm or a nascent firm within which single individual entrepreneurs can make autonomous decisions (Calisto and Sarkar, 2017).

2.8.2 Entrepreneurial Orientation (EO)

Even though entrepreneurial orientation (EO) is a special topic in entrepreneurship, EO is different to entrepreneurship. EO is a strategy for supporting management decision-making (Covin and Lumpkin, 2011). EO is a form of organisational behaviour (Miller, 1983), while entrepreneurship is a more complex system that consists of activities and the entrepreneur undertaking new business. Implementation of EO in a company can positively impact on the firm's performance and growth (Lumpkin and Dess, 1996, 2001; Dess et al., 1997; Wiklund and Shepherd, 2003; Avlonitis and Salavou, 2007; Hughes and Morgan, 2007; Chirico et al., 2011; Lisboa et al., 2011; Shan et al., 2016). Proactive behaviour in pursuing opportunities is a strength of companies and can lead to competitive advantage. The top management, in their decision-making, also need to be courageous and take risks. Therefore, companies require good estimation and prediction abilities to adapt to fast-changing environments. Implementing EO can promote innovation by configuring it alongside resources such as intellectual capital and social capital (Wu et al., 2008).

According to Covin and Slevin (1989), Salavou and Lioukas (2003), and Itzhak Gnizy, William E. Baker and Amir Grinstein, 2014), the dimensions of entrepreneurial orientation consist of 'competitive aggressiveness,' 'autonomy,' 'innovativeness,' 'risk-taking,' and 'proactiveness'. Competitive aggressiveness denotes the reaction to a pre-existing, competitive market (Lumpkin and Dess, 2001). By adopting a stance of competitive aggression, the firm can seize opportunities and improve their innovation capability.

Autonomy plays a crucial role in developing a firm's current strengths, identifying opportunities, and encouraging the growth of a new firm (Lumpkin et al., 2009). Lumpkin, Cogliser and Schneider (2009) view autonomy as enabling entrepreneurial initiative. The autonomy of the decision-maker is dependent on whether the company is an organic or mechanistic type of organisation (Chang et al., 2012). Organic organisations are less formal, open to risk-taking, and more creative. The organic organisation proclivity gives the employees opportunity to be the decision-maker. By contrast, mechanistic companies are more formal, inflexible, bureaucratic, and standardised (Menguc and Auh, 2010).

The other dimension of EO is innovativeness. Innovativeness represents the propensity of a firm to undertake an experiment, to stimulate novel ideas, and to improve their business (Lumpkin and Dess, 1996). This tendency helps those firms to produce something new, such as new products, and new technologies which attract the markets (Cassiman and Golovko, 2011). According to some scholars Zaltman et al (1973), Hurley and Hult (1998), Siguaw et al. (2006), and Marcati et al. (2008), innovativeness is an openness to newness. Similarly, a study by (Carvalho, 2016) replaced the innovativeness dimension with openness.

Risk-taking means a propensity to take decisions and action in uncertain new markets, investing resources for unpredictable outcomes, or loaning the financial investment (Lumpkin and Dess, 2001). It involves a willingness to allocate resources to undertaking activities, projects, and the revenue carries a high risk and operates in an uncertain environment (Lumpkin and Dess, 1996; Hughes and Morgan, 2007). Hughes and Morgan (2007) mentioned that without the involvement of risk-taking, innovation could be interrupted and restrained. Managers need to take a risk if they want to implement radical innovation. The more risks are taken by a company, the more radical the innovation the company produces (Mata and Woerter, 2013). However, managers should consider all factors that might influence the decision, such as customers' needs. All internal and external factors should be analysed before taking a risk in decision-making.

In a fluctuating and changing market, companies need to seize opportunities to attain competitive advantage, and should proactively identify opportunities in the

market (Lumpkin and Dess, 2001). By being proactive, the companies are not only fulfilling customers' existing needs but also creating new ones.

2.8.3 Intellectual Capital

Traditional economists draw a distinction between tangible assets, such as tools, and finances etc., and intangible assets, such as customer demand, reputation, and intellectual capital, which can promote economic growth and productivity within a company (Nahapiet and Ghoshall, 1998). Anderson and Eshima, (2013) mentioned intangible resource can be the significant source of competitive advantage due to unique and difficult to be imitated. Since intangible resources are preferable to tangible resources, studies in this area have primarily investigated intangible resources. According to Terziovski (2007), intellectual capital is the most powerful of all intangible resource in regard to attaining competitive advantage.

Díaz-fernánde et al. (2015) identify intellectual capital as an intangible resource that is completely or partially managed by the organisation, and which returns value creation to the organisation. However, creating value is difficult. Managers need to control risks and create new products, which requires proses or driver. Managers can control the risks and rewards associated with creating new markets and new products, and lead to competitive advantage (Díaz-fernández et al., 2015).

According to Nahapiet and Ghoshall (1998), intellectual capital refers to valuable resources and the capabilities that arise from knowledge. This aligns with the definition provided by Subramaniam and Youndt (2005) which defines intellectual capital as the total sum of knowledge, individually or collectively. The function of intellectual capital in acquiring knowledge is sometimes described as the process of know-what; know-how; and denotative knowledge. Intellectual capital, such as human capital and social capital, are valuable, non-substitutable and inimitable (Hayton, 2005; Newbert, 2007; Kraaijenbrink et al., 2010). According to Lin et al. (2013), knowledge can be understood as the source of firm ability to generate innovation. Therefore, developing intellectual capital helps to increase the ability of knowledge to produce innovation.

The dimensions of intellectual capital are various. For instance, George Tovstiga Ekaterina Tulugurova et al. (2009) divide intellectual capital into human capital (competence, attitude, and intellectual agility) and structural capital (relational, organisational, and renewal and development). Hayton (2005) states that intellectual capital consists of human capital, intellectual property, and reputational capital. The investment in human capital, media exposure, and the diversity of team management in the organisation of intellectual capital can facilitate the performance of entrepreneurship.

More recently, intellectual capital has been described as the accumulation of knowledge resources that are exploited by firms (Subramaniam and Youndt, 2005). According to Subramaniam and Youndt (2005), and Kang and Snell (2009), the dimension of intellectual capital includes social capital, human capital, and organisational capital. Human capital here relates to the embedded knowledge perceived in an individual, such as knowledge, skills, and competencies that yield creativity. It can be divided as specialist and generalist (Kang and Snell, 2009). While specialist human capital is related to master the specific knowledge, the generalist human capital has more general ability in mastering knowledge and skill.

Social capital is the knowledge embedded in the interactions and interrelations between individuals to create the creativity. For example, the top management team may have various background or speciality. This diversity of knowledge is sometimes difficult to manage, but it can foster creativity (Hayton, 2005; Vlaisavljevic et al., 2016). According to (Kang and Snell, 2009), social capital comprises cooperative and entrepreneurial of relational archetypes. The cooperative relational has stronger ties in relationship. It enables the members in social unit sharing their knowledge due to high trust each other. However, it becomes a problem if the new member from different unit shares the new knowledge. It is because this archetype is difficult to accept the diversity, especially from different social unit. It is because of the influence from trust. In contrast, entrepreneurial of relational archetypes advance the knowledge and experience to facilitate the flexibility in absorbing the knowledge.

Organisational capital is structured, formal, and codified knowledge, such as policy, patents, databases, and guidance (Subramaniam and Youndt, 2005). Even though this capital is a form of intellectual capital, this research studies human capital

and social capital. This research focuses on human capital and social capital since it is connected to tacit knowledge (Batjargal, 2007; Yu et al., 2013). Tacit knowledge has the benefit of being unique and difficult to imitate. Creativity and new ideas from an individual or team are difficult to imitate and can enable the company to obtain a competitive advantage. This capital comprises organic and mechanistic archetypes. Mechanistic organizational capital has some characteristics such as consistent processes and structures, specified routines, and the instruction following cultures tends to emphasise the efficient of coordination by setting up the patterns of behaviour.

2.8.4 Strategy path of innovation

The drivers of technological innovation capabilities consist of human-driven capabilities (Wang et al., 2008; Crossan and Apaydin, 2010; Yam et al., 2011; Saunila and Ukko, 2013), technology-driven capabilities, and business-driven capabilities. Technology-driven capabilities are built through technology development capability and operations capability. Business-driven capability comprises management capability and transactional capability (Zawislak et al., 2012). Innovation capability can also be driven by strategic orientation, which includes culture, behaviours/traits, and entrepreneurial orientation (Akman and Yilmaz, 2008; Zawislak et al., 2012).

The process of innovation capability includes technology development capability, operational capability, and management capability. Technology development capability is the ability to interpret, create, and change current circumstances and other capabilities to enable innovation (Zawislak et al., 2012). Operational capability refers to the ability to utilise knowledge, skill, and technical systems to increase productive capacity (Zawislak et al., 2012). Management capability is also important in organising technological development capability and operations capability within the scope of enterprises (Zawislak et al., 2012). The process of innovation capability needs drivers to enable innovation outcome.

In this research, drivers are divided into internal and external drivers, which comprise all resources and capabilities of the company. Internal drivers include tangible resources, such as people, money, time, and equipment (Lawson and Samson, 2001; Saunila and Ukko, 2013; Xiaobo Wu and Sivalogathasan, 2013; Saunila,

Mäkimattila, et al., 2014). Internal drivers consist of intangible resources, such as strategy, intellectual capital, culture, competence, absorptive capacity, and cooperation. On the other hand, external drivers explore the capability related to the external environment of the company, such as its customers, market, government, alliances, and suppliers (Akman and Yilmaz, 2008; Crossan and Apaydin, 2010; Sok and Cass, 2011; Yam et al., 2011; Castellacci and Natera, 2013).

Other drivers of innovation capabilities are learning capabilities, strategy alignment, and new value adaptation. Learning capability is important to increase skills by studying past experiences (Yam et al., 2004). The strategy can increase innovation performance by harnessing new knowledge and intangible resources (Alegre and Chiva, 2008). This strategy will direct and guide the learning process in knowledge management to create new value (Siguaw et al., 2006). The resource such as the employee's skill can be developed by the experience in the process learning. They can emerge the new idea to solve the problem faced or to increase their working system.

The drivers also can be dragged from the external of the company, such as from customers and the competitor. Value creation is innovation involvement in establishing customer value and engage the customer to have the desire to buy novelty benefit of innovation product or service from an organisation (Maine et al., 2012). Further, the competitors can also be the driver. By identifying the feature of product or service from the competitors, the companies can create the new features of the product which are better than a competitor.

PART 3 THE GAPS AND FUTURE RESEARCH AGENDA ON THE LITERATURE REVIEW

This section will provide a summary of the systematic literature review and identify the gaps in knowledge and the potential future research agenda in the field of innovation capability.

2.9 The gaps in innovation capability

2.9.1 Intangible resource and innovation capability

A company can maintain a competitive advantage by utilising their ability to engage in innovation. Innovation is a complex process of creating an idea and implementing the idea until it becomes a new product/process and then commercialising it (Tidd and Bessant, 2009). In managing innovation, it is necessary to properly configure capabilities and resources, however, this is difficult. This is because there are many factors that can hinder innovation, such as over-investment in training employees in particular skills, where the return on investment is less than expected. It can also be the case that the skills staff are being on trained are obsolete, as competitors have the more advanced technology. For example, the case of Xerox in regard to implementing new technology.

The most important inputs in innovation are tangible and intangible resources (Saunila and Ukko, 2014). Since intangible resources are unique and inimitable, this type of resource is more powerful than tangible resources. Eustace (2000) explain that intangible resources are, “all non-material factors that contribute to the performance of firms in the production of goods or the provision of services, or that are expected to generate future economic benefits to the entities or individuals that control their deployment”.

Previous studies investigating intangible resources and innovation capability have yielded mixed results (Gregory G. Dess and Jason D. Sha W, 2001; Subramaniam and Youndt, 2005; Cruz et al., 2012). For example, Subramaniam and Youndt (2005)

studied the effect of intellectual capital on innovation capability. The results showed the negative impact of human capital on radical innovation, while social capital and organisational capital positively affect radical innovation and incremental innovation. This negative impact is due to the lack of trust between individuals in sharing their ideas. Other study findings emphasise the positive impact of social capital on innovation outcome (Wu et al., 2008). Most previous papers discuss the strength of the effect of social capital on innovation (Wu et al., 2008; Camps and Marques, 2014; Sundaramurthy et al., 2014). However, only limited studies have investigated the effect of human capital on innovation capability. This may be because strong social capital, such as the organisational conflict in a working group, can lead to the emergence of creativity and new ideas.

In SMEs, innovation is essential to surviving and sustaining a competitive advantage (Leitner, 2011). Innovation can be a strength of SMEs that enables them to be successful in a highly competitive market. Previous studies have argued that innovation capability improves productivity, the revenue, competitive advantage, and working environments in SMEs (Edwards et al., 2005; Gassmann and Keupp, 2007; Laforet, 2013). However, SMEs have difficulty introducing new products. This is because innovation requires investment in resources (Laforet, 2013). The factor inhibiting SMEs from adapting quickly to a fast-changing business environment is lack of resources, such as human capital, financial capital, time, and security (Singh et al., 2008; Ates and Bititci, 2011; Saunila and Ukko, 2014). According to Laforet (2013), high-tech SMEs have short life cycle products, so they need to innovate in order to succeed in a competitive market. Despite the limitations SMEs face, they have advantages such as the lack of bureaucracy, and no hierarchy in structure capital. These advantages enable SMEs to adapt the change environments. Due to these advantages, SME has potencies in producing innovation. Even though SME has the potential performance in innovation, the study of innovation capability in developing country is still under-researched (OECD, 2010; Yokakul, 2010)

Regarding innovation outcome, Table 2.10 shows the Global Entrepreneurial Sub-Index for each country, which relates to a process and product innovation; human capital; risk acceptance; and risk capital. The best innovation performance for a developed economy is in the USA, and China for the developing countries, as indicated

by the high ratio for each pillar. The most important pillars in the index are human capital and absorptive capacity (Ács et al., 2017). This is because human capital includes skills, abilities, and knowledge as the drivers of an entrepreneurial ecosystem, and also innovation (Coleman, 1988; Subramaniam and Youndt, 2005). These pillars represent the various intangible resource, particularly in regard to intellectual capital.

Table 2. 10 The pillars performance of innovation and intangible

Country	Product Innovation	Process Innovation	Human capital	Risk Acceptance	Risk Capital
Developed countries					
United States	0.91	0.93	**1.00**	0.98	**1.00**
Switzerland	0.97	0.88	0.77	0.89	**1.00**
Canada	0.79	0.66	0.92	0.75	**1.00**
Taiwan	**1.00**	0.77	0.69	0.59	0.93
Sweden	0.81	**1.00**	0.63	0.75	0.62
Developing countries					
China	**0.86**	0.67	0.44	0.52	0.89
Turkey	0.72	0.38	0.76	0.25	**0.76**
Malaysia	0.23	**0.71**	**0.90**	0.58	0.23
Indonesia	0.49	0.20	0.45	**0.75**	0.13
South Africa	0.54	0.50	0.25	0.43	0.18
Thailand	0.38	0.32	0.50	0.23	0.28

In the Southeast Asian region, SMEs account for two-thirds of the employment in the developing countries (Sok and Cass, 2011). Even though SMEs are the backbone of the developing countries, human resources are still limited. The lower level of human capital causes companies to struggle with creating innovation (Robson et al., 2012). Radas and Božić (2009) explain that improving innovation in SMEs in the developing countries is challenging due to their inadequate infrastructure; deficient product; weaker capability of capital and labour market; inadequate education system; and ineffective regulation in promoting innovation. In addition, innovation in SMEs in the developing countries is prone to pursuing incremental innovation rather than radical innovation. In an the developing countries, human capital has the heterogeneous capability to achieve competitive advantage, as it forces people to create new ventures or become entrepreneurs (Unger et al., 2011).

In the previous papers identified in the literature review, the studies of intangible resources and innovation capabilities were mostly conducted on SMEs in developed countries. Only a few studies have investigated the developing countries. There are some industrial scales over the previous papers such as large company and SMEs. Figure 2.4 presents a comparison between each industrial scale and the context of the market (developing, developed, and multi-country).

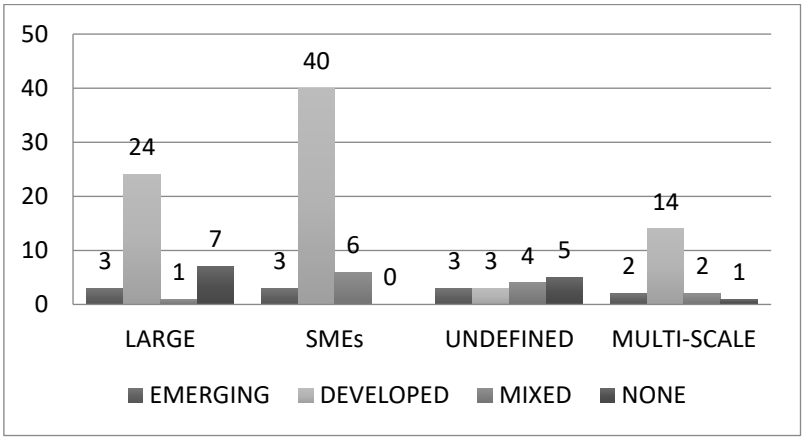


Figure 2. 4 Study trends regarding the scale of industry

The results of previous studies relevant to this research are shown in Figure 2.5, which shows the percentage of the research conducted in the developing countries and developed economies. The largest proportion of research in the field of intangible resources and innovation has been conducted in developed countries. On the other hand, only a small proportion of studies of intangible resources and innovation were conducted in the developing countries. Therefore, an investigation aimed at identifying the determinants of innovation management in the developing countries is still needed.

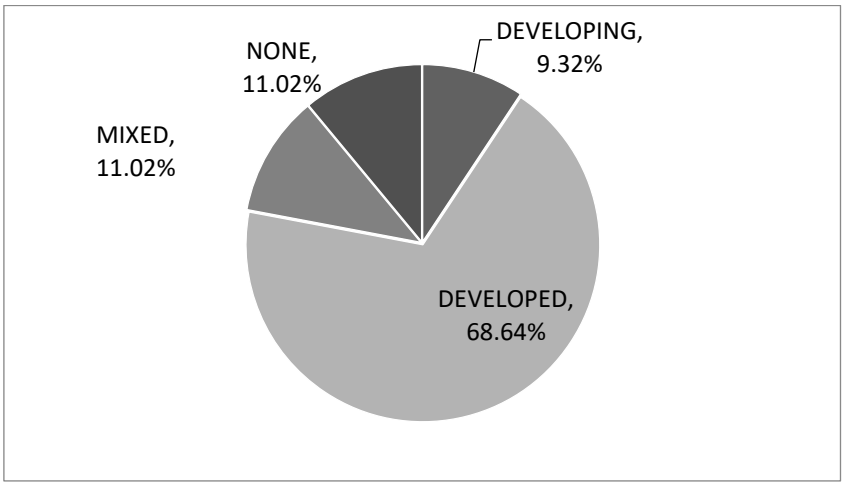


Figure 2. 5 The proportion of research area in the developing and developed countries

To sum up, the studies of intangible resources and innovation are still fragmented and mostly provide theoretical results only. This topic thus requires deeper investigation in an empirical study of the relationship between intangible resources and innovation capability. Further, the present research attempts to fill the knowledge gaps by studying intangible resources and innovation capability in the context of SMEs in the developing countries**.**

Research Gap 1: Research on innovation capability should explicitly examine how intangible resources influence innovation capability in SMEs in the developing countries.

2.9.2 The mediating effect of entrepreneurial orientation

Many theoretical arguments focus on how intangible resources can yield competitive advantage and innovation; empirical studies investigating the relationship between intangible resources and innovation capability have produced mixed results (Dakhli and Dirk De Clercq, 2004; Subramaniam and Youndt, 2005; Soosay and Hyland, 2008; Xiaobo Wu and Sivalogathasan, 2013; Delgado-Verde et al., 2016). The failure to obtain consistent results could be because past studies have failed to consider the role of an organisation's entrepreneurship orientation on the relationship between intangible resources and innovation capability.

Entrepreneurial firms constantly face complex and turbulent external environments (Lumpkin and Dess, 1996), which are fertile ground for new information and knowledge and hence provide a context that is conducive to information acquisition and dissemination. The more entrepreneurial a firm is, the more proactively and extensively it engages in environment scanning (Miles et al., 1978; Daft and Weick, 1984), and the greater extent to which it is involved in information acquisition and dissemination (Huber, 1991; Sinkula, 1994).

Entrepreneurial orientation (EO) refers to the strategy-making process that provides organisations with a basis for entrepreneurial decisions and actions e.g.

(Lumpkin and Dess, 1996; Dess et al., 1997; Wiklund and Shepherd, 2003). Furthermore, entrepreneurial firms are innovative and risk tolerant, and therefore foster an internal environment in which learning through exploration and experimentation is most likely to take place (Hamel and Prahalad, 1991; Slater and Narver, 1995). This study builds on the existing body of work and, more specifically, conceptualises EO as a mediator of intellectual capital and innovation relationship.

Research Gap 2: Research on innovation capability should explicitly explain the mediating role of entrepreneurial orientation in the relationship between intangible resources and innovation capability.

2.10 Conclusion

This chapter has explained the growth of and change in innovation capability over the last three decades. The objective was to shed light on the current and previous research in this theoretical area in order to identify knowledge gaps and the future research agenda. Identifying the gaps and future research agenda helps to understand the roles of academic viewpoints, which allow a research agenda to develop to further understand the roles of the theoretical perspectives that promote competitive advantage within firms. The literature review was undertaken systematically in order to gain previous papers from qualified sources.

In answering the initial question that guided the systematic review, the researcher identifies five themes associated with intangible resources: (1) entrepreneurship, innovation performance, and intellectual capital; (2) entrepreneurial orientation; (3) social capital; (4) human capital; and, (5) strategy path of innovation. Most of the previous studies recognise the important role of intellectual capital as an intangible resource that can enable innovation (Terziovski, 2007; Carmona-Lavado et al., 2010).

The utilisation of intangible resources such as intellectual capital and entrepreneurial orientation can reinforce performance and innovation capability (Wu et al., 2008). Even though the influence of intellectual capital is broadly accepted in this research domain, there are still mixed results regarding the nature of intellectual capital and innovation capability (Subramaniam and Youndt, 2005; Carmona-Lavado

et al., 2010). According to Subramaniam and Youndt (2005), human capital negatively affects radical innovation due to a potential lack of trust between colleagues. Xiaobo Wu and Sivalogathasan (2013) highlight the importance of human capital as the key intangible asset, as the potential source of innovation.

In this case, the study of the relationship between each element of intellectual capital and the types of innovation capability requires further investigation. The researcher also identified the concept of entrepreneurial orientation, which can also support intellectual capital and innovation. For example, Wu, Chang and Chen (2008) propose a framework that includes entrepreneurial orientation as the moderator of the relationship between intellectual capital and innovation. This study supports the argument of Wiklund and Shepherd (2003) who state that the study of the relationship between intangible resources (intellectual capital) and entrepreneurial orientation has been overlooked.

Many previous studies have been undertaken in developed countries. Since SMEs are the backbone of the developing countries, it is necessary to study intellectual capital as an intangible asset in enabling innovation in SMEs in the developing countries also. Therefore, the research question that will be exploring is: "*In the context of SME's in the developing country, how does intangible resource affect innovation capability?*" The summary and findings of this chapter are shown in Table 2.11.

Table 2. 11 The Summary of Findings and Directions for Future Research

Gaps
Intangible resource and innovation capability
The discussion around resources and the capabilities in innovation differ in the context of different environments and different influencing factors. the study of intangible resources and innovation capabilities have produced mixed results. For example, Subramaniam and Youndt (2005) found that human capital negatively affects radical innovation, but positively affects incremental innovation. By contrast, social innovation positively affects radical innovation and incremental innovation. SMEs have some potential advantages, such as flexibility and an informal structure, which support innovation (Laforet, 2013). However, one obstacle that SMEs face is the general of lack of skill, i.e. human resource. Furthermore, it is difficult for SMEs to produce radical innovation, their resources and capabilities. However, it is possible for SMEs to enhance their innovation capability by optimally organising intangible resources. The studies of drivers and processes in innovation capabilities, particularly in SMEs, have mostly been carried out in developed countries. It is not known whether the findings from developed countries can be generalised to the developing countries. Since SMEs have become the backbone of economic growth in the developing countries, they need to develop their innovation capability to attain competitive advantage. However, the study of innovation capability in the developing countries is still neglected, therefore the relationship between intangible resources and innovation capability still requires further investigation.
Research Gap 1: Research on innovation capability should explicitly examine how intangible resources influence innovation capability in SMEs in developing economies.

The impact of entrepreneurial orientation on the relationship between intangible resources and innovation capability
Since the past studies investigating the effect of intangible resources on innovation have yielded mixed results, there is a need for a strategy to enable innovation capability, such as entrepreneurial orientation. Moreover, only limited studies have considered entrepreneurial orientation as the mediator of the relationship between intangible resources and innovation capability.
Research Gap 2: Research on innovation capability should explicitly explain the mediating role of entrepreneurial orientation in the relationship between intangible resources and innovation capability.
Research Question
"*In the context of SME's in the developing country, how does intangible resource affect innovation capability?*"

CHAPTER 3 THE DEVELOPMENT OF CONCEPTUAL MODEL

- Introduction
- Resource-based view (RBV)
- Overview of the conceptual model
- Human capital and entrepreneurial orientation
- Social capital and entrepreneurial orientation
- Intellectual capital and innovation
- Mediating effect of entrepreneurial orientation
- Conclusion

Next: Chapter 4 - Research Philosophy and Methodology

3.1 Introduction

In the previous chapter, the gaps in and findings of past research were summarised in a systematic literature review. This revealed the current status of intangible resource and innovation capability. The research question addressed in this study is: "*In the context of SME's in the developing country, how does intangible resource affect innovation capability?*" To answer this question, a conceptual model was constructed to assess the relationship between intellectual capital and entrepreneurial orientation (EO), and its effect on innovation capability.

There are many theoretical arguments about how intellectual capital can lead to competitive advantage and innovation. Nevertheless, empirical studies investigating the relationship between intellectual capital and innovation have produced mixed results (Leonard-Barton, 1992; Villalonga, 2004; Subramaniam and Youndt, 2005; Leitner, 2011; Gómez and Vargas, 2012). Some studies Camps and Marques (2014), Lawson and Samson (2001), and Saunila and Ukko (2014) examine the effect of well-being, working climate, creativity, culture and strategy on fostering innovation. The failure to obtain consistent results could be because these studies failed to take into

account the role of EO on the relationship between intellectual capital and innovation capability. Entrepreneurial firms constantly face complex and turbulent external environments that are fertile ground for new information and knowledge, and hence provide a context that is conducive to information acquisition and dissemination. The more entrepreneurial a firm is, the more proactively and extensively it engages in environmental scanning (Miles et al., 1978; Daft and Weick, 1984; Huggins and Thompson, 2015), and the greater the extent to which it is involved in information acquisition and dissemination (Huber, 1991; Sinkula, 1994; García-Morales et al., 2007).

This study builds on the existing body of work and, more specifically, conceptualises EO as a mediator of the intellectual capital and innovation capability relationship. Hence, this study aims to understand the relationship between intellectual capital and EO, which impacts on a firm's innovation. Three dimensions of EO have been used consistently in the literature: openness, risk-taking, and proactiveness. The involvement of EO, as one supporting aspect of strategic decision-making, can be considered as the driver of innovation capability. EO is thus proposed to make the relationship between intellectual capital and innovation capability more consistent.

THEORETICAL PERSPECTIVES

Previous researchers have already identified the important role played by innovation in achieving competitive advantage. Therefore, investigations in this field of research are increasing. Under traditional views of economic growth, such as Schumpeterian theory, define that innovation comprises new product, new material, new methods, exploitation and exploration the opportunity to find new market (Nugroho, 2011). Many previous researchers have adopted Schumpeter's theory as the fundamental theory of innovation such as (Tidd and Bessant, 2009; Laursen and Salter, 2014).

The development of innovation management requires interdisciplinary approach to bring about productive benefit in every sector which innovation is prominent. The theory in investigating innovation involves the various domain of knowledge, and the combination in some different fields (Wu et al., 2008). Resource-Based View (RBV)

is the based theory in this this research, because it contains the study of resource and capability.

3.2 Resource-Based View (RBV)

The resource-based view (RBV) is the fundamental theory in studying resources and capabilities (Newbert, 2007; Lin et al., 2013). RBV theory is not only important to understand the concept of intellectual capital, which generates value creation (Peppard and Rylander, 2001), it also relates to firm capability (Newbert, 2007; Lin et al., 2013). Previous authors have argued that RBV has a significant effect on a company's competitive advantage and performance (Newbert, 2007; Scott L. Newbert, 2008; Kraaijenbrink et al., 2010; Ployhart and Moliterno, 2011; Partanen and Möller, 2012; Shaw et al., 2013).

According to Peteraf (1993), RBV explains how to combine resources and internal capabilities to attain competitive advantage, where the right combination of resources and internal capabilities can result in inimitable knowledge. It is important for strategic management to maintain highly competitive advantage. According to some scholars Peteraf (1993), Barney (1991), and Bello et al. (2016), RBV creates heterogeneity in the firm's resources and capabilities, which leads to improvement in and nurturing of competitive advantage.

To attain competitive advantage, company resources should be organised according to VRIN (Valuable-Rare-Inimitable-Non-Substitutability) (Barney, 1991). Resources should be so managed to enable the companies to implement a value creation strategy, where a resource is valuable if it can improve value-creation. In RBV, these resources include tangible and intangible resources. Tangible resources include physical and financial assets, while the primary intangible resource is intellectual capital (Subramaniam and Youndt, 2005; Terziovski, 2007; Díaz-fernández et al., 2015; Delgado-Verde et al., 2016).

In this case VRIN is the capability to sustain competitive advantage. VRIN can also exploit their strengths to improve the company's performance. Further, in highly competitive markets, companies should have the courage to be different from their competitors. This capability is a rare resource that can lead to companies gaining a competitive advantage. The ability to attract customers, and to create a new product or

process, can also provide an advantage to a company. Barney (1991) explains that companies which engage in unique activities and processes to implement their value creation strategy are difficult for competitors to duplicate. This is a strength of those companies and can enable them to succeed in a highly competitive market. Companies should have idiosyncratic capabilities in order to maintain their competitiveness. The correct configuration of resources and capabilities can yield superior company performance (Teece, 2007).

According to Teece (2007), dynamic capability can empower companies to create, deploy, and protect the resources that promote superior long-term performance. Teece (2007) defines dynamic capability as the firm's ability to combine, to construct and to reconfigure internal and external abilities to anticipate the change of environments. The companies can exploit their resource by providing distinctive skills, methods, techniques, organisational structures, decision procedures, and disciplines to anticipate the change of environments and to seize the opportunities. For example, the start-ups companies can ask the universities to conduct the research such as creating the new products and new methods. The combination of internal know-how and external know-how of the start-ups companies and the universities are important to create innovation.

Another example of the implementation of dynamic capability is Zara. Zara, a fashion company, identifies customer needs and analyses future trends by monitoring the daily fashion choices of its customers. In this context, internal competences, such as designers' skills and knowledge, are valuable to the company in creating new products. Responding to customers' needs is thus a proactive way for Zara to be a leader in a highly competitive market.

Dynamic capability includes the configuration of resource to attain the competitive advantage (Teece, 2007). It is broadly similar to the RBV framework developed by Barney (1991). This framework depicts the nexus between resource, capability, and competitive advantage. Since this research studies the relationship between intellectual capital, EO, and innovation capability, the framework provided by Barney (1991) is followed. The researcher defines intellectual capital (human capital and social capital) as the resource, and the EO dimension as the capabilities. According to (Menguc et al., 2014) innovation is the main source of competitive

advantage. Also, the competitive advantage derives from strategies that utilise resources (O'Connor, 2008), in this research, innovation capability is posited as the competitive advantage. Figure 3.1 below shows the relationship between resources, capabilities, and competitive advantage (Barney, 1991). This framework represents the guidance used to develop the conceptual model.

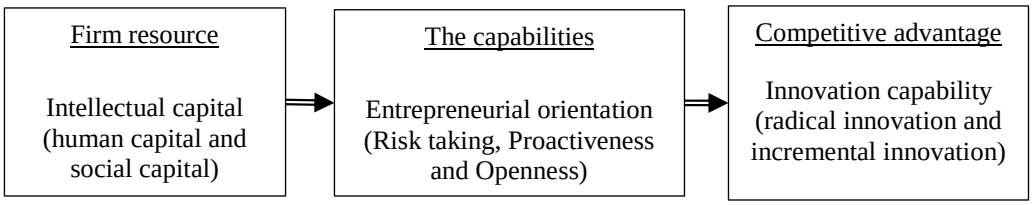


Figure 3. 1 The relationship between resources, capabilities, and competitive advantage
Adopted and modified from Foerstl, Franke and Zimmermann (2016), and Barney (1991)

3.3 Overview of the conceptual model

In the highly competitive business environment, companies must remain competitive. Innovation is one of the key business processes in achieving competitive advantage (Li and Calantone, 1998; Lawson and Samson, 2001; Adams et al., 2006; Hogan and Coote, 2014). Managing innovation is complicated (Hohberger et al., 2015). It entails a thorough understanding of how to manage resources, capabilities, and outcomes (Siguaw et al., 2006).

In regard to capability, EO is viewed as the internal capability of the company, which can influence the company's performance (Lee et al., 2001). EO refers to the strategy-making process that provides organisations with a basis for entrepreneurial decisions and actions (Lumpkin and Dess, 1996; Dess et al., 1997; Wiklund and Shepherd, 2003). Furthermore, entrepreneurial firms are more innovative and risk tolerant, and therefore are able to explore opportunities to increase their competitiveness. The present study builds on the existing body of work and, more specifically, conceptualises EO as a mediator of the relationship between intellectual capital and innovation. Three dimensions of EO have been consistently used in the literature: proactiveness, risk-taking, and openness. Proactiveness refers to the extent to which a firm anticipates and acts on its future needs (Miller and Friesen, 1978;

Lumpkin and Dess, 1996). Miller and Friesen (1978) define risk-taking as "the degree to which managers are willing to make a large and risky resource commitments – i.e. those which have a reasonable chance of costly failures". Finally, openness is the extent to which a firm proactively questions long-held routines, assumptions, and beliefs (Sinkula et al., 1997).

EO can also strengthen the relationship between intellectual capital and innovation (Wiklund and Shepherd, 2003; Wu et al., 2008). Wiklund and Shepherd (2003) argue that the positive impact of EO mediates the relationship between knowledge-based resources and a firm's performance, meaning that EO can promote the relationship between a firm's resource and its performance. Another study, by Wu, Chang and Chen (2008), also shows that EO can moderate the relationship between intellectual capital and innovation, and that firms should manage their intellectual capital because this can provide them with a competitive advantage. Wu, Chang and Chen (2008) explain that, by managing intellectual capital to reach a higher level of innovation. They also emphasised that the implementation of interactive and coordinative milieu would support employees by creating an atmosphere conducive to innovation.

In terms of risk-taking, Camps and Marques (2014) describe it as an innovation enabler that mediates the relationship between social capital and innovation outcome. The authors argue that a climate of risk-taking and creativity leads to innovative behaviour and capability. This climate will apply to any innovation group or R&D department that is willing to take a risk. It will also reduce the cost and time required to effectively deliver the information.

Previous studies have produced various results. The researcher combined all the studies mentioned above to create a hypothesis model, as shown in Figure 3.2 below.

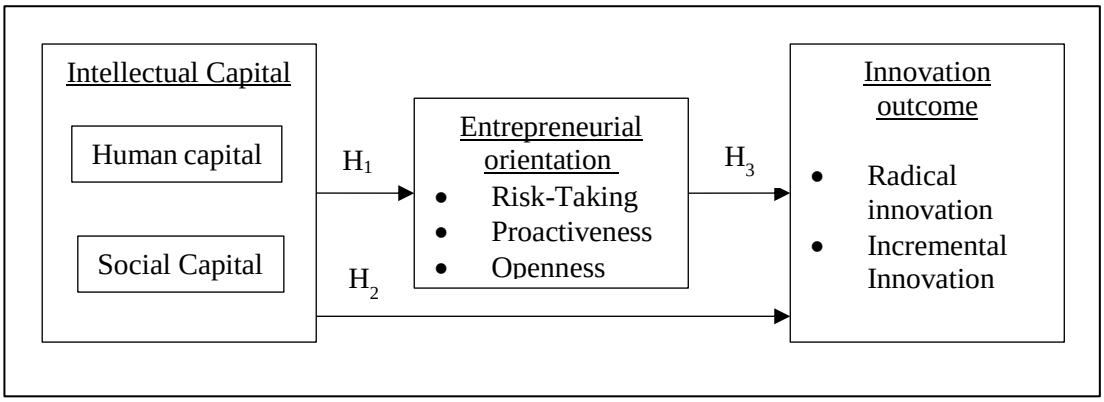


Figure 3. 2 The research model hypothesis

3.4 Human capital and entrepreneurial orientation

Investment in developing skills and knowledge to generate human capital via education is extremely beneficial (Akçomak and ter Weel, 2009). The development of human capital is, in turn, very important to economic development and entrepreneurship (Javalgi and Todd, 2011). Human capital refers to the skills and knowledge that are embedded in individuals. When it comes to decision-making, one challenge faced by managers is finding ways to improve competitive advantage by exploiting their human capital resources.

Human capital also needs the behaviour such as entrepreneurial orientation to help manager in decision making. Entrepreneurial orientation (risk-taking, proactiveness, and openness) is one possible way of increasing innovation outcomes. The first dimension of entrepreneurial orientation is risk taking. Risk taking is a behaviour that should be embedded in the manager to innovate (Avlonitis and Salavou, 2007). In a highly competitive market and uncertain business environment, the manager should able to quickly anticipate their competitors by making timely decisions and allocating resources appropriately (Calantone et al., 2002; Morgan and Strong, 2003). According to Javalgi and Todd (2011), SMEs should develop their entrepreneurial and human capabilities in challenging, risky and uncertain business environments in order to enhance their competitive advantage.

Then, second dimension of entrepreneurial orientation is proactiveness. Proactiveness is the behaviour of using initiative to anticipate and pursue a new

prospect of future demand, and to participate in an emerging market (Lumpkin and Dess, 1996). Proactiveness requires exploration, learning orientation, and higher recompense costs (Dai et al., 2014). Proactiveness constitutes a readiness to anticipate competitors and future demands by introducing new products or services (Dai et al., 2014). Kreiser et al. (2013) define proactiveness as the action of searching for opportunity and anticipating the future market. Such anticipation will enable a firm to adapt to a changing environment and dynamic market demand (Baker and Sinkula, 1999; Erdil et al., 2004), as well as creating a strategy to take advantages of opportunities and potential future markets.

An individual who has a high degree of openness will have high creativity, curiosity, and enthusiasm in learning, and will participate in the development and sharing of knowledge (Wang et al., 2011). Organisations should develop new ideas and openness to new technologies, pursuing new knowledge as the main element of innovativeness. According to Hurley and Hult (1998), flexibility and openness are believed to increase innovation in a firm by promoting new ideas. Therefore, it is hypothesised that there is a positive relationship between human capital and openness. Furthermore, through a learning process, this asset will strengthen the role of knowledge in innovation management processes. In terms of the relationship between human capital and innovation, many previous researchers agree that human capital positively influences innovation (Dakhli and Dirk De Clercq, 2004). The argument above leads to the following hypothesis:

Hypothesis (H1): Human capital is positively related to entrepreneurship orientation a) risk-taking, b) proactiveness, c) openness

3.5 Social capital and entrepreneurial orientation

According to Marcati, Guido and Peluso (2008), entrepreneurs must have a creative cognitive style to promote innovation. A creative cognitive style in addition to a degree of risk-tolerance and also flexibility motivates the diffusion of innovation within small firms. Marcati, Guido and Peluso (2008) state that entrepreneurs should encourage mutual trust, collaboration, and communication in order to nurture

networking processes. Boso, Story and Cadogan (2013) studied the differential performance consequences of the interplay between entrepreneurial orientation (EO), market orientation (MO), and social capital (SC), and highlighted the important role of social capital in determining the complex relationship between the firms' entrepreneurial orientation and their market orientation behaviour. According to Acquaah (2007) and Boso, Story and Cadogan (2013), the strong performance of entrepreneurial firms in developing countries is due to the strong association between EO, MO, and social capital in those firms. The importance of social capital has long been recognised by academics and practitioners. Scholars have studied the role of social capital in performance (Steinfield et al., 2010), knowledge-sharing (Inkpen and Tsang, 2011), and investment (Young and Tsai, 2008).

Various previous studies have agreed on the positive effect of trust, norms (Knack and Keefer, 1997; Onyx and Bullen, 2000), and network (Onyx and Bullen, 2000) in innovation. Subramaniam and Youndt (2005) developed a conceptual model of the relationship between intellectual capital and the type of innovation capability, which they broke down into radical innovation capability and incremental innovation capability. An interesting phenomenon is the supporting role of social capital in enabling a positive effect from the relationship between human capital and radical innovation. Meanwhile, social capital has a positive effect on both types of innovation (Subramaniam and Youndt, 2005). Tortoriello, Reagans and McEvily (2012) also identified the different types of social network that have a positive influence on knowledge acquisition, innovation, and creativity.

The success of the innovative project is based on strong network and relationship social capital (Akçomak and ter Weel, 2009). This is because the unpredictable and risky financing of innovation activities requires trust between employees, researchers, and experts in a firm. Akçomak and ter Weel (2009) explain that the development of social capital takes a long time, and investment in R&D might not be profitable for the private sector. This is because the private sector has difficulty investing in developing social capital. However, Tsai et al. (2013) evaluated the relationship between social capital and innovation performance from the perspective of the relationship between buyers and sellers, and found that the commitment to innovate and customer knowledge play an important role in this relationship. Social capital can decrease the

cost associated with controlling and monitoring activities (Presutti et al., 2007). It also has a positive effect on innovation, depending on the quality of the relationship, strength of the ties, and the dominant social norms (Coleman, 1988; Putnam, 1993; Knack and Keefer, 1997; Onyx and Bullen, 2000; Tortoriello et al., 2012). Thus:

Hypothesis (H2): Social capital is positively related to entrepreneurship orientation a) risk-taking, b) proactiveness, c) openness

3.6 Human capital and innovation

OECD defines human capital as knowledge, skills, experiences, and creativity (Firth and Narayanan, 1996; Hadjimanolis, 1999; Cormican and O'Sullivan, 2004; Archibugi and Coco, 2005; Criscuolo et al., 2007; Roper et al., 2008; Erickson and Rothberg, 2009; Kelley et al., 2011; Heidenreich et al., 2016). Human capital also includes the competencies (Tulugurova et al., 2009) and attributes of an individual that support the individual creativity, social behaviour, innovativeness, and economic well-being (von den Driesch et al., 2014; Earp et al., 2014; Hon, 2012; Johnsen and Ford, 2006; Mabey and Nicholds, 2015; Rothaermel and Hess, 2007; Teixeira and Tavares-Lehmann, 2014; Wei and Ling, 2014).

In the study of human capital and innovation capability, there were still yielding different result. The study such as Subramaniam and Youndt (2005) and Gregory G. Dess and Jason D. Sha W (2001) believe that human capital negatively affect radical innovation. Subramaniam and Youndt (2005) also explain that the relationship between human capital and innovation capability is complicated and requires organisational action, such as organisational innovativeness, to understand the complexities of the knowledge-innovation link. This negative effect of human capital on innovation are the consequence of lack of trust of the employees and the high investment in and high expectations of human capital, but low return on investment (ROI).

In contrast, Leitner (2011) shows that investing in training can influence positively to the human capital and innovation. Training and education can be the way to enhance knowledge, skill, ability, and workability. Indivuduals can harness their

talents, increase the capabilities and create their creativity (Hayton, 2005). For example, a company might have a strategy to surpass their competitors by training their R&D workers via marketing courses. In addition, Gómez and Vargas (2012) believed that the selection of skilled and qualified staff can enhance creativity. Based on this notion, the following hypothesis was developed:

Hypothesis (H3): Human capital is positively related to innovation capability a) radical innovation, b) incremental innovation.

3.7 Social capital and innovation

The influence of social capital on innovation is still a subject of debate (Carmona-Lavado et al., 2010). The importance of social capital has long been recognised by academics and practitioners, and previous studies have investigated the role of social capital in performance (Steinfield et al., 2010), knowledge sharing (Inkpen and Tsang, 2011), and investment (Young and Tsai, 2008). Social capital is related to innovation because it can produce creativity (Coleman, 1988).

Social capital is defined as an asset that focuses on interactive collaboration and communication with an external organisation, such as customers and suppliers (Erickson and Rothberg, 2009; Lu and Hung, 2011), for instance collecting the ideas of the wider community outside of the organisation. This capital can also occur inside the company, for example, team members can collaborate on creating new product development projects.

Pierre Bourdieu defines social capital as, "the aggregate of the actual or potential resources which are linked to possession of a durable network of more or less institutionalised relationships of a mutual acquaintance of recognition" (Portes, 1998; Agampodi et al., 2015). Robert D. Putnam (1993) identifies social capital based on the social organisation's characteristics, namely network structure, norms, and trust; these characteristics will then enhance society's productivity through facilitating cohesive action. Other authors agree that social capital is an essential resource embedded within a social relationship that is accessed and organised to support actions (Steinfield et al., 2010; Tsai et al., 2013).

Social capital comprises bonding, bridging, and linking (Woolcock and Narayan, 2000). Bonding refers to the connection between members in the community that have close relationships, for instance family members, friends, and neighbours (De Silva and Harpham, 2007). Bridging is the interaction between different people across socio-demographics, such as people who share the same cultural, ethnic or professional background. Finally, linking refers to the connections between people based on authority gradient (the power to control and affect people within the group).

Based on the findings of previous studies, social capital can have a positive or a negative effect on innovation. For instance, Subramaniam and Youndt (2005) conducted an empirical study on the relationship between intellectual capital and innovation capability, and found that social capital positively affects radical innovation and incremental innovation. Social capital has a positive effect on both types of innovation (Knack and Keefer, 1997; Onyx and Bullen, 2000; Subramaniam and Youndt, 2005). From a teamwork perspective, a diversity of job-relevance has a positive impact on innovation.

However, a team with diverse background also has a negative impact, especially in terms of conflict and communication issues (Hülsheger et al., 2009). Social capital has a negative impact on innovation if the connections between companies are too tight, where it will influence the decision-making rationale (Coleman, 1988; Chou et al., 2006)**.** Coleman (1988) has explained that norms can hinder creativity, as they give people a sense of security, meaning they have less desire to innovate. Knack and Keefer (1997) also stated that low trust would hinder innovation. Social capital can decrease the costs associated with controlling and monitoring activities (Presutti et al., 2007). Previous studies have produced mixed results regarding the effect of intellectual capital on innovation, therefore:

Hypothesis (H4): Social capital is positively related to innovation capability a) radical innovation, b) incremental innovation.

3.8 Mediating effect of entrepreneurial orientation

3.8.1 Risk-Taking

The proclivity of innovation produces very high risk. Since innovation is an expensive investment and often occurs under volatile circumstances (Das and Joshi, 2007), team managers will take a risk when deciding to pursue innovation. The development of team diversity plays a role in enabling radical innovativeness. A strong commitment from the top management team to risk-taking will significantly accelerate the speed of innovation (Shan et al., 2016). A diverse top management team background can lead to conflict; however, it can also bring about advantages such as creativity and new ideas.

Risk-taking refers to the degree of managers' willingness to make a decision and allocate the resource based in the fluctuate dynamic environment (Calantone et al., 2002; Morgan and Strong, 2003). An 'intrapreneurial' culture, such as one that encourages risk-taking, should be ingrained in the innovation manager's character (Avlonitis and Salavou, 2007). According to Camps and Marques (2014) and Li and Calantone (1998), risk-taking improves innovation outcome.

In the high-risk market, to make other competitors obsolete, the company need to utilise its' resource and ability to break through the market. It could be by developing radical innovation which is the ability to generate innovation that significantly disrupts an existing product and technology (Gatignon et al., 2002; Subramaniam and Youndt, 2005). Meanwhile, incremental innovation capability refers to upgrading, exploiting, and improving an existing product, process, or technology (Gatignon et al., 2002). Since risk-taking can promote innovation, therefore:

Hypothesis (H5): Risk-taking mediates the relationship between intellectual capital and innovation capability a) radical innovation, b) incremental innovation

3.8.2 Proactiveness

Proactiveness is one of the main elements of entrepreneurship orientation, besides risk-taking and innovativeness (Kreiser et al., 2013; Dai et al., 2014). Ruvio (2014) also includes proactiveness as part of innovativeness orientation. On the other hand, Covin and Slevin (1989) identify proactiveness, innovation and risk-taking as elements of the strategic stance of SMEs. In a situation of high competition between companies, initiative should be taken, such as predicting opportunities to satisfy customers, or to create new opportunities. Companies should proactively seek to increase their capability to attain competitive advantage.

Firms can be proactive in seeking opportunities to introduce new products or services to gain an advantage over the competition and anticipate future demands (Rauch et al., 2009). The use of technological skills (HC) promotes a technologically proactive attitude (proactiveness) in a firm's employees (García-Morales et al., 2007).

Hypothesis (H6): Proactiveness mediates the relationship between intellectual capital and innovation capability a) radical innovation, b) incremental innovation

3.8.3 Openness

Marcati et al. (2008b) proposed a conceptual model of entrepreneurial innovativeness. In this model, the authors explain that general innovativeness positively affects openness to experience, as a personal trait. Openness to experiences is related to the level of tolerance to accept something new. However, in this study, openness resembles innovativeness, because it also can be the driver of organisational innovativeness (Ruvio et al., 2014). They mentioned that innovativeness is studied at both an individual and organisational level because it relates to organisational culture. Openness also refers to behaviour that is flexible, adaptive, and not resistant to new ideas.

From a knowledge management perspective, openness is an element of learning capability, which has a significant effect on product innovativeness and performance (Akgün et al., 2007). Openness is also beneficial in creating innovation and solving various problems using different approaches and techniques. An individual who has a

high degree of openness will also have high creativity, curiosity, enthusiasm in learning, and will participate in the development and sharing of knowledge (Wang et al., 2011). The organisation should develop new ideas and be open to new technology, in order to utilise new knowledge as the main element of innovativeness.

From an open innovation perspective, openness is one of the characteristics of open innovation (Inauen and Schenker-Wicki, 2011). Openness through collaboration between firms and stakeholders in the intensity of open innovation activities has a significant positive impact on the development of new products (Inauen and Schenker-Wicki, 2011).

Hurley and Hult (1998) also describes creativity in openness, which leads to new ideas, as an aspect of company culture. Therefore:

Hypothesis (H7): Openness mediates the relationship between intellectual capital and innovation capability a) radical innovation, b) incremental innovation

3.9 Conclusion

To conclude, this chapter has discussed the conceptual model as depicted in Figure 3.2. This research explores the relationship between intellectual capital and innovation capability. Since the previous literature has produced conflicting results, in this study entrepreneurial orientation has been included as a mediator in enabling innovation capability. From the systematic literature review, the researcher emerges the research question by identifying the gaps from the conflicting result in the previous theories. According to Sandberg and Alvesson, (2011), the way to find the gaps from conflicting result in the previous theories is called confusion spotting. Furthermore, the summary of the hypotheses is provided in Table 3.1 below.

Table 3. 1 Summary of hypotheses

Evidence	Function	Research hypotheses
Human capital is the skill and knowledge ingrained in the individual employee (Subramaniam and Youndt, 2005). Risk-taking is one of a personal trait that should be ingrained in the manager. The riskiness trait includes instinctive behaviour rather than logical behaviour that is necessary to take the decision-making about finance capital and human capital (Morgan and Strong, 2003) instinctive rather than logical behaviour that is necessary to make decisions about financial capital and human capital (Morgan and Strong, 2003). To cope with an uncertain business environment, the manager should have a willingness to take a risk (Calantone et al., 2002).	*Human Capital and Risk-Taking*	H1a: Human capital is positively related to risk-taking.
In capturing the challenge of anticipating and pursuing a new prospect of future demand, and participating in an emerging market (Lumpkin and Dess, 1996), proactiveness involves greater exploration, learning orientation, and high recompense costs (Dai et al., 2014)	*Human Capital and Proactiveness*	H1b: Human capital is positively related to proactiveness
In the firm, the individual should have an attitude of openness to achieve creativity, curiosity, and enthusiasm in learning, and will participate in the development and sharing of knowledge (Wang et al., 2011). According to Hurley and Hult (1998), flexibility and openness are believed to increase innovation in the firm by promoting new ideas (Hurley and Hult, 1998).	*Human Capital and Openness*	H1c: Human capital is positively related to openness
The unpredictable nature and risky financing of innovation activities requires trust between employees, researchers, and the expert in the firm (Akçomak and ter Weel, 2009).	*Social Capital and Risk-Taking*	H2a: Social capital is positively related to risk-taking.
Proactive behaviour, according to Fuller and Marler (2009), consists of commitment, creativity, network building, and initiative. Proactiveness is a behaviour that involves creating alliances in an effort to identify partnership opportunities and to initiate action (Sarkar et al., 2001; Golonka, 2015).	*Social Capital and Proactiveness*	H2b: Social capital is positively related to proactiveness
The link between social capital and the willingness to share and receive knowledge is discussed by Vlaisavljevic, Cabello-Medina and Pérez-Luño (2016). They also mention that openness and cooperation positively influence innovation performance.	*Social Capital and Openness*	H2c: Social capital is positively related to openness

Table 3.1 Continued

Evidence	Function	Research hypotheses
In terms of the relationship between human capital and innovation, many previous researchers agree that human capital positively influences innovation (Dakhli and Dirk De Clercq, 2004). Subramaniam and Youndt (2005) also identified the relationship between human capital and radical innovation as being negative, except if it is mediated by social capital, when it produces a positive result.	*Human Capital and Radical Innovation*	H3a: Human capital is positively related to radical innovation
Human capital positively influences incremental innovation (Subramaniam and Youndt, 2005). New employees are more likely to produce more innovative ideas about refining processes than employees who are reluctant to adapt to new processes and capabilities (Reilly et al., 2014)	*Human Capital and Incremental Innovation*	H3b: Human capital is positively related to incremental innovation
Social capital has a positive effect on radical innovation (Subramaniam and Youndt, 2005). It is also has a positive effect on general innovation depending on the quality of the relationship, strength of the ties, and social norms (Coleman, 1988; Putnam, 1993; Knack and Keefer, 1997; Onyx and Bullen, 2000; Tortoriello et al., 2012).	*Social Capital and Radical Innovation*	H4a: Social capital is positively related to radical innovation
Social capital has a positive effect on incremental innovation (Subramaniam and Youndt, 2005). Collaboration with different partner types can easily lead to incremental innovation ideas (De Leeuw et al., 2014).	*Social Capital and Incremental Innovation*	H4b: Social capital is positively related to incremental innovation

Table 3.1 Continued

Evidence	Function	Research hypotheses
Risk-taking has a positive effect on new product development (Calantone et al., 2002). In the development of team diversity, risk-taking plays a role in enabling radical innovativeness (Shan et al., 2016). A strong commitment from the top management team to taking risks will significantly accelerate the speed of innovation (Shan et al., 2016)	*Risk-Taking and Radical Innovation*	H5a: Risk-taking mediates the relationship between human capital and social capital to radical innovation
A new/improved product is very risky, and the firm should tolerate risk and accept random failures (Akman and Yilmaz, 2008).	*Risk-Taking and Incremental Innovation*	H5b: Risk-taking mediates the relationship between human capital and social capital to incremental innovation
Lumpkin and Dess (1996) define proactiveness as behaviour that seeks to create new opportunities to innovate by exploiting opportunities. Rauch et al. (2009) also mention that proactiveness is implemented to search for opportunities to compete, and to anticipate future demand. In addition, proactive firms promote radical innovation (Akman and Yilmaz, 2008).	*Proactiveness and Radical Innovation*	H6a: Proactiveness mediates the relationship between human capital and social capital to radical innovation
Proactiveness can create and identify opportunities (Johannessen et al., 2005). Also, proactiveness can be a strategy to assist the improvement of innovation (Akman and Yilmaz, 2008).	*Proactiveness and Incremental Innovation*	H6b: Proactiveness mediates the relationship between human capital and social capital to incremental innovation
Hurley and Hult (1998) describe creativity in openness, which leads to the emergence of new ideas, as an aspect of company culture. Openness through collaboration between firms and stakeholders in the intensity of open innovation activities have a significant positive impact on the new product (Schenker-Wicki and Inauen, 2011).	*Openness and Radical Innovation*	H7a: Openness mediates the relationship between human capital and social capital to radical innovation
Collaboration through customer and supplier involvement in designing new products strengthens and increases incremental product innovation (Menguc et al., 2014). In addition, alliances with competitors to attain external knowledge and skills is crucial for incremental innovation (Xu et al., 2013).f	*Openness and Incremental Innovation*	H7b: Openness mediates the relationship between human capital and social capital to incremental innovation

CHAPTER 4 RESEARCH PHILOSOPHY AND METHODOLOGY

Focusing on the Quantitative Research Method

- Introduction
- Nature of the research
- Research design: overview
- Research paradigm
- Quantitative Research
- *Quantitative research methods and instruments*
- Conclusion

Next: Chapter 5 Research Design and Research Method

4.1 Introduction

The previous chapter presented the conceptual design of hypotheses based on the research gaps and research question that were identified in the literature review chapter. This chapter will discuss the philosophical stance that underpin the present research, and the methodology that guides the research towards answering the research questions.

This chapter aims to provide a clear understanding of the research paradigm that inform the current study, which comprises a two-part discussion. First, it will discuss the philosophical assumptions this research relies upon. Second, the research techniques, including the research instruments, the data collection techniques, and the statistical tools used will be discussed in research methodology section. The quantitative methodology was selected to address the research problem, and the justification for this choice will be presented in this chapter.

4.2 Nature of the research

Before undertaking any piece of research, the researcher should consider the philosophical assumptions and methodology that will be employed to address the research problem. This section will begin by presenting the fundamental philosophical assumptions made in this study, regarding how to apprehend the nature and characteristics of knowledge. The philosophical assumptions are important to understand, as they reveal the rationale of the researcher in selecting and evaluating the research paradigm that is utilised to create the research design. This section will also define the concept of research, the criteria of good research, and the purpose of undertaking the present research. The ultimate objective of the research process is to build, increase, and improve knowledge of a particular topic (Polit and Cheryl Tatano Beck, 2004).

4.2.1 The criteria for good research

Kothari (2004) sets out the criteria for good research as follows: (1) the research aims defined should be lucid, as they guide the whole process; these can be obtained from the research question and the research background. (2) The research procedures should be explicit, detailed, and replicable, which allows other researchers to follow the same procedures and improve on the research. Research procedures can differ, due to different techniques and aims. (3) The research design should be carefully considered to produce an unbiased result. To achieve this, the process of collecting and analysing data should have clear validation. Validation processes vary across different studies and fields and will depend on what research methods are utilised; for example, Cronbach's Alpha is used to validate the reliability of a questionnaire, and triangulation to validate interview data. (4) The researcher also should set out all of the limitations and flaws in the research process, in order to recommend future research directions. (5) The data analysis should be valid and reliable. There are a variety of methods that can be used to analyse data. Since this research applied a quantitative method, statistical tools were required, such as regression analysis, factor

analysis, and Cronbach's Alpha. (6) Inferences should be limited to those justified data and constrained to those for which the data provide the sufficient basis. (7) The integrity of the researcher, and their reputation in research, is also a consideration, whereby the more experienced the researcher, the more convincing the research. Overall, though, good research should be systematic, logical, empirical, and replicable (Kothari, 2004).

4.2.2 The purpose of undertaking research

The researcher will be in pursuit of a particular purpose, depending on the problems and topics to be addressed, and the scope of the study. However, in general, research aims to answer the specified research question and to uncover facts that have not yet been discovered. Kothari (2004) categorises the various objectives of research, which can fall into one of the following broad groups.

1. Research revealing phenomena or achieving new insight and knowledge (exploratory research studies);
2. Research accurately describing the characteristics of a specific individual, condition, or group (descriptive research studies);
3. Research determining the frequency of events or of the nexus between entities (diagnostic research studies);
4. Research testing a hypothesis regarding a causal effect between variables (hypothesis-testing research studies).

4.3 Research design: overview

Research includes the utilisation of theory that is developed from previous studies and experience, and that makes logical sense (Pathirage et al., 2008). By understanding the existing theory, the researcher can begin to construct the research questions and to plan the research design. The research design is the blueprint for the whole research, and details the techniques and processes of data collection and analysis

(Zikmund, 2000). Appropriately planning the research is important to produce good quality research (Zikmund, 2000).

The research design must be clear on each procedure to ensure clarity regarding the research process followed to answer the research question. Furthermore, different research questions will require different research methodologies. Therefore, the researcher must understand the different existing perspectives, experiences, and knowledge relating to the research questions in order to appropriately design the research.

4.3.1 Research design of the current study

In general, this research studies human behaviour in the area of innovation capability. Studying human behaviour is closely related to the social sciences. Specifically, this research studies the relationship between intellectual capital and entrepreneurial orientation, which impacts on ICT-SME firm innovation in Indonesia. Thus, causal research was conducted, as the most appropriate research design. The causal research approach aims to hypothesise the relationship between intellectual capital, entrepreneurial orientation, and innovation capability. Figure 4.1 shows the outline of the research process followed for this study.

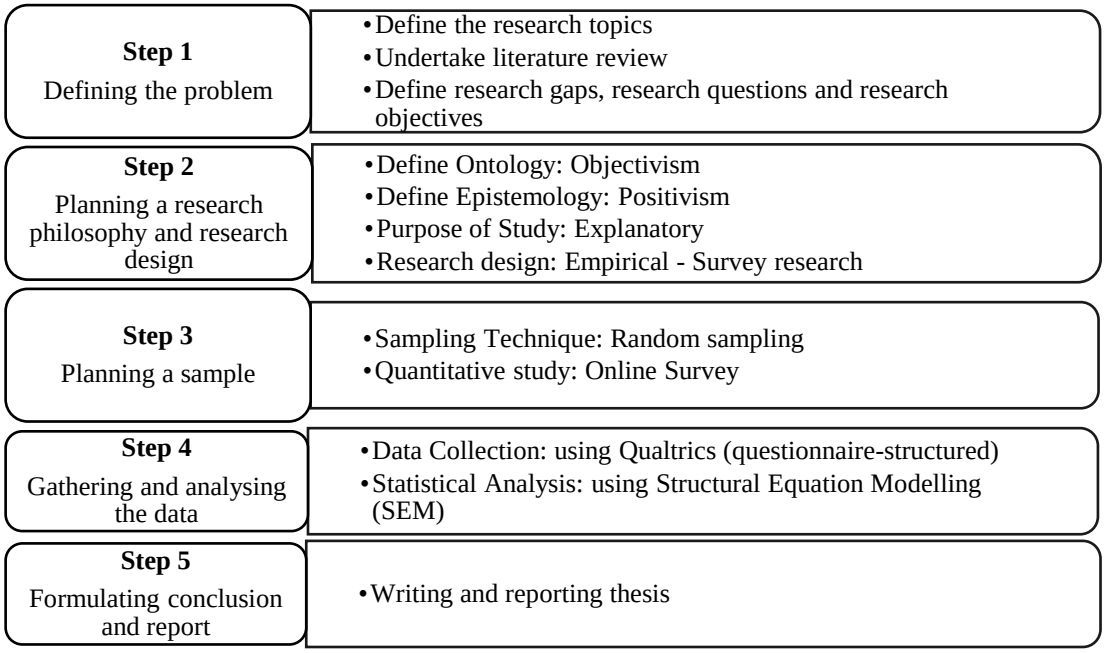


Figure 4. 1 Outline of the research process
Adapted and modified from Sampe (2012); Zikmund (2000); Saunders, Lewis and Thornhill (2007)

4.4 Research paradigm

The etymological origin of the term "paradigm" is the Greek '*paradeigma*', meaning "pattern, example, sample" (Liddell and Scott, 1940). Bryman and Bell, 2003 define a paradigm as "a culture of beliefs and dictates which for scientists in particular disciplines influence what should be studied, how research should be done, and how results should be interpreted". In undertaking research, researchers must adopt a particular view, beliefs, and methods. These also comprise beliefs, values, and assumptions that must be perceived and embedded in the researcher's actions in conducting their research (Kuhn, 1970).

According to Burrell and Morgan (1979) and Saunders, Lewis and Thornhill (2007), the purposes of establishing a research paradigm include:

- To clarify the researchers' assumptions about the nature of science and humanity.
- To provide a replicable method that can be followed by other researchers, as appropriate for their works.
- To support the researcher in designing their research process

- To determine the direction and scope of the research.

The research paradigm is determined by the researcher's selected ontology, epistemology, methodology, and method(s) (Guba, 1990). Table 4.1 presents the definitions of ontology, epistemology, methodology, and method.

Table 4. 1 Definitions of the ontology, epistemology, methodology, and method

Adapted from Easterby-Smith, Thorpe and Jackson (2015) and Guba (1990)

Ontology	The philosophical assumptions about the nature of reality. Questions: what is the nature of the understandable? Or, what is the nature of realism? (Guba, 1990)
Epistemology	General set of assumptions about the best ways of inquiring into the nature of the world. Questions: "what is the relationship between the knower (the inquirer) and the known (or knowable)?" (Guba, 1990)
Methodology	Combination of techniques employed to question a specific situation. Questions: "how should the inquirer go about discovering the knowledge?" (Guba, 1990)
Method	Individual techniques for data collection, analysis, etc.

According to Sobh and Perry (2006) and Guba (1990), there are four research paradigms within the field of organisational science, namely: positivism, critical theory, constructivism, and critical realism. Positivism requires a realist ontology (Guba, 1990). It also provides a structured methodology for the researcher, requiring a quantitative method and statistical analysis.

Critical theory comprises the philosophy of critiquing the structure and outcome of research (Easterby-Smith et al., 2015). It also evaluates the extent of the dominance of powerful social actors. Another type of research philosophy is constructivism. Constructivism assumes there is no single reality, as different individuals have different natures (Easterby-Smith et al., 2015). According to this philosophy, theory is

constructed by an individual, and the researcher must also communicate one by one of the individuals in order to understand the problem inside the system. Finally, critical realism produces generalised knowledge by presenting empirical findings embedded in the theory (Sampe, 2012). Table 4.2 shows the classification of four paradigms.

Table 4. 2 The classification of research paradigms

Adapted from Easterby-Smith, Thorpe and Jackson (2015); Guba (1990) and Sobh and Perry (2006)

Paradigm	**Positivism**	**critical theory**	**constructivism**	**critical realism**
Ontology What is the nature of reality?	Realist: Reality is real and apprehensible	Critical realist: "Virtual" reality shaped by social, economic, ethnic, political, cultural, and gender values, crystallised over time	Relativist: Multiple local and specific "constructed" realities	Critical realist: reality exists but can never be fully apprehended
Epistemology How can the researcher understand the reality?	Findings true: researcher is objective, viewing reality through a "one-way mirror"	Value-mediated Findings: the researcher is a "transformative intellectual" who changes the social the world within which participants live	Created findings: the researcher is a "passionate participant" within the world being investigated	Findings probably True: researcher is value-aware and needs to triangulate any perceptions he or she obtains
Methodology How can knowledge be discovered in order to answer the research question?	Mostly focus on the testing of theory. Thus, mainly quantitative methods such as: survey, experiments, and verification of hypotheses	Dialogic, transformative: eliminate false consciousness and energise and facilitate transformation	Hermeneutic, dialectic: Individual notion obtained hermeneutically, and evaluated dialectically to produce constructions with significant consensus	Modified objectivist: objectivity remains a regulatory ideal, but can only be approximated, with special emphasis placed on external guardians such as the critical tradition and the critical community
Method What tools are appropriate to use to discover knowledge and answer the research question?	Quantitative methods, such as sampling, questionnaires, interviews, focus group discussions, and statistical analysis	Ideological review, action research such as open-ended interviews, open-ended questionnaires, and participant observation	Qualitative methods such as a case study, unstructured interviews, and grounded theory, narrative	Mainly qualitative methods such as case studies and convergent interviews

4.4.1 Ontology

The word 'ontology' originally derives from the Greek phrase which comprises *onto*, or being, and *logia*, or "logical discourse" (Liddell and Scott, 1940). Easterby-Smith, Thorpe and Jackson (2015) and Saunders, Lewis and Thornhill (2007) define ontology as a view concerning the nature of the 'real' world. Ontological position can be broadly categorised into two opposing views, objectivism and subjectivism. Objectivism is the ontological stance that evaluates the existence of social phenomena and their values by focusing on the independence of social actors (Bryman and Bell, 2003; Saunders et al., 2007). By contrast, the subjectivist ontological view of social phenomena is shaped by individuals' views (Saunders et al., 2007).

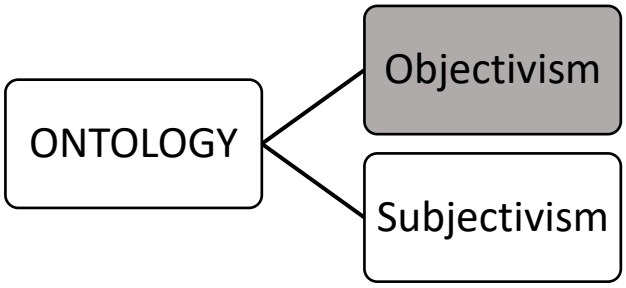


Figure 4. 2 Objectivism is the ontological position of this research

4.4.2 Justification for the selected ontology: Objectivism

Since this research aims to understand the relationship between intellectual capital and entrepreneurial orientation (EO), which impacts on a firm's innovation capability, this research assumes an objectivist ontology. The selection of this ontology reflects the purpose of the research, which is to explain the phenomena under study. This section will clarify the philosophical assumptions that are upheld in the context of innovation capability.

In the context of innovation capability, intellectual capital can be claimed to be the nature of reality that becomes the foci in studying innovation capability. The phenomena being studied in this research are the mixed results yielded by previous

studies of the relationship between intellectual capital and innovation. The failure to obtain consistent results could be because the studies fail to take the role of organisation's entrepreneurial orientation on the relationship between intellectual capital and innovation into account. Therefore, the researcher assumes the involvement of entrepreneurial orientation as the mediator in enabling innovation capability. It is because some studies set entrepreneurial orientation as the driver of innovation capability (Wu et al., 2008; Camps and Marques, 2014). This assumption requires an objectivism ontological position. In addition, this assumption entangles the fundamental aim of objective ontology, which is to comprehend the reality and nature of the variables under study, in this case intellectual capital, entrepreneurial orientation and innovation capability. In addition, it enables an explanation of how these variables works.

4.4.3 Epistemology

The previous section discussed ontology, which relates to the nature of reality. The chosen ontology is also fundamental to determining the research paradigm, and to decide what stance the research will take. This section will discuss epistemology, which provides philosophical basis that underpins the relationship between knowledge and reality (Easterby-Smith et al., 2015).

There are two broad types of philosophical assumption within epistemology, namely positivism and constructionism. Positivism is the epistemological stance that advocates the implementation of natural sciences methods to study social reality (Bryman and Bell, 2003). In formulating a strategy to collect data for this study, the researcher should develop a hypothesis from the existing theory (Saunders et al., 2007). On the other hand, constructivism is the epistemological stance that advocates the importance of comprehending the differences between individuals as social actors. Table 4.3 shows the key features of and differences between positivism and constructionism.

Table 4. 3 Key features of positivism and constructionism

Adapted from Levent Altinay and Paraskevas (2008); Saunders, Lewis and Thornhill (2007); Bryman and Bell (2003) and Easterby-smith, Lyles and Peteraf (2009)

Key Features	Positivism				Constructionism		
Basic beliefs	▪ Objectivism ▪ The observer is independent ▪ Science is value-free				▪ Subjectivism ▪ The researcher is part of what is observed ▪ Science is driven by human interest		
Aims	▪ Discovery				▪ Invention		
Starting points	▪ Hypothesis				▪ Meanings		
Techniques	▪ Measurement				▪ Conversation		
Analysis/ interpretation	▪ Verification/falsification				▪ Sense-making		
Outcomes	▪ Causality				▪ Understanding		
Method of research	▪ Focus on facts ▪ Look for causality and fundamental laws ▪ Reduce phenomena to its simplest elements ▪ Formulate and test hypotheses				▪ Focus on meanings ▪ Try to understand what is happening ▪ Look at the totality of each situation ▪ Develop ideas through induction from data		
Preferred methods	▪ Quantitative				▪ Qualitative		
Sampling	▪ Large samples				▪ Small samples investigated in depth over time		
Research design	▪ Structured, formal, and specific detailed plans				▪ Dynamic and flexible		
Research instruments	▪ Questionnaires, scales, test scores, and experimentation				▪ The researcher		
Methodology	**Survey Research**	Multivariate research design	Experimen-tal research	Case studies	Discourse analysis	Grounded theory	Action research

4.4.4 Justification for the selected Epistemology: Positivism

Based on the features presented in Table 4.3, for this research positivism was adopted as the epistemological stance. As such, this research utilised a quantitative research method, the implementation of statistical techniques and utilisation of a large sample aims to determine the representative of population. Quantitative methods were applied in recognition of the different elements of the research problem, and in order to identify the best predictors of outcome (Creswell and Clark, 2011).

Quantitative methods are employed in investigations of nature and the features of phenomena, such as the correlation between particular variables (Leedy and

Ormrod, 2013). There are many types of quantitative methods research, such as correlation studies, developmental designs, observational studies, and survey research (Creswell, 2014). According to Creswell (2014), the use of quantitative methods enables the researcher to view the 'big picture' of the research problem(s). Creswell (2014) also explains the initial steps required for quantitative methods, which are drawing the hypothesis from the theory, and then testing the hypothesis through statistical analysis.

As the explanation aforementioned, the epistemological stance of this research is positivist which utilised quantitative methods by statistical tools to analyse data. This analysis is appropriate to answer the nature of the relationship between variables. Since this research aims to understand the relationship between intellectual capital, entrepreneurial orientation and innovation capability, quantitative methods appropriate to analyse. These aims can be broken down into seven hypotheses, which are:

H1: Human capital is positively related to entrepreneurial orientation: a) risk-taking, b) proactiveness, c) openness.

H2: Social capital is positively related to entrepreneurial orientation: a) risk-taking, b) proactiveness, c) openness.

H3: Human capital is positively related to innovation capability: a) radical innovation, b) incremental innovation.

H4: Social capital is positively related to innovation capability: a) radical innovation, b) incremental innovation.

H5: Risk-taking mediates the relationship between intellectual capital and innovation capability: a) radical innovation, b) incremental innovation

H6: Proactiveness mediates the relationship between intellectual capital and innovation capability: a) radical innovation, b) incremental innovation

H7: Openness mediates the relationship between intellectual capital and innovation capability: a) radical innovation, b) incremental innovation.

The importance of intellectual capital to innovation has been acknowledged in previous studies. The causal impact of intellectual capital produces mixed results, which requires a mediating variable that can enable innovation. Since entrepreneurial

orientation is also a component of strategy that enhances performance, this research proposes entrepreneurial orientation as the mediating variable in the relationship between intellectual capital and innovation capability.

Furthermore, the positivist epistemology is appropriate for testing the developed hypothesis and determining whether or not a relationship between intellectual capital and innovation capability is a positive one. Statistical analysis was used to test the hypothesis that was developed from the existing theory, and to understand the connection between the theory and the real world (observation). This research also utilised a deductive approach in reaching a conclusion. Table 4.4 shows how the positivist epistemology was applied in this research.

Table 4. 4 Positivist epistemology as applied in this research

Basic principles	Positivism	In this research
View of the world	The external world exists and is objective	Intellectual capital and innovation capability can enhance competitive advantage in SMEs. In enabling innovation, SMEs require the implementation of a strategy such as the utilisation of intellectual capital and entrepreneurial orientation as the driver of innovation capability. It is the best solution to reinforce innovation capability.
Involvement of the researcher	The researcher is independent	Hypotheses were developed from the previous theory and conceptual frameworks provided by earlier researchers.
Researcher's influence	Research is value-free	The random sample was collected from a large-scale population of SMEs in Indonesia. The validation and reliability data was analysed statistically to avoid bias.
What is observed?	The objective world, facts	ICT-SMEs' innovation, innovation capability, entrepreneurial orientation.
Concepts	The definition of fundamental theory should be clear	Resources-based view (RBV).
Unit of analysis	A sample of the population	Organisational level: SME
Generalisation through	Statistical probability	The researcher utilised an online survey to collect the data. Then, the data was analysed and verified in order to present valid and reliable data. In addition, statistical analysis was implemented to verify the hypothesis from both theory and the observed reality.
How is knowledge developed?	Reducing phenomena to simple elements representing general laws	The nexus between variables was analysed to measure innovation capability and the competitive advantage of a firm.
Sampling requirements	Cross-sectional analysis	Making comparisons of variation across samples and large numbers of ICT-SMEs in Indonesia. The sample size was 297 companies.

4.4.5 Research Methodology: Deductive approach

There are two broad approaches to research methodology, deductive and inductive (Pathirage et al., 2008). According to Gill and Johnson, (2002) and Pathirage, Amaratunga and Haigh (2008), a deductive approach comprises the development of a conceptual theory developed from a previous theory, which is then tested via empirical study. By contrast, the inductive approach involves a theory being constructed from the results of observation as part of an empirical study (Saunders et al., 2007). Table 4.5 shows the differences between the deductive and inductive approach to research methodology.

Table 4. 5 Deductive and inductive approaches

Adapted and modified from Saunders, Lewis and Thornhill (2007) and Pathirage, Amaratunga and Haigh (2008)

Deduction	Induction
Explores the causal relationship between variables	A close understanding of the research context
A highly structured approach	A more flexible structure to permit changes of research emphasis as the research progresses
Researcher is independent from the research process	Researcher is included in the research process
Quantitative data collection	Qualitative data collection
Requires a sample size that is adequate to generalise conclusions	Less requirement for a generalisable conclusion

The positivist paradigm and the deductive approach as applied in the social sciences are derived from the scientific processes of natural science, such as developing conceptual model based on the theory. Then, the hypothesis in the conceptual model is evaluated. In this research, a deductive approach was applied,

including hypothesis testing to evaluate the causal relationship between intellectual capital, entrepreneurial orientation, and innovation capability.

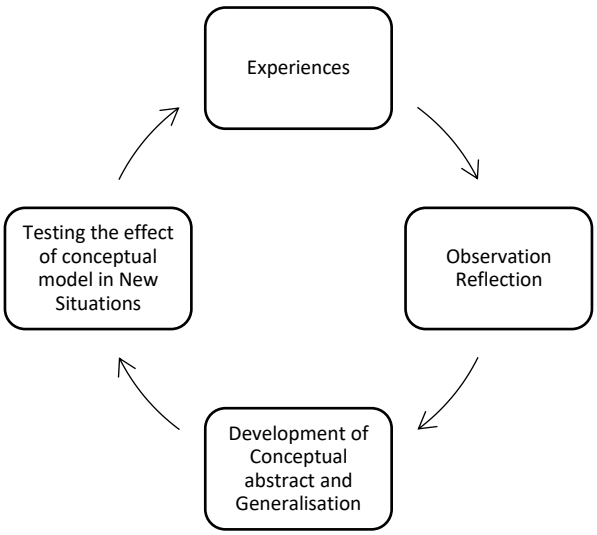


Figure 4. 3 The quantitative research process

Adapted and modified from David A. Kolb, Rubin and McIntyre (1979)

According to Gill and Johnson (2002), the learning process cycle begins with experience, is followed by the formulation of abstract concepts and theories, continues with the generalisation of the effect of abstract concepts and theories, and returns to experience. This learning process cycle follows Kolb's learning cycle, as illustrated in Figure 4.3 above.

4.5 Characteristics of the research design: Quantitative research

The research design guides the researcher in undertaking the research. Selecting an appropriate research design is important to determine the procedures that will be used to obtain the research input, such as the data collection techniques. For example, in the quantitative method, the researcher can collect data using an online survey, and conduct a statistical analysis to test the hypothesis. By creating an appropriate research design, researchers can gather the primary or secondary data via either experiments or surveys (Creswell, 2014; Easterby-Smith et al., 2015).

The research processes are determined by the research problem(s) or research question(s) being addressed, i.e. what the researcher intends to find out. Then, the researcher must decide "how to find the solution" (Kothari et al., 2014). The next stage of the research process is to decide what approach to research methodology will be applied, i.e. whether the research will be qualitative or quantitative (Kothari et al., 2014). "Qualitative research usually emphasises words rather than quantification in the collection and analysis of data" (Bryman and Bell, 2003), and the appropriate research strategy could be inductive, constructive, or interpretive. On the other hand, "Quantitative research usually emphasises quantification in the collection and analysis of data" (Bryman and Bell, 2003). The differences between quantitative research and qualitative research are illustrated in Table 4.6 below.

Table 4. 6 Difference between quantitative and qualitative research design

Adopted from Kothari, Kumar and Uusitalo (2014)

Characteristics	Quantitative research	Qualitative research
Underpinning philosophy	Rationalism: "That human beings achieve knowledge because of their capacity to reason."	Empiricism: "The only knowledge that human beings acquire is from sensory experiences."
Approach to enquiry	Structured/rigid/predetermined methodology.	Unstructured/flexible/open methodology.
Main purpose of investigation	To quantify the extent of variation in a phenomenon, situation, issue, etc.	To describe variation in a phenomenon, situation, issue, etc.
Measurement of variables	Emphasis on some form of either measurement or classification of variables.	Emphasis on description of variables.
Sample size	Larger sample size.	Fewer cases.
Focus of enquiry	Narrows focus regarding the extent of enquiry but obtains the required information from a greater number of respondents.	Covers multiple issues but obtains the required information from fewer respondents.
Dominant research value	Reliability and objectivity (value-free).	Authenticity, but does not claim to be value–free.
Underpinning philosophy	Rationalism: "That human beings achieve knowledge because of their capacity to reason."	Empiricism: "The only knowledge that human beings acquire is from sensory experiences."
Analysis data	The frequency of distribution was using analysis of cross-tabulation and other statistical tools.	Subject responses, narratives or observational data to the identification of themes and describes these.
Communication of findings	Organisation is more analytical in nature, drawing inferences and conclusions, and testing the magnitude and strength of the identified relationship.	Organisation more descriptive and narrative in nature.

A quantitative research design was selected for this research, which employs descriptive analysis to summarise the findings. In addition, the present research uses statistical analysis, such as factor analysis, to classify the patterns of correlation, and

Structural Equation Modeling (SEM) to explore the interaction between variables and the extent of the impact of variables (Hair et al., 2010).

4.6 Quantitative research methods and instruments

Quantitative research methods include numerical data collection and statistical data analysis, i.e. testing a hypothesis against an underlying theory. This requires an objectivist view of social reality (Bryman and Bell, 2003). Figure 4.4. illustrates the main phases and processes of quantitative research.

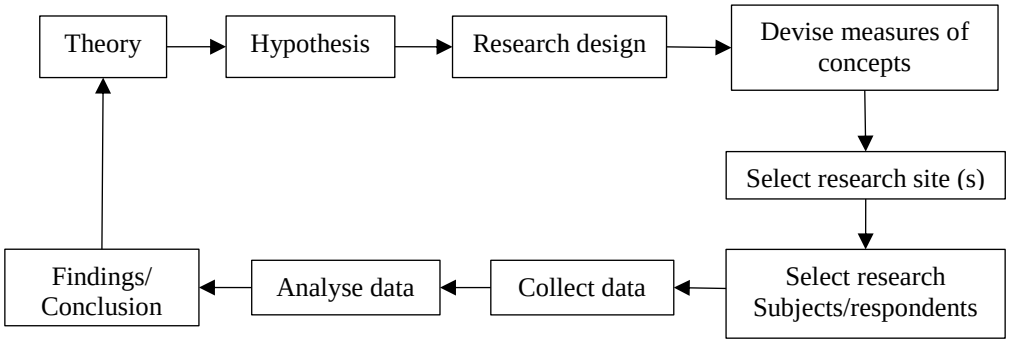


Figure 4. 4 The quantitative research process
Adapted and modified from Bryman and Bell (2003)

4.6.1 Web-based survey

The growth of the internet has enabled researchers to utilise online platforms to support more efficient data collection. Lee (2000) references the influence of worldwide availability of computer technology in supporting the researcher in the process of collecting, storing, and managing data. There are four key benefits of utilising the internet to support research (Easterby-Smith et al., 2015). First, access to the respondents or particular groups of respondents becomes easier. Second, tracing social interaction or social trends is also easier. Third, the internet may enable the collection of data relating to sensitive topics by ensuring anonymity for both the researchers and the respondents (Zikmund, 2000; Easterby-Smith et al., 2015). Fourth,

the researcher can trace social process easier than through face to face interaction (Easterby-Smith et al., 2015).

The method provided by the internet for the researcher to collect data and communicate with the respondents is a web-based survey. Rather than using email questionnaire, the researcher decides to utilise web-based survey. A web-based survey is preferable to an email survey, because the responses are stored directly in an online database ready for statistical analysis (Easterby-Smith et al., 2015). The web-based survey is also easier, cheaper, and very simple to implement, with guidance and a tutorial so that researcher can follow a step by step the process without the need for technical training.

The web-based survey also provides many interactive features. For example, automatic instruction and a modern display enable the respondent to navigate both forward and backward questions. Also, the data can be monitored and downloaded by the other statistical analysis program such as Excel and SPSS (Easterby-Smith et al., 2015). It will avoid error in data entry and data analysis.

4.6.2 Data analysis: Hypothesis testing

The hypothesis was developed before creating the research design. The hypothesis tested in this research originated from the existing Resource-Based View (RBV) theory. Such hypotheses are usually derived from the objectives or aims of the research (Zikmund, 2000). The hypothesis developed in this study aims to answer the research question by predicting the relationship between variables (Creswell, 2014). The aim of this research is to understand the extent to which intellectual capital, and entrepreneurial orientation affect innovation capability of ICT SMEs in Indonesia. Then, the researcher breakdown the aim to be the hypotheses as mentioned in the subsection 4.4.4.

According to Kothari, Kumar and Uusitalo (2014), a hypothesis has three characteristics: (1) it is an uncertain proposition; (2) its validity is still unidentified; (3) it requires a relationship between two or more variables. The process of formulating a hypothesis comprises three steps, as illustrated in Figure 4.5 below, and

as follows: (1) developing the hypothesis; (2) collecting applicable evidence; and (3) testing the evidence to draw an inference and test the hypothesis validity (Kothari et al., 2014).

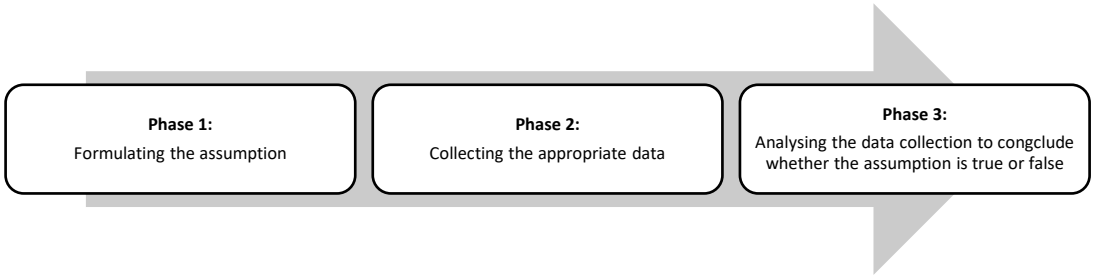


Figure 4. 5 The process of testing a hypothesis
Adapted from Kothari, Kumar and Uusitalo (2014)

4. 7 Conclusion

Determining the research philosophy and research method is an important phase in undertaking research. The researcher can determine the basic assumption and prediction of the research based on the research question and research aims stated. Also, the researcher must design the research methods that is most appropriate to the research aims. Selecting the most appropriate methods for the research topic area influence the process validity, reliability and the research finding and result. Furthermore, the researcher should know the notion of attaining knowledge and understand the nature of the relationship between variables and the manifestation of this in the relevant society or population.

The research processes employed by different researchers vary. It is not as simple as a single piece of work. A research study consists of an objective, research processes, and a conclusion. In addition, quantitative research also aims to prove or disprove a hypothesis. The researcher tests the hypothesis by predicting and interpreting the result. Figure 4.6 illustrates the quantitative research process.

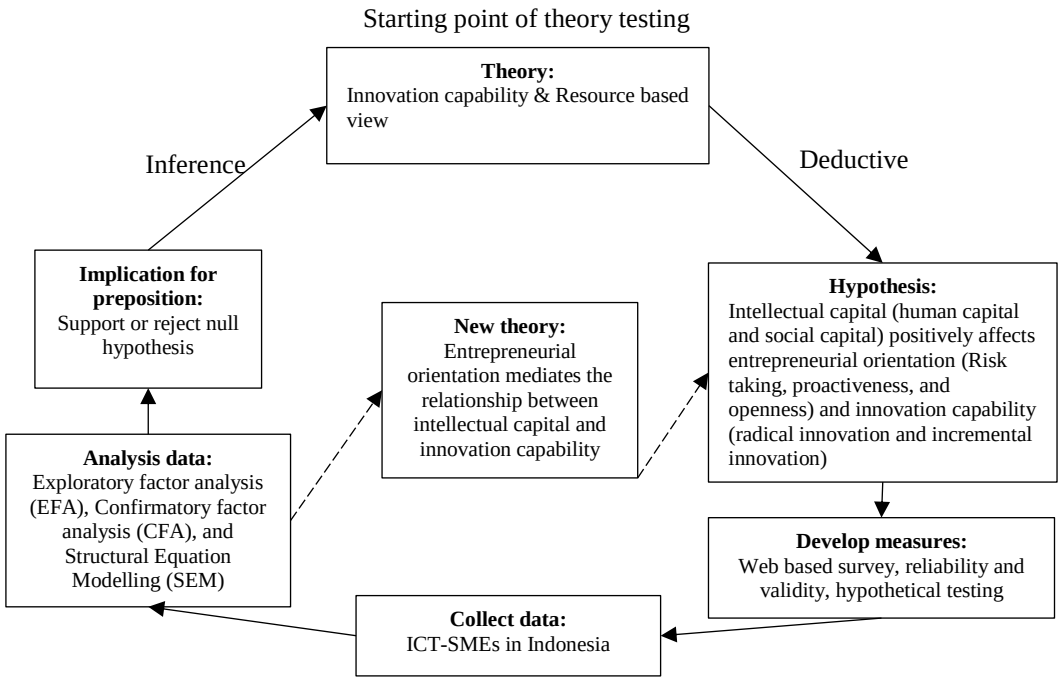


Figure 4. 6 The logic of research process
Adapted from De Vaus (2002)

In this research, the philosophical assumptions made were based on the research problem, questions, and objectives. A quantitative research design was created, including a methodology that comprises research strategies and data collection techniques to support the research process. By establishing the research philosophy and research methodology, the researcher could better comprehend the identification of drivers of innovation capability, and the development of innovation processes in SMEs. In addition, the research philosophy and research methodology helped to explain the logic of the research process in identifying knowledge gaps, and to answer the research questions. Statistical analysis was employed to evaluate the validity and reliability of data and test the hypothesis, and to produce generalisable research findings. The research philosophy and research methods are summarised and presented in Figure 4.7 below.

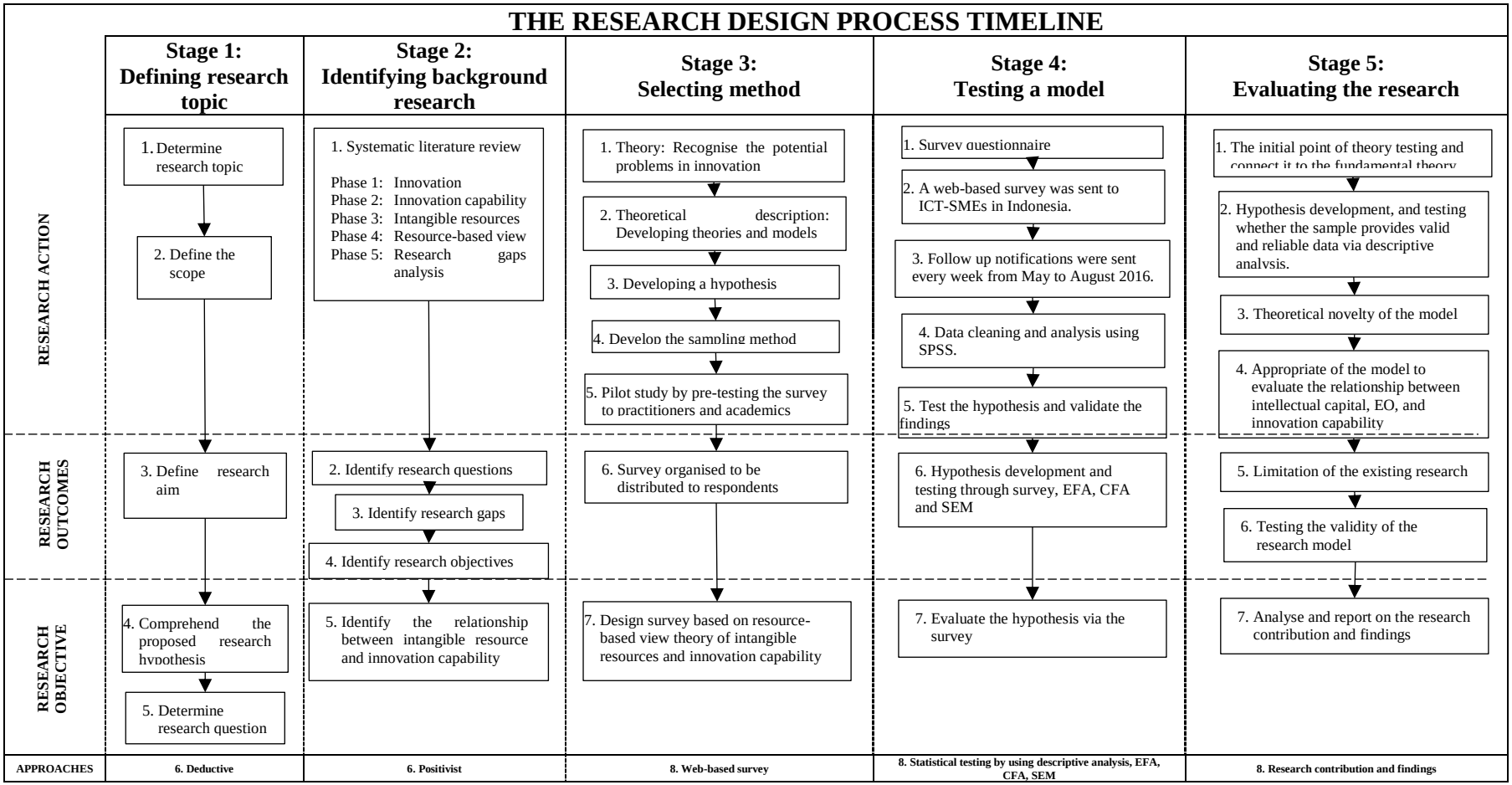


Figure 4. 7 Summary of the research philosophy and research methodology

CHAPTER 5 RESEARCH DESIGN

Focusing on the quantitative research method: survey

- Introduction
- Selecting the appropriate research approach
- Research design
- Quantitative methods: empirical survey study
- Likert scale
- Target population and sampling method
- Context: Indonesia as a developing country
- Data collection
- Pilot study/pre-testing the questionnaire
- Data management, analysis and interpretation
- Structure Equation Modeling (SEM)
- Assessing the questionnaire validity
- Anticipated ethical issues and general considerations
- Conclusion

Next: Chapter 6 - Data Analysis and Result

5.1 Introduction

The previous chapter set out and justified the research philosophy and methodology. This chapter will present the research design. The research design is the overall blueprint for the research activity through which the research question will be answered, guiding the data collection and analysis (Bryman and Bell, 2003; Saunders et al., 2007). Yin (2006) defines the research design as a framework that serves as the logical connection between the research question, data collection method and analysis, and the inferences drawn from the results. The research question, objectives, and the hypothesis of this study are presented in Figure 5.1 below.

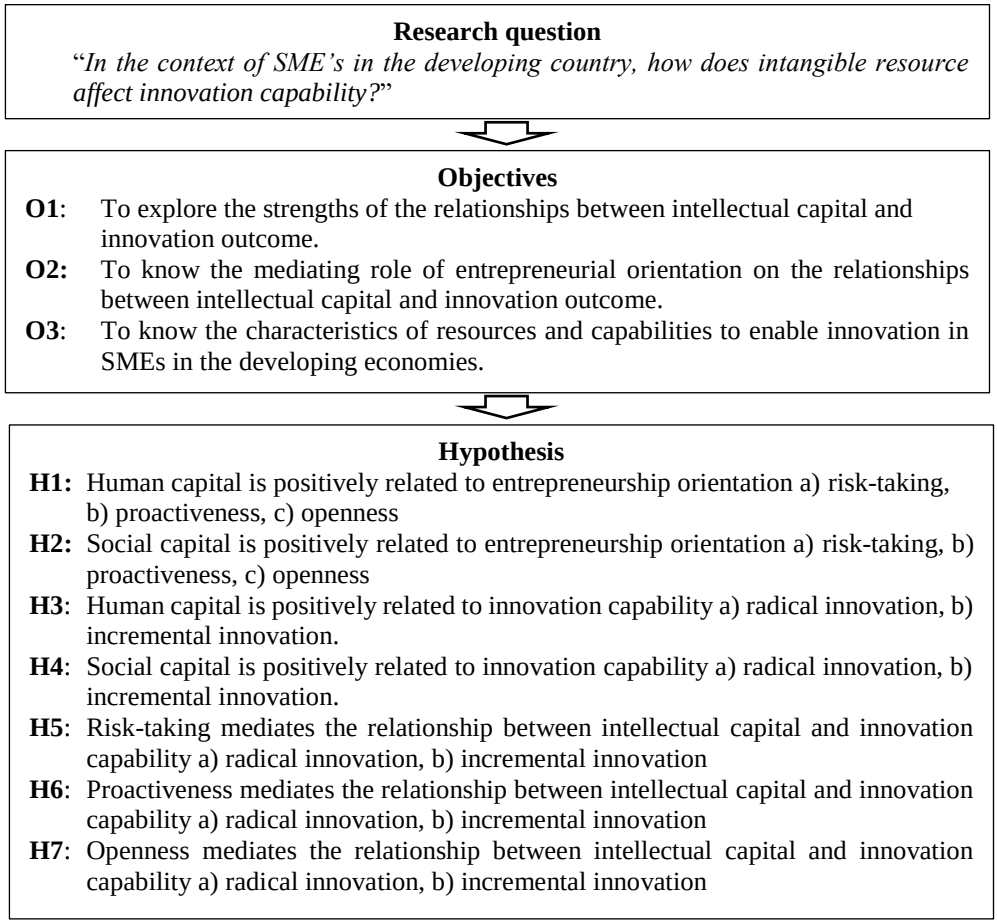


Figure 5. 1 The research question, objectives, and hypothesis

This chapter aims to outline the logic of research design, which comprises the research approach, research strategies, methods, and procedures, and the data collection techniques. As part of the research design process, the data collection and analysis instrument(s) should be determined as appropriate for the research question and objectives, the hypothesis, anticipated results, and the validation of the results (Bryman and Bell, 2003; Saunders et al., 2007; Easterby-Smith et al., 2015).

The initial, and crucial, stage of research design is planning. Planning comprises the selection of the research activities most appropriate to answer the research question and to determine the type of information required (Blumberg et al., 2014). For this research, the researcher utilised quantitative methods, specifically an inferential survey, which is a survey that determine the dependent and independent

variable. This survey identifies the cause and effect of the relationship between variables (Easterby-Smith et al., 2015).

5.2 Selecting the appropriate research approach

Before selecting the appropriate research approach, a researcher should familiarise themselves with the research topic. The quality of research depends on the personal skills of researcher in mastering the chosen topic (Easterby-Smith et al., 2015). Mastering and experiencing the selected topic leads to results that are more convincing and qualified, as an experienced and skilled researcher increases confidence in the research. (Blumberg et al., 2014) also state that researchers who have experience, skill, ability, a good reputation, and personal integrity are guaranteed to produce high quality of research.

The research approach that is selected influences the entire research pathway. It determines the research paradigm, strategies, philosophy, context, methods, and research methodology. Therefore, it is essential to select a research approach that fits the characteristics of the research, and that the methodological approach selected can be justified. Since the researcher has knowledge of, and a background and experience in statistical analysis and statistical software, the quantitative method was chosen for this research. A survey method was used to collect data, and statistical analysis was used to answer the research question and achieve the research objectives presented in Figure 5.1.

5.3 Research design

The research design process includes the development of the research paradigm, theory building, data collection, data analysis, and the thesis report. Research design often follows the pattern shown in Figure 5.2, below.

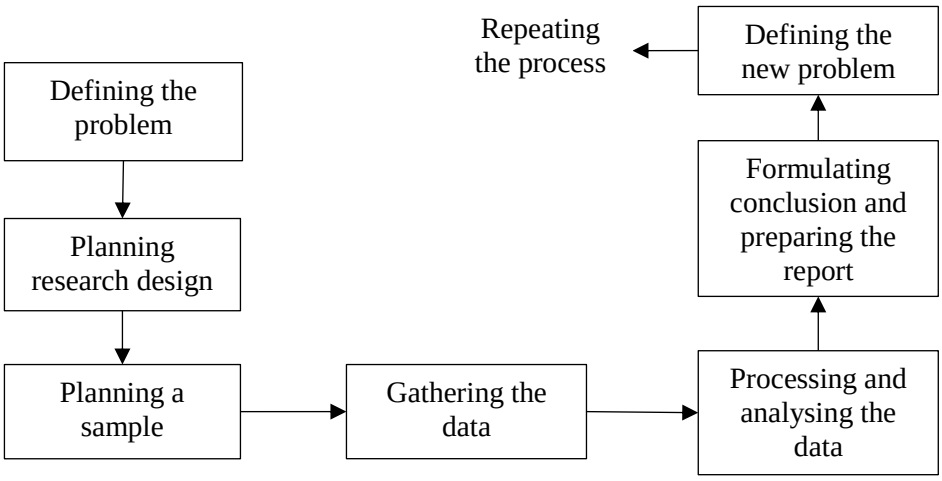


Figure 5. 2The phases of research activity
Adopted from Zikmund (2000)

The present research followed five steps, illustrated in Figure 5.3 below. First, the research process began with the researcher identifying the research topic. This was followed by evaluating previous studies via a systematic literature review. From this, the researcher identified literature gaps, and formulated the research question and objectives. A deductive approach was applied, a method which involves testing theoretical propositions via a specific research strategy, according to the aim of the research (Saunders et al., 2007). The deductive approach derives the inference based on the existing theory. Since the researcher utilise deductive approach, the researcher formulated the hypothesis based on the existing theory. Then, the hypothesis will be evaluated by undertaking the empirical study.

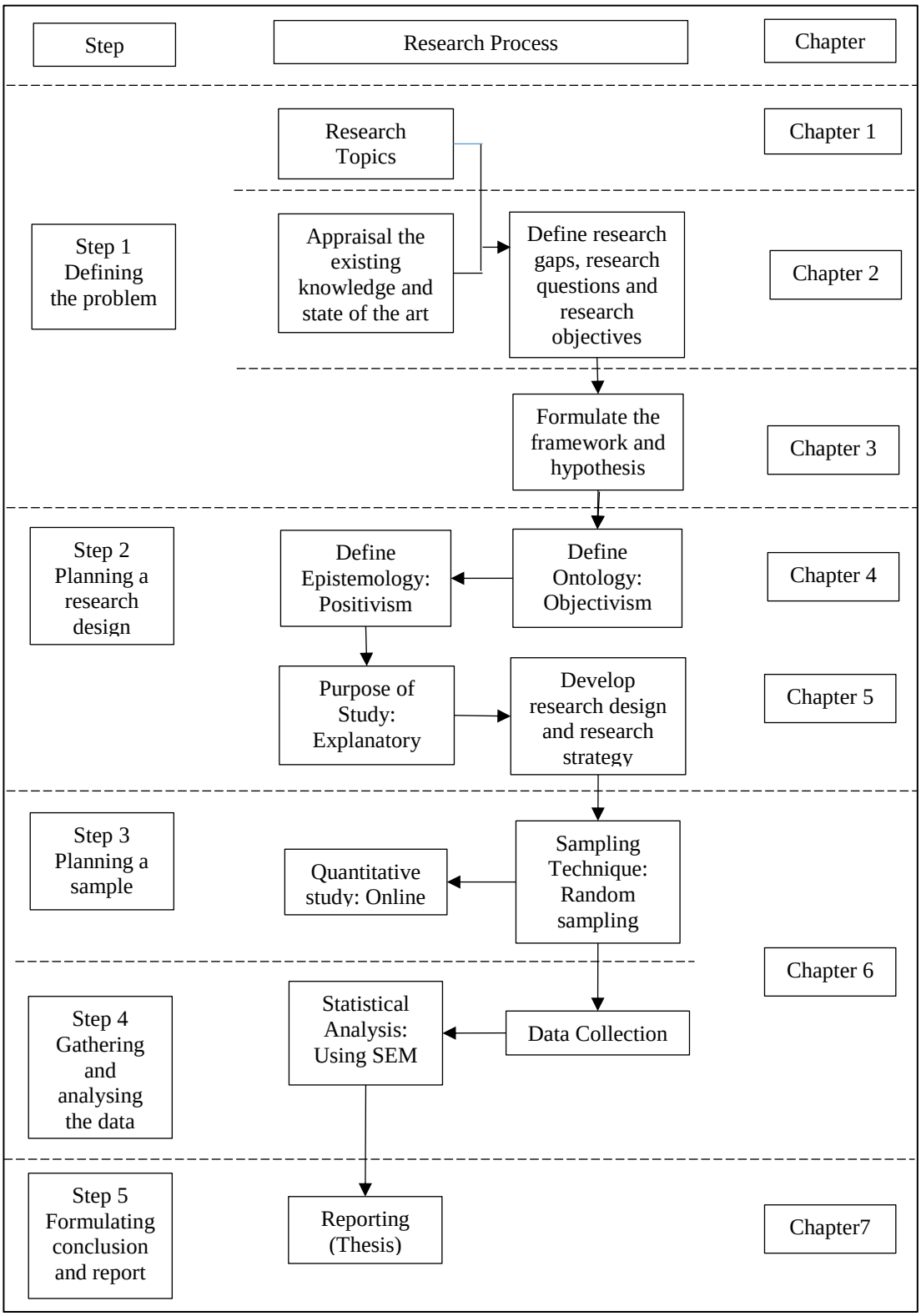


Figure 5. 3 Research Steps
Adapted and modified from Zikmund (2000)

The next step was to plan the research design, which involved determining the research philosophy and research methodology that would guide the research, including the ontological and epistemological stances assumed. Objectivism was the chosen ontological paradigm. “Objectivism is an ontological position that asserts that social entities exist in reality external to, and independent of, social actors concerned with their existence (Saunders et al., 2007). In order to fulfil the research purpose, an explanatory study was conducted to investigate the relationship between variables. Data was gathered via an online survey, and the results were analysed using Structural Equation Modelling (SEM). The findings, discussion and conclusion are reported in the thesis, as the final step in the research process.

5.4 Quantitative methods: empirical study by survey

Creswell (2014) states that, in quantitative research, the researcher utilises existing theory to clarify and analyse the results of their inquiries and hypotheses. Quantitative research uses hypotheses to achieve the aim of the research and can be conducted according to either an experimental design (true experiments and quasi-experiments) or a non-experimental design (survey) (Creswell, 2014).

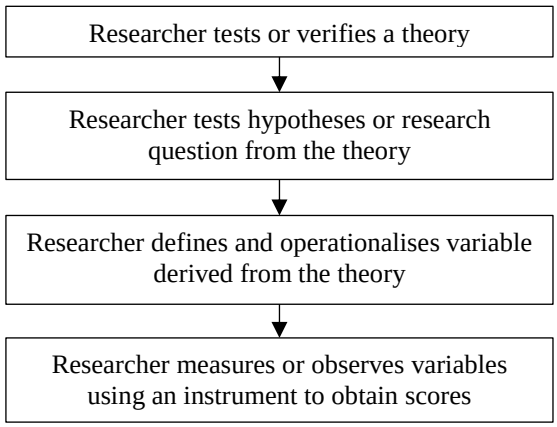


Figure 5. 4 Deductive Approach to Quantitative Research
Adapted from Creswell (2014)

In the quantitative method, theory-building is occurring deductively. The deductive approach is described in Figure 5.4. It requires a hypothesis, model, and research question for the initial step of collecting the data. The quantitative methods comprise survey research and experimental research (Creswell, 2014). This present study is survey research, which uses a questionnaire as the data collection instrument.

5.4.1 Survey methods

The survey is one of the most popular data collection techniques, as it can yield more efficient and effective data, in terms of both time and cost (Zikmund, 2000; Babbie, 2009; Sampe, 2012). The use of surveys allows researchers to investigate many variables in one period, and collect in depth data that provides a picture of the real world. The sample is representative of the population, so the data can also be generalised.

According to Blumberg, Cooper and Schindler (2014), the role of a survey is to provide a set of standardised questions as the instrument to communicate the research purpose and collect data from respondents. Data here refers to sets of information about actualities, notions, knowledge, and facts, and is collected via interaction with people or with secondary data, such as published statistics (Zikmund, 2000; Sampe, 2012). The survey method gathers this data via the completion of questionnaires or phone interviews with respondents, or in the form of public statistical data which is then analysed using statistical techniques (Zikmund, 2000; Babbie, 2009; Sampe, 2012). There are various types of survey; (Zikmund, 2000) summarises the advantages and disadvantages of each, as shown in Table 5.1 below.

The implementation of the survey method can help explain the characteristics of or relationship between variables (Zikmund, 2000; Bryman and Bell, 2003; Saunders et al., 2007; Babbie, 2009; Easterby-Smith et al., 2015). Furthermore, online surveys can be utilised to gather data faster, easier, and more cheaply. For this study, this method was employed to analyse the relationship between intellectual capital and

innovation outcome. The researcher identified managers, CEOs, and owners of SMEs as respondents, due to their level of knowledge regarding their company.

Table 5. 1 Advantages and Disadvantages of Typical Survey Methods

Adapted from Zikmund (2000)

Elements	Door-to-door interviews	High-traffic location personal interview	Telephone interview	Mail survey	Internet
Speed of data collection	Moderate to fast	Fast	Very fast	Slow, researcher has no control over return of questionnaire	Instantaneous
Geographic flexibility	Limited to moderate	Confined, possible urban bias	High	High	High (worldwide)
Respondent cooperation	Excellent	Moderate to low	Good	Moderate: a poorly designed questionnaire will have a low response rate	Varies depending on the website used; high from consumer panels
Questionnaire length	Long	Moderate to long	Moderate	Varies depending on incentive	Moderate: length customised according to answers
Item non-response rate	Low	Medium	Medium	High	Software can minimise
Possibility for respondent misunderstanding	Low	Low	Average	High: no interviewer present for clarification	High
Degree of interviewer influence on answers	High	High	Moderate	None: interviewer absent	None
Ease of call-back or follow-up	Difficult	Difficult	Easy	Easy, but time-consuming	Difficult, unless e-mail address is known
Cost	Highest	Moderate to high	Low to moderate	Lowest	Low
Special features	Visual materials may be shown or demonstrated; extended probing possible	Viewing of video materials possible	Simplified fieldwork and supervision of data collection; quite adaptable to computer technology	Respondent may answer questions at own convenience; has time to reflect on answers	Streaming media allow graphics and animation

5.4.2 Source of quantitative data: Web-based survey

The most effective and efficient way to collect data is by using a web-based survey (Easterby-Smith et al., 2015). This is due to the simple and fast way in which the data can be spread and controlled. For this study, Qualtrics was utilised as the web-based survey instrument for data collection. This was chosen for two reasons; first, the salient progressive function of the internet and role of digital technologies in people's

daily activities is increasing (Pénard et al., 2013). Second, the unit analysis in this research is ICT SMEs, which mostly employ the internet and digital technologies in their business activities and operations.

The key benefit offered by Qualtrics is the ability to conduct a descriptive analysis of the data gathered. Qualtrics can be exported to SPSS and Excel, to be analysed in advanced level of statistical analysis. However, the drawbacks of this tool are the slow response time from the respondents and the possibility of technical issues, for example, the respondent skipping questions due to lack of understanding.

Before providing the questionnaire via the web-based survey, the researcher must first design the questionnaire, as shown in Figure 5.5. Qualtrics provides an interactive tool for the researcher, which includes pop-up guidelines for building the questionnaire (Easterby-Smith et al., 2012). In order to overcome the possibility of the respondents skipping questions, Qualtrics includes an option to prevent respondents from ignoring a question, where an alert is triggered if the respondent has not answered a question. However, Qualtrics is flexible in allowing respondent to postpone an answer and complete it at a later point, for example if they are too busy to answer sufficiently or are confused by the question.

Every two weeks, the researcher evaluated the data collection statistics, and sent reminders to respondents who had not completed their answers. At the end of questionnaire, the researcher asked for the respondents' email addresses, in order to be able to keep in touch with the respondents.

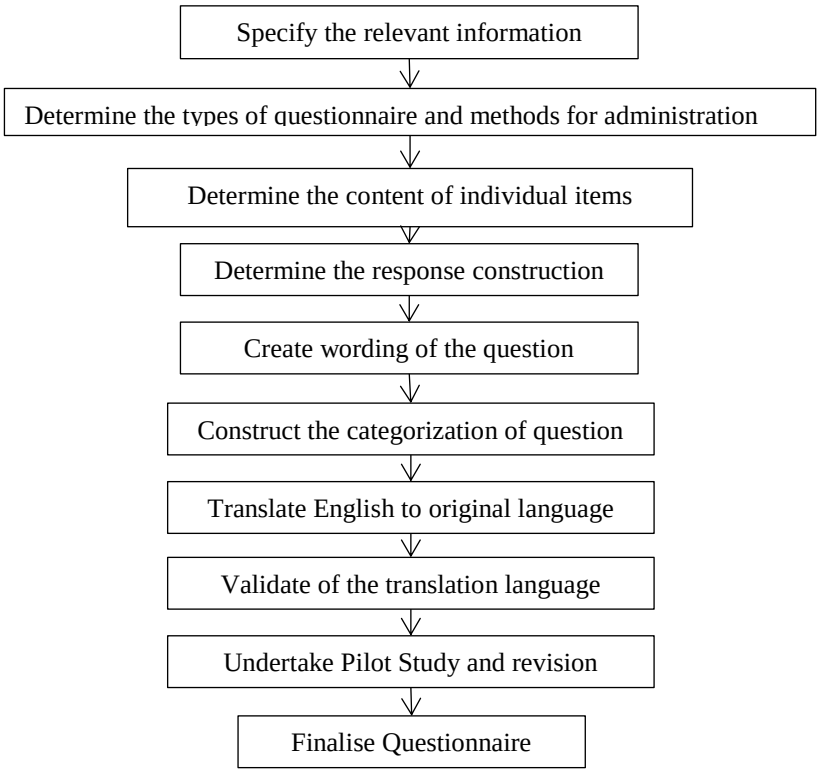


Figure 5. 5 The questionnaire design
Adopted from Patel and Joseph (2016)

5.4.2.1 Specify the relevant information

The first step in designing a questionnaire is to specify the information that is sought, which should be relevant to the research objective (Seymour, 2012). Seymour (2012) explains that the questionnaire is related to the topic if the information collected is requisite and important. In order to achieve this, the researcher should produce a list of important information that is compatible with the research objective before creating the questionnaire (Seymour, 2012).

The objective of this research is to understand the relationship between intellectual capital and EO, which impacts on firm innovation. To achieve this, it was necessary to investigate intellectual capital (human capital and social capital); entrepreneurial orientation (risk-taking, proactiveness and openness); and the

radicalness of innovation (radical and incremental innovation) in ICT-SMEs. In addition to this, the researcher used secondary data obtained from the Central Bureau of Statistics (CBS/BPS) to inform the research.

5.4.2.2 Determine the types of questionnaire and methods that can be used

According to Bryman and Bell (2003), the web-based survey is a type of self-administered questionnaire. There are some benefits and drawbacks to using web-based surveys, as shown in Table 5.2 below.

Table 5. 2 The benefits and drawbacks of web-based survey

Benefits	Source	Drawbacks	Source
● Good visualisation because of interactive graphical interface	(Bakry, 2013)	● Limited by Internet access	(Bakry, 2013; Chang and Vowles, 2013)
● Time efficient and flexible	(Chang and Vowles, 2013; Easterby-Smith et al., 2012)	● Ethical and legal concerns	(Chang and Vowles, 2013)
● Reduced data errors, reduction of bias	(Bakry, 2013)	● Selection/sampling bias	(Chang and Vowles, 2013)
● Can determine user location, domain name and internet address	(Bakry, 2013)	● Risk of inadequate response rates	(Chang and Vowles, 2013)
● Enables fast or direct follow-up	(Chang and Vowles, 2013)	● Competition to reach target populations	(Bakry, 2013; Chang and Vowles, 2013)
● Cost and time effective	(Bakry, 2013; Chang and Vowles, 2013)	● Literacy and disability issues, such as language barriers	(Bakry, 2013)
● No geographical barrier	(Chang and Vowles, 2013)	● Truthfulness anxieties	(Chang and Vowles, 2013)

Qualtrics provides a questionnaire template, which can facilitate and simplify the process of constructing the questionnaire for the researcher. Qualtrics also supports the researcher in organising and managing the questionnaire in a systematic way, and in conducting the descriptive analysis. The researcher also can set a period time for the questionnaire to be active for, and Qualtrics will close the questionnaire when that time expires.

The questionnaire used in this study involved both open-ended and closed-ended questions. An open-ended question is a question to which the respondents can determine their own response and is not restricted by a list of possible answers (Bryman and Bell, 2003). For example, open-ended questions were employed to ask about the revenue, age, and size of the companies the respondents represented. On the other hand, closed-ended questions provide the fixed alternative answers, from which the respondents choose the answer that best reflects their view (Bryman and Bell, 2003). This type of question was used to explore the issues of human capital, social capital, risk-taking, proactiveness, openness, radical innovation, and incremental innovation.

5.4.2.3 Determine content of individual items

In this research, the researcher sought to investigate the intellectual capital, as an intangible resource; the mediating element, namely entrepreneurial orientation; and innovation outcomes, radical innovation and incremental innovation. The researcher utilised multi-form questions to arrange the interval data, which is applied in the reliability analysis by Likert scale. Table 5.3 below explains the questionnaire format suggested by Allison et al. (1996).

Table 5. 3 Questionnaire format

Adapted from Allison et al. (1996)

Questions	Types of Questions
Human capital, social capital, risk taking, proactiveness, openness, radical innovation, incremental innovation.	**Closed Questions:** The respondent is encouraged to indicate their answer by ticking the boxes provided in the questionnaires. The respondent is able to choose a point on a scale, based on the Likert scale approach (Likert, 1961).
Company's age and Company's Size	**Open Questions:** *The experience of the company and the number of employees* The respondent could answer the question without being restricted by a structured question format. An essay type format was enabled, so that the respondent could answer the questions freely. The space allowed for essay responses was unlimited, so that the respondents could write a full answer.

5.4.2.4 Determine the sequence of question

After selecting the web-based survey instrument, the next step was to arrange the questionnaire in the web-based survey instrument. The researcher followed the principles below to develop the web-based survey for this research, as shown in Table 5.4.

Table 5. 4 Principles for constructing web-based surveys

Adapted from Dilman (2000)

Principles	In this survey
Principle 1: Provide an introduction to the questionnaire in the web-based survey with a welcome screen that is motivational, emphasises the ease of responding, and instructs respondents on the action needed to proceed to the next page.	▪ *In the first page of the questionnaire, the name of the survey was provided as well as an introduction letter that included the name of the researcher, the name of the university, the purpose of the survey, the different sections of the survey, instructions for completion, and the time required to complete the survey.*
Principle 2: The initial question in the web-based survey should be clearly presented on the first screen of the questionnaire and must be attractive and easily answered by respondents.	▪ *The questions began on page 2, for two reasons. First, page one was the introduction to and the instructions for the questionnaire. Second, the questionnaire employed bilingual language (Indonesian and English), which required more space.*
Principle 3: Present each question in a conventional format similar to that normally used on paper questionnaires.	▪ *At least two questions per page were presented in the same format as paper questionnaires.*
Principle 4: There should be appropriate contrast with a colour background, and the layout of the questionnaire should fit the screen and be readable.	▪ *The questionnaire used the Qualtrics template with a white colour background and black for the text. At least two questions per page were given, which fit the screen. Therefore, respondents did not need to scroll down to see all the questions.*
Principle 5: Achieve a consistent visual appearance, such as font size, theme, and screen configuration.	▪ *The Qualtrics template features a consistent font and screen configuration.*
Principle 6: Present detailed instructions about the action needed to respond to the question, and any additional instruction required.	▪ *In the questionnaire, multiple choice and essay-based questions were asked. Every question included an instruction that allowed respondent to click, rank or write their response, depending on the type of question. There was also a 'back' and 'next' instruction at the end of each question that allowed respondents to return to the previous question or move forward.*
Principle 7: Prevent the respondent from ignoring (without answering) a question before moving on to the next question.	▪ *Qualtrics can trigger an alert to avoid non-response to questions. The questions on each page must be completed before moving to the next page, or the alert pops up.*
Principle 8: Construct the questionnaires in the web-based survey so that they scroll from question to question, unless order effects are a major concern.	▪ *The online questionnaires were managed via Qualtrics.*
Principle 9: When the number of answer options exceeds the number that can be displayed on one screen, consider double banking with appropriate navigational instructions added.	▪ *The Qualtrics application managed the entire process of creating the questionnaire. It was possible to modify and arrange the settings of the questionnaire as appropriate and according to the researcher's preferences.*

5.5 Likert Scale

The Likert scale is implemented in the fields of social science, management, health, psychology and other disciplines (Awang et al., 2015), and is used to measure the respondent's level of agreement with a specific statement. The Likert scale can be used to measure the specified items via a five-point, seven-point, or more points scale (Subramaniam and Youndt, 2005; Dawes, 2008; Jaakkola et al., 2010). There is almost no difference in terms of the mean and variance between utilising a five-, seven-, or eleven-point scales (Dawes, 2008). For the closed-ended question, the researcher used a Likert scale to measure the agreement of the respondent. For all multiple-choice questions, theresearcher utilised seven score of the options, i.e. 1 – Strongly disagree • 2 – Disagree • 3 – Somewhat disagree • 4 – Neutral • 5 – Somewhat agree • 6 – Agree • 7 – Strongly agree.

Patel and Joseph (2016) explain that the advantage of using a Likert scale is that it simplifies the construction and analysis of a measurement scale. It also helps the respondent to better comprehend the questionnaire (Patel and Joseph, 2016). However, the disadvantage of using a Likert scale is that it takes the respondents more time to complete the questionnaire.

The questionnaire used in this research comprised of four sections: Section A - Learning Orientation, Culture, and Strategy Orientation; Section B - Technology Orientation; Section C - Innovativeness Orientation; Section D - Performance and Company Profile. Some of the questions were not specifically relevant to the research. Since the questionnaire was developed to analyse the relationship between intellectual capital, entrepreneurial orientation, and innovation capability, only relevant questions were included. A full list of the questionnaire items related to the research purpose is provided below in Table 5.5.

Table 5. 5 Questionnaires sources and dimension scales

Q1	**Human Capital**	**Scales**
Individual decision-making and problem-solving skills and ability. Hahn et al., (2015); Marsick and E.Watkins, (2003).		
HC9	In my company, people identify the skills they need for future work tasks.	1 (Strongly disagree) to 7 (Strongly agree)
HC10	In my company, people view problems in their work as an opportunity to learn.	
Q2	**Social Capital**	**Scales**
The collaboration between divisions; the professionalism and the loyalty of the employees; and the degree of communication between employees. Calantone et al. (2002); Camps and Marques, (2014).		
SC2	There is total agreement on this company's vision across all levels, functions, and divisions.	1 (Strongly disagree) to 7 (Strongly agree)
SC3	All employees are committed to the goals of this company.	
SC4	Employees view themselves as partners in charting the direction of the company.	
Q3	**Risk Taking**	**Scales**
Risky resource commitments and risk-taking strategy. Eggers et al. (2014); (Lumpkin and Dess, 1996, 2001); Ruvio et al. (2014).		
RT2	This company encourages innovative strategies, knowing well that some will fail.	1 (Strongly disagree) to 7 (Strongly agree)
RT3	This company does not like to "play it safe".	
RT4	This company likes to take big risks.	
Q4	**Proactiveness**	**Scales**
The firm anticipates future needs. Eggers et al. (2014); (Lumpkin and Dess, 1996, 2001); Ruvio et al. (2014).		
PR1	Managers are constantly seeking new opportunities for the company.	1 (Strongly disagree) to 7 (Strongly agree)
PR2	Managers take the initiative to shape the environment to the company's advantage.	
PR3	Managers are often the first to introduce new services.	
PR4	Managers usually take the initiative by introducing new administrative techniques.	
Q5	**Openness**	**Scales**
Open-mindedness in learning; behaviour in questioning long-held routines, assumptions, and beliefs. Eggers et al. (2014); (Lumpkin and Dess, 1996, 2001); Ruvio et al. (2014); Sinkula et al. (1997).		
OP4	This company is always moving toward the development of new answers.	1 (Strongly disagree) to7 (Strongly agree)
OP5	This company is open and responsive to change.	
OP6	This company's manager is always searching for fresh, new ways of looking at problems.	
Q6	**Radical Innovation**	**Scales**
New knowledge of the process, technology, and managerial innovation. Bakry, (2013); Yamakawa et al., (2011).		
RI8	Learned product development skills and processes entirely new to the company.	1 (Strongly disagree) to 7 (Strongly agree)
RI9	Acquired entirely new managerial and organisational skills that are important for innovation	

Table 5.5 Continued

Q7	Incremental Innovation	Scales
Sustaining knowledge and skill of process, technology, and managerial innovation; maintaining the customers' satisfaction, and taking care of the existing customer. Bakry, (2013); Yamakawa et al., (2011).		
II4	Constantly surveys existing customers' satisfaction.	1 (Strongly disagree) to 7 (Strongly agree)
II5	Fine-tunes what it offers to keep its current customers satisfied.	
II6	Upgraded skills in product development processes in which the company already possesses significant experience.	
Q8	**Firm Size**	
FS1	0-5	
FS2	6-50	
FS3	51-150	
FS4	151-250	
Q9	**Firms Age**	
FA1	1-3 years	
FA2	4-6 years	
FA3	7-10 years	
FA4	10 years and above	
Sources: (Gong et al., 2013; Laforet, 2013; Uhlaner et al., 2013).		

5.6 Target population and sampling design

This section will discuss the sampling design strategy and the method of collecting the data. In the first stage, the researcher constructed a sampling frame that detailed the eligible respondents (Easterby-Smith et al., 2015). The questionnaire was designed for and aimed at the managers, CEOs, owners, and directors of ICT-SMEs, which constitutes the target population of this research. This unit of analysis was selected as these respondents were deemed to be the most knowledgeable of the issues under study. Selecting appropriate respondents is essential to attain a representative sample and elicit valid responses. In the second stage, the researcher validated the questionnaire responses. The valid, eligible responses constitute the sample, which is taken to be representative of the wider population as the larger unit of analysis.

In research, the 'population' is defined as the large units or groups of entities from which a researcher intends to draw inferences about the entities, phenomena, and

cause and effect relationship under study (Allison et al., 1996; Bryman and Bell, 2003; Easterby-Smith et al., 2015). Easterby-Smith et al. (2012) describe the sample as the subset that represents the population and explain that evidence collected from the sample is important to justify the inference that is made about the larger population.

Sampling design provides a way to select a valid and representative sample that can be used to describe the larger population. In quantitative research, the use of sampling design is important, as the rule of thumb of gathering the data in the survey process. The sample size and sampling proportion should be representative and precise in order to obtain a trustworthy sample (Easterby-Smith et al., 2015). 'Representative' in sampling refers to how accurately the sample characteristics reflect those of the population (Easterby-Smith et al., 2012).

In this research, the researcher applied systematic random sampling, which is dependent on a sampling list of the area or unit population. In this case, the sample was selected from ICT-SMEs in Indonesia.

5.6.1 Small and medium-sized enterprises in the sector of Information and Communication Technology (ICT-SME)

Small and medium-sized enterprises (SMEs) is an essential sector in developing countries such as Indonesia. SMEs in Indonesia comprise micro companies, which have less than five employees, small companies, with between 5 and 19 employees, medium-size companies, between 20 and 99 employees; and large companies, with a hundred and more employees (Indonesia, 2016). In Indonesia, SMEs account for 97% of labour absorption.

The last two decades have seen the exploitation of information and communication technology (ICT) in the digital economy (Cardona et al., 2013). According to Cardona et al. (2013), ICT is a form of capital good that has a strong association with innovation in and the re-engineering of processes. The International Standard Industrial Classification of All Economic Activities (ISIC) defines ICT economic industries as follows: "The production (goods and services) of a candidate

industry must primarily be intended to fulfil or enable the function of information processing and communication by electronic means, including transmission and display". In the ISIC, the ICT sector is divided into ICT manufacturing industries, ICT trade industries, and ICT services industries. Each sector has a code number, which is referenced in the questionnaire used in this research to indicate the different company identification categories.

The ICT sector is characterised by fast-changing technology and innovation (Grillitsch et al., 2015). In Indonesia, the ICT sector has increasingly contributed to value-added, as mentioned in the appendix of the 2012 Science and Engineering Indicators (Board, 2012). Indonesia's value-added gradually increased from 18,666 in 2008 to 28,190 in 2010. The value-added trends in eight Asian countries (India, Indonesia, Malaysia, Philippines, Singapore, South Korea, Taiwan and Thailand) are illustrated in Figure 5.6 below.

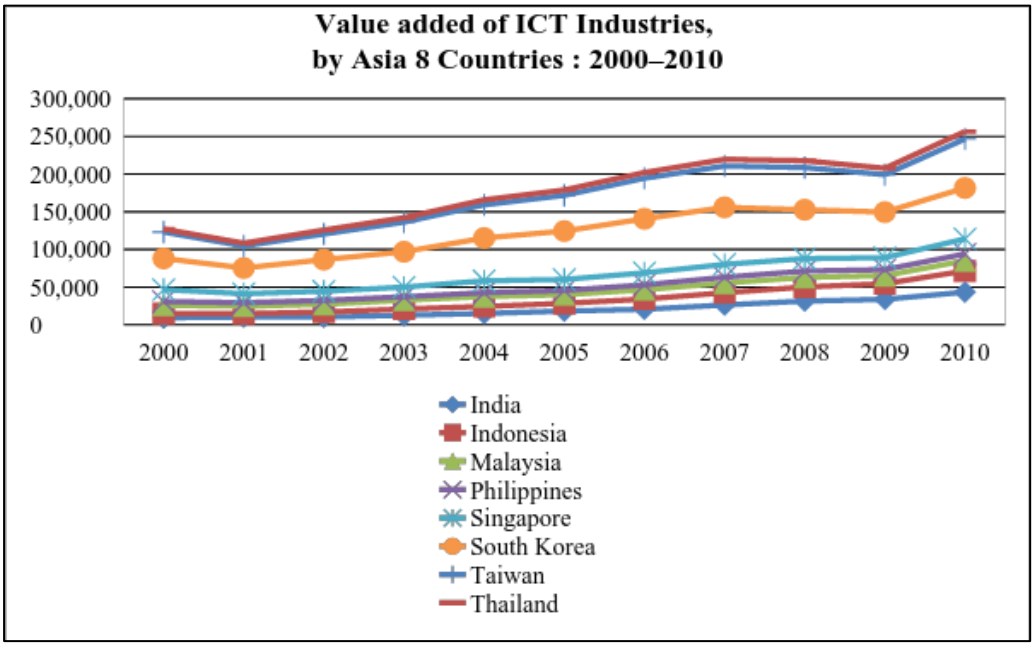


Figure 5. 6 Value-added in ICT industries, eight Asian countries: 2000–2010
Adapted from (Board, 2012)

Previous researcher have identified rapid growth in the ICT sector (Dhewanto et al., 2012). Figure 5.4 also shows that the trend of value-added in ICT industries in Indonesia is gradually increasing.

In some countries, promoting ICT is one way of achieving GDP growth. This is because ICT can support the manufacturing and marketing process (Cornell-University et al., 2015). The information and communication in the digital era spur the utilisation ICT product in all field. The Global Innovation Index also references ICT as an innovation indicator that is measured for each country. According to the International Telecommunication Union, ICT as an innovation indicator can be measured in reference to four points. First, the ICT access index, which is a combined index of ICT indicators including fixed telephone lines, mobile cellular telephone subscriptions, international internet bandwidth (bit/s), and percentage of households with internet access (Cornell-University et al., 2015). Second, the ICT use index, which is measured according to: (1) utilisation of the internet; (2) fixed (wired)-broadband internet; (3) active mobile-broadband (Cornell-University et al., 2015). Third, the government's online service development, including the provision of

information, policy, public service, transactional service, and telecommunication infrastructure (Cornell-University et al., 2015). Fourth, the E-participation index, which indicates the deployment and benefit of internet facilitation provided by the government (Cornell-University et al., 2015).

According to Tödtling and Grillitsch (2015), knowledge based on ICT innovation provides a company with competitive advantage. In the ICT sector, the importance of technology (Zahra et al., 2000), knowledge, process innovation, and organisational innovation causes enhanced innovation outcome (Tödtling and Grillitsch, 2015).

5.6.2 Sampling Frame

According to Nations (2013), the ICT industry is an industry that generates and distributes information and cultural product, and supplies the means to transfer or distribute ICT products. In this study, ICT-SMEs are classified based on the International Standard Industry Classification (ISIC 4). The UN developed the ISIC coding system as the international standard for grouping industry actors according to their activities. As well as, Institution of Statistics Indonesia refers this code as the industrial classification. The benefit in using ISIC code is to clarify the classification of industry regarding the sort of business, and the type of product explores (Nations, 2013). In addition, the Institution of Statistics Indonesia uses the ISIC codes to classify industries according to type of business and product (Nations, 2013). The cluster of ICT SMEs based on ISIC code is as follow.

- 58- Book, software, newspaper, journal, mailing list publishing activities
- 59- Motion picture, video and television programme production, sound recording and music publishing activities
- 60- Radio broadcasting, television programming, and other broadcasting activities
- 61-Telecommunication

- 62- Computer programming, consultancy, and related activities
- 63- Information service activities

5.7 Context: Indonesia as developing country

Innovation in a developing country is challenging due to the inadequate infrastructure, deficient product, weaker capital capability and labour market, inadequate education system, and regulation that is ineffective in promoting innovation (Cornell-University et al., 2015). In addition, innovation in developing countries tends to pursue incremental innovation rather than radical innovation. According to (Cornell-University et al., 2015), innovation can solve a variety of problems, such as pollution, health issues, poverty, and unemployment. Therefore, developing countries should invest more in innovation, encourage technology adoption, and should seek governmental stimulation to promote these activities.

The Global Innovation Index (GII) 2015 ranks developed and developing countries based on their innovation input (institutions, human capital, and infrastructure) and innovation output (knowledge and creative output). Within this framework, Indonesia achieves an overall score of 29.79, ranking 97th out of 141 countries. In the Global Entrepreneurship Index (GEI), Indonesia receives just 21.1 points, ranking 90th out of 137 countries. In 2016, Indonesia achieves ranking 88th out of 128 countries. Table 5.6 shows the total GII and GEI scores for the seven Asian countries (India, Indonesia, Malaysia, Philippines, Singapore, South Korea, and Thailand).

Table 5. 6 GII and GEI scores and rankings for seven Asian countries

Adapted from University, INSEAD and WIPO (2015) and Ács et al. (2017)

Country	GII Score	Rank	GEI Score	Rank	Income
India	31.74	81	25.8	69	Lower middle income
Indonesia	29.79	97	21.2	90	Lower middle income
Malaysia	45.98	32	33.4	54	Upper middle income
Philippines	31.05	83	24.1	76	Lower middle income
Singapore	59.36	7	52.2	24	High income
Korea	56.26	14	50.5	27	High income
Thailand	38.10	55	27.1	65	Upper middle income

From the Table 5.6, it can be seen that the GII score for Indonesia is the lowest among the seven Asian countries. The same is true for its GEI scores and ranking. This indicates that Indonesia's innovation and entrepreneurship abilities are weak in comparison to the other Asian countries.

5.7.1 Study sample population: Indonesia

The list of ICT-SMEs companies was gathered from ICT groups on Facebook and LinkedIn. The researcher also searched the data of the Central Bureau of Statistics (CBS/BPS) in Indonesia, which provides a general overview of industry in the country and divides it into several sectors, of which ICT is one, and classifies companies into big, medium, small, and micro companies. According to the Central Bureau of Statistics (CBS/BPS) in Indonesia, the total number of SMEs was 3,668,873 in 2015.

Since Indonesia is an archipelago country with 34 provinces, the researcher clustered the data according to island. This resulted in seven clusters: Sumatra, Java, Bali and Nusa Tenggara, Kalimantan, Sulawesi, Maluku, and Papua. In terms of the total index of production, according to the Central Bureau of Statistics (CBS/BPS), Sumatra has the highest index, at 25.82%. Sulawesi, Java, Kalimantan, Bali and Nusa Tenggara, Maluku, and Papua followed, with 18.97%, 18.08%, 14.37%, 8.38%, 8.28%, and 6.12% respectively.

Figure 5. 7 The sources of SME databases

5.8 Data collection

The sample unit chosen is from ICT-SME's. The survey is undertaken by is the web-based survey, i.e. Qualtrics. Approximately, the duration in fulfilling the questionnaire is 20 to 30 minutes. All respondents were contacted and followed up with via email, or a private message on Facebook or LinkedIn to confirm their willingness to participate, to answer any queries, and verify that the company they represented was ICT-SMEs. However, the researchers could not follow up with respondents who were not willing to provide their email address.

5.8.1 Response rate

To reach a broader range of respondents, the social media sites such as Facebook and LinkedIn were utilised. The questionnaires were distributed to the managers, CEOs, directors, and owners of ICT-SMEs in Indonesia in two ways. First, via a private message invitation on LinkedIn; 114 invitations were sent via LinkedIn, which produced 21 participants. Second, via Facebook, where the researcher sent an

anonymous link created by Qualtrics to a Facebook group for ICT-SMEs, namely the 'SUWEC' group. The group has 5,523 members, and 522 members responded to the questionnaire. However, 55 respondents only partially completed the questionnaire. In total, 276 respondents met the inclusion criteria; the other respondents were not eligible as they were not managers, CEOs, directors, or owners of ICT-SMEs. The total number of completed and usable surveys that could be analysed for this research was 297. The survey questions is using bilingual language (Indonesia and English). It is because as the first language of the country is Indonesian and only a few people can communicate in English.

Table 5. 7 Representativeness in sampling

Representative	**Criteria**			
Objectives	The objective of this research is to understand the extent to which intellectual capital (human capital and social capital) and entrepreneurial orientation (risk-taking, proactiveness and openness) affect the innovation capability (radical and incremental innovation) of ICT-SMEs in Indonesia.			
Unit of analysis	A sample size of 297 respondents representing ICT-SMEs in Indonesia.			
Response rate	***Sent***	***Received***	***Relevant respondent***	***Percentage***
Indonesia	2000	636	297	46.66%
SME definition	According to the Central Bureau of Statistics (CBS/BPS) in Indonesia (Kartiwi, 2006; Janita and Chong, 2013): Medium: 20 to 99 employees with a turnover between > £30,539 and £610,799 (>IDR 500 Million to 10 Billion excluding land and buildings) Small: 5 to 19 employees with a turnover between £3,053.9 and £30,539 (IDR 50 Million to 500 Million excluding land and buildings) Micro: < 5 employees with a turnover of < £3,053.9 (<IDR 50 Million)			
Included in the study	Respondents: the manager/CEO/ director/owner. Focus on SMEs in the developing country (Indonesia) Criteria: ICT-SMEs according to ISIC code			
Excluded from the study	People: general workers, casual staff, new-recruits, and part-timers. Criteria: Big companies with more than 250 employees; other fields such as food, mining, and construction.			
Distribution method	Anonymous link distributed to ICT-SMEs groups on Facebook, a personal message via LinkedIn, and personal message on Facebook.			
Language	Use of two languages (Indonesian and English) as the first language of the country is Indonesian, and few people are familiar with the English language.			

5.8.2 Method of survey delivery and follow up

At the start of the questionnaire, the researcher explained the purpose of the study, assured respondents that their anonymity would be protected, and data kept confidential. The researcher monitored the responses using Qualtrics data and analysis to determine the number of completed and partial responses. The researcher set up an automatic reminder email to be sent every two weeks in order to attain more completed questionnaires. In cases where respondents did not understand question, the researcher provided assistance via Facebook Messenger and email. Monitoring and follow up via an email alert can help to increase the number of responses (Kittleson, 1997). Obtaining a high number of response is important (Easterby-Smith et al., 2015) in order to meet the minimum sample size and thereby produce good quality research.

The researcher attained to contact the respondents from the Group of ICT in Indonesia by Facebook and LinkedIn. The researcher sent an anonymous link created by Qualtrics to the personal message inbox of every member of the ICT groups on Facebook and LinkedIn, and also posted it to the group's wall on Facebook. The survey distribution process is illustrated in Figure 5.8 below.

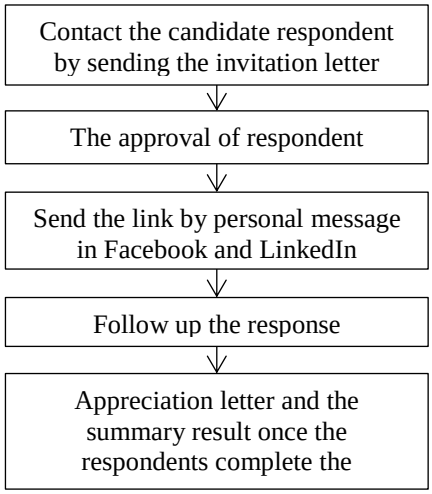


Figure 5. 8 Survey distribution process

The challenge in this process was that respondents might be unwilling to answer the questionnaire because the question was too confidential, too long, and too difficult. Therefore, the researcher sought to persuade respondents to answer the questions by assuring of them that their data would be kept confidential and provide the result at the end of research. According to Easterby-Smith, Thorpe and Jackson (2015), there are certain steps that can be taken to increase survey response rate, which are:

(1) Make the questions understandable and simple.

(2) Present the clear purpose of the research, so the respondent can consider the benefit of completing the questionnaire.

(3) Provide incentives for participating in the survey. In the present research, the researcher provided an appreciation letter and summary of the research results.

(4) Give assurance of confidentiality and anonymity. In the current research, the researcher guaranteed that personal identity would not be revealed, and that the data would be used only for academic purposes, and only the aggregate of all data would be published.

(5). Send out a reminder. In this research, a reminder was sent via email every two weeks.

5.9 Pilot study/pre-testing the questionnaires

Before a questionnaire is distributed, a pilot study or pre-testing of the questionnaire should be conducted. The pilot study is the final step in the questionnaire design process (Giuseppe Iarossi, 2006), and involves refining the questionnaire to ensure it is understandable to the respondents (Saunders et al., 2007). This testing is necessary to validate and enhance the quality of the research instrument by improving the questions, format, and scales (Creswell, 2014). Pilot testing is also important to revise the questions from an expert point of view. According to (Giuseppe Iarossi, 2006), a researcher might conduct a pilot study for three reasons:

(1) To assess the sufficiency of the instrument;
(2) To predict the length of the instrument;
(3) To evaluate the ability of the researcher.

In this research, the researcher completed a pilot study by asking for the recommendations of and feedback from experts. The researcher identified experts' academics and practitioners who specialised in the fields of human resources, innovation, and entrepreneurship. This included eight academics and two practitioners, from Indonesia and the UK. The researcher chose to receive feedback from experts in both countries since two languages were used (Indonesian and English) in the questionnaire. For the Indonesian experts, it was necessary to ensure that they were bilingual in the relevant languages. Some of the feedback received from the experts is presented in Table 5.8 below.

Table 5. 8 Pilot study results

No	Summary of comments received	Respondent (A: Academic; P: Practitioner)
1	Clarify some specific terminology and the consistency of the terms	A1; A2; P3; A8.
2	Clarify the research questions making concise and precise; length of the survey	P1; A2; A4; A6
3	Repetitive questions	A3; A7.
4	Some questions request confidential information such as company profile	P1; P2.
5	Grammatical errors in English	A2; A3; A4; A5; A7; P3;

Notes: (1) A1; A2; A3; A4; A5; A6; A7; A8: Academicians;
(2) P1; P2; P3: Practitioners**.**

5.10 Data management, analysis and interpretation

This research followed four key procedures for managing the data: coding, editing, electronic data entry, and data cleaning. After data has been gathered, it should be cleaned by data cleaning or scrubbing. In this process, the researcher should detect and correct the missing data or uncompleted data. For example, respondent A did not answer question 1. Even though, respondent A answer all questions except question 1, the researcher cannot use the data of respondent A. It is categorised as missing data or uncompleted data. Missing data increases the opportunity for data error (Hair et al., 2010; Khedhaouria et al., 2015).

5.10.1 Statistical Analysis

Statistical analysis comprises the descriptive analysis from the data collection and hypothesis analysis based on the existing theory. The statistical analysis aims to determine the prediction of an original theory that is still valid with the observed data collected (Creswell, 2014).

The researcher used Statistical Package for the Social Sciences (SPSS) version 24, and Microsoft Excel 2010 to analyse the descriptive statistics of the data. Other software used included AMOS version 23. This is the extended version of the SPSS software, and Structural Equation Modelling (SEM).

5.10.2 Examining surveys for missing data

Missing data in this study refers to questionnaire items that respondents did not answer, leading to unavailable data. Data extraction is a valuable process of identifying missing data. Excel can identify and extract these entries using the blank count formula. Otherwise, the missing data can be extracted by using the frequency of descriptive analysis in SPSS.

Missing data examination is important because it influences the research validity and reliability. In addition, the AMOS program is not run the process of statistical analysis after the path of the variable has been created.

As the Qualtrics online software was utilised, the researcher was able to ensure that questions could not be skipped without answering. After the questionnaire completion deadline had passed, the data collected was downloaded in an Excel format, and then saved in SPSS file format. Excel was used to detect the absence of specific questions. In this research, there was no missing data. However, it is important to double check for missing data to ensure that the next process can be properly performed. Although forcing respondents to complete all of the questions in a survey might be considered unethical (Fink, 2003), it avoids the problem of missing data, and a the higher quality of responses can be collected.

5.10.3 Descriptive statistics

According to Easterby-Smith, Thorpe and Jackson (2015), descriptive statistics is a statistical method that involves identifying, quantifying, and summarising the features of the data gathered. Descriptive statistics enable the researcher to identify

outlier data, missing values, and the pattern of distribution. It is also utilised as a data cleaning and data transforming technique. The descriptive statistics utilised are frequencies, mean, median, mode, variance, and standard deviation. The definitions of the measures utilised in descriptive statistics are provided in Table 5.9 below.

Table 5. 9 The measures applied in descriptive statistics

Measures	Definition
Frequency distribution	Summarising data that is derived from one variable, presented via tables and diagrams (Easterby-Smith et al., 2015). There are many ways to present frequency distribution, such as a bar chart, scatter chart, and histogram, in order to show patterns in the data.
Mean	The mean is the average of the data values. It is obtained from calculating the total values divided by the number of values.
Median	The middle point in the distribution of values. It is attained by arranging the data into descending or ascending order, and then divided in half (Easterby-Smith et al., 2015).
Standard deviation and variance	The average amount spreads around the mean data. It is calculated as the square root of variation around the mean (Easterby-Smith et al., 2015). Variance is the average of the sum of the squared of standard deviation.

5.10.4 The statistical tools applied in this research

In this research, three statistical tools were used. First, factor analysis was conducted. Factor analysis is an interrelationship method that aims to identify the fundamental relationship between variables (Hair et al., 2010). To achieve the research aim, factor analysis should identify the unit of analysis; provide a data summary and data reduction; select the variable; and integrate with other multivariate analyses. Factor analysis was employed because it supports the data reduction process. Second, the chi-square analysis was also applied. This analysis measures the likelihood that data could have arisen coincidentally (Saunders et al., 2007). Third, a correlation efficient was calculated to determine the causal effect of the relationship between

variables (Saunders et al., 2007). A correlation coefficient can measure the effect strength of quantifiable variables. Person's R is the most well-known technique for determining the correlation coefficient (Bakry, 2013). The observed data result is usually presented in the form of a standardised correlation's coefficient. According to Field (2009), the general rule of the size effect of the correlation coefficient can be broken into three categories: (1) $\pm$ 0.1 signifies a weak effect of the relationship; (2) $\pm$ 0.3 denotes a medium effect; and (3) $\pm$ 0.5 indicates strong effect of the relationship.

In this research, explanatory analysis was also utilised. It emphasises the analysis of the causal effect of the relationship between variables. Explanatory research uses data to test theory. There are three types of variable: independent variable, dependent variable, and mediating variable. According to Field (2009) an independent variable or predictor is usually applied to develop the experimental design. This variable could be changed by treatment. By contrast, the dependent variable, or outcome variable, is not manipulated by the observer as it emerges from the data observed. Finally, the mediating variable is the one that influences the relationship between the independent variable and the dependent variable (Hair et al., 2010; Creswell, 2014).

In order to identify the variables, the researcher must undertake a careful literature review, and then discuss the findings with experts. The step of organising the variables is necessary to justify the variables and the hypothesis. The relationship between the variables is explained in Table 5.10, below.

Table 5. 10 The relationship between variables

Adapted from Saunders et al. (2012)

Relationship between variables	
Dependent variables	● Changes alongside other variables' changes. ● Innovation outcome, i.e. radical innovation and incremental innovation.
Independent variables	● Alters the dependent variable. ● Intellectual capital (human capital, social capital).
Mediating variables	● Conveys the influence of the independent variables on the dependent variable. ● Entrepreneurial orientation (risk-taking, proactiveness and openness).

5.11 Structure Equation Modeling (SEM)

Structural Equation Modeling (SEM) is a statistical method for examining the relationship between multiple variables (Hair et al., 2010). According to Hair et al. (2010) SEM is the integration between two multivariate analyses, namely factor analysis and multiple regression analysis.

This research uses SEM to evaluates the relationship between intellectual capital, entrepreneurial analysis, and innovation outcome. There are several steps involved in SEM. First, the researcher should define the model. This model is based on the theory used to explain the phenomena. In this research, existing theory was used to formulate the hypotheses, through a combination of relevant theories.

After the hypothesis has been developed, the researcher should evaluate the model fit, and test the unidimensional of the items result of questionnaire by using Exploratory Factor Analysis (EFA). In this step, the researcher should achieve factor loading without negative factor loading and cross loading.

Next, the researcher should also examine the construct validity and identify any significant links amongst variables via Confirmatory Factor Analysis (CFA). In this step, the researcher will employ AMOS software. After the researcher has established a good model fit, they will track the path of the relationship between the variables using AMOS. AMOS also analyses the multiple regression between the variables constructed. This software complements SPSS but cannot process the data if there are missing variables.

Therefore, the researcher needs to ensure that no data is missing. Incomplete data influences the means and covariance, meaning that the covariance matrix cannot be consistent, homogenous, or sensible (Savalei and Bentler, 2006). The statistical analysis that is applied by SPSS is descriptive statistics, regression-correlation, factor analysis, as well as the validity and reliability to test the instrument and model fit.

Some limitations of this method are the fitness of the sample size, and the ability of the researcher to run the program software and carry out analysis via a statistical method. The next chapter will explain in more detail the SEM process and other

statistical analysis methods applied in the next chapter, which is the data analysis and result chapter.

5.12 Assessing the questionnaire validity

Assessing validity is important to ensure the validation and justification of the questionnaire and the resultant data (Creswell, 2014). There are many different forms of validity; Saunders et al. (2007) states that the validity of questionnaire comprises content validity, construct validity, and criterion validity.

Content validity is the extent to which the instrument, in this case the questionnaire, provides adequate coverage of investigative questions regarding the presence of the constructed variable in the research (Saunders et al., 2007). To this end, a literature review was undertaken, and previous literature was used as a baseline for the questionnaire. The researcher also conducted a pilot study with academics and practitioners to test the questionnaire and determine whether or not the questions are relevant to the current condition of the industry.

Construct validity is very important to measure the construct of latent variable. to According to Cronbach and Meehl (1955) and Saunders et al. (2007), construct validity measures the generalisability of the questions in the construct. How good and understandable the questions are that represent the good of construct validity.

In addition to the above, there are two types of statistical conclusion validity, internal and external validity. Internal validity refers to the extent to which an experimental process, treatment, or experience of the participants threatens the investigator's capability to draw correct conclusions about the population under study (Creswell, 2014: p.174). The researcher should ensure there is no further effect of the independent variable that influences the dependent variable. To this end, the researcher should analyse a control variable as an additional variable.

On the other hand, external validity refers to the extent of the applicability of the inference(s) drawn from the sample data to other persons, settings, and previous and future conditions (Creswell, 2014: p.176). In other words, external validity relates to

how generalisable the conclusion from the sample is to other variables, objects, or people.

According to Creswell (2014), selecting the research method, research analysis, knowledge assertion, and inference outcome are essential, particularly in formulating the objective paradigm. Table 5.11 provides the list of criteria for internal and external validity that were applied in this study.

Table 5. 11 Internal and external validity criteria for this study

Criteria for internal validity	**Criteria Met?**
● Selecting the appropriate research method: quantitative method.	Yes
● Selecting the appropriate research tool: web-based survey.	Yes
● Content validity: items measure the content they were intended to measure?	Yes
● Criterion validity: do the scores predict a criterion gauge?	Yes
● Construct validity: scores serve a valuable purpose and have positive consequences when implemented (Creswell, 2014)?	Yes
● Construct validity testing: Correlation at p <0.001; Cronbach's Alpha > 0.7; a KMO measure of adequacy; Bartlett's test of sphericity; chi-square test of variables p < 0.05.	Yes
● Plot testing or field-testing the survey: questions, format, and scales (Creswell, 2003).	Yes Yes
● SEM-AMOS: RMSEA >0.05; GFI > 0.90; AGFI > 0.90; CFI > 0.90; TLI: close to 1	
Criteria for external validity	
● Demographic information: country, type of business.	Yes
● Experiments draw conclusion(s) from the sample data that are applicable to other persons, other companies, other settings, past or future situations.	Yes
● Language: survey used two languages, Indonesian and English.	Yes

5.12.1 Research quality

This section will map out the quality criteria applied in this research, in order to show that the research achieves the standards of good quality research. This will be

achieved by undertaking validity and reliability measures via statistical analysis. The research quality criteria are presented in detail in Table 5.12 below. The quality standards set out by Easterby-Smith et al. (2012) were adopted, according to whom, the determinants of good quality research are: reliability, construct validity, content validity, and contribution to theory and practice.

Table 5. 12 The criteria of research quality

Quality Criteria:	Criteria directed in this research
Reliability	● The questionnaire in this research asks the relevant question based on previous literature.
Construct Validity	● Scores have a beneficial purpose and have positive significance when implemented. ● A pilot study is applied to test the questions, formats and the scales.
Content Validity	● Selecting the appropriate research technique, i.e. a quantitative method. ● Selecting the appropriate research tool: web-based survey. ● A survey has been pre-tested and feedback gained from practitioners and academics.
Criterion Validity	● Demographic evidence: the characteristics of the country, the types of businesses. ● Experiments illustrate the correctness of inferences from the sample data in relation to other persons, other settings, and past and future situations. ● Language: the survey uses bilingual version which is Indonesian and English version.
Contribution to theory	● The contribution of research recommended the relationship among intellectual capital, entrepreneurial orientation and innovation capability.
Contribution to practice	● Other managers from ICT-SMEs in the developing country such as Indonesia, researchers, and policy creators can evaluate the conclusions of this research. It will aid considerations regarding investing in areas such as company strategy in ICT-SMEs.

5.13 Anticipated ethical issues and general considerations

The researcher followed the University of Strathclyde's ethics procedure and obtained ethical approval before distributing the questionnaire. This was required because the research relates to human beings. According to Israel and Hay (2006), ethical issue relates mostly to personal privacy, personal disclosure, authenticity, and the credibility of the report. It is necessary to consider ethical issues in order to protect the safety and confidentiality of respondents (Fouka & Mantzorou, 2011: p. 1).

5.14 Conclusion

In this chapter, the researcher has discussed the research design and the research methodology that were employed in this study. The researcher also set out the philosophical assumptions relied on, and the process of selecting the research methods. Selecting the appropriate research design, philosophical assumptions, and methodology will affect the quality and the conclusions of the research. For this research, the positivist paradigm was selected, and quantitative methods were used. This chapter has also explained all of the procedures used to collect the data, analyse the data, and validate the research instruments. Within the research design, the researcher developed and designed a strategy for the entire process of conducting the research. A review of the research design is provided in Table 5.13 below, and Figure 5.9 shows the decisions made in/for this study.

Table 5. 13 Research design summary

Category	Options
Research questions	*RQ1: What is the relationship between intellectual capital, entrepreneurial orientation, and innovation outcome?* *RQ2: How does entrepreneurial orientation mediate the relationship between intellectual capital and innovation outcome?*
Research Philosophy	Positivism.
Research Approach	Quantitative study utilising a deductive methodology and hypothesis-testing theory.
Research Characteristics	Assesses and evaluates the relationships between variables, and analyses numeric data using statistical techniques and sampling techniques.
Research Strategies	Survey research strategy via a web-based questionnaire instrument.
Method of data collection	Observation: all events organised and controlled by Qualtrics software. All information recorded. A web-based survey is the instrument used to collect data.
Variables control	Investigational: variables controlled and handled to accomplish the research aim. Dependent: human capital, social capital, risk-taking, proactiveness, openess, radical innovation, and incremental innovation.
The purpose of the study	Causal: the relationships between the variables. To evaluate the relationship between intellectual capital, entrepreneurial orientation, and innovation outcome.
Time range dimension	Investigation period: September 2013 - March 2017 Survey design: February 2016- April 2016 Survey circulation: May 2016 - October 2016 Data cleaning and analysis: November 2016 - February 2017
Hypotheses	H1: Human capital positively affects a) risk-taking; b) proactiveness; c) openness; d) radical innovation; e) incremental innovation. H2: Social capital positively impacts a) risk-taking; b) proactiveness; c) openness d) radical innovation; e) incremental innovation. H3: Risk-taking mediates the relationship between a) human capital and radical innovation; b) human capital and incremental innovation; c) social capital and radical innovation; d) social capital and incremental innovation. H4: Proactiveness mediates the relationship between a) human capital and radical innovation; b) human capital and incremental innovation; c) social capital and radical innovation; d) social capital and incremental innovation. H5: Openness mediates the relationship between a) human capital and radical innovation; b) human capital and incremental innovation; c) social capital and radical innovation; d) social capital and incremental innovation.
Milieu	ICT-SMEs.

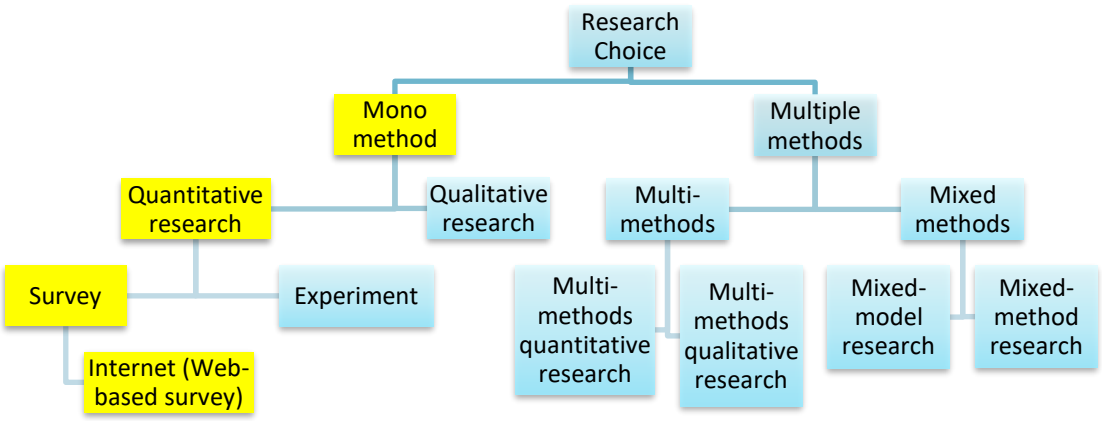


Figure 5. 9 Research decisions
(Adapted from Saunders et al. 2007)

CHAPTER 6 DATA ANALYSIS AND RESULT

- Introduction
- Data preparation and data screening
- Selecting the appropriate statistical methods for testing hypothesis
- Non-response bias
- Measures
- The measurement models
- Demographic summary of sample firms in Indonesia
- Validity and reliability test
- Hypotheses model and relationship
- Confirmatory factor analysis (CFA)
- Nested model tests
- Analytical procedures
- The Sobel mediator test and bootstrapping
- Summary of the results

Next: Chapter 7 - Discussion and Conclusion

6.1 Introduction

In Chapter 3, the researcher developed the research questions and a conceptual framework. In Chapter 4 and Chapter 5, the researcher explained the research design, research philosophy, and research methodology. This chapter will present the empirical findings, which is important in answering the research question, and analyse the quantitative data collected via the web-based survey. It is important that appropriate and correct methods of analysis are carried out systematically and coherently in order to produce a good research result.

Before the detailed analysis phase, the researcher presents the data preparation and screening based on the data from the survey of ICT-SMEs in Indonesia, namely 'The Innovation Capability Survey 2015/2016'. Further, an initial validity and reliability test will also be conducted, as well as data screening to eliminate errors and

refine the data. This research contributes to the existing body of research by investigating the roles of intellectual capital and entrepreneurial orientation in influencing innovation capability in Indonesia.

6.2 Data preparation and data screening

The researcher performed a data screening process to improve the quality of the data. Data screening entails the identification of any outliers, inconsistency, or missing data (Wilson et al., 2010). For this study, the Qualtrics web-based survey tool was utilised to collect the data, an application that automatically records and stores all of the survey responses.

The data was collected between 1 May 2016 and 30 October 2016. After data has been collected, the researcher should ensure that it is of adequate quality and take steps to avoid bias. In order to ensure good quality and unbiased data, the researcher should identify any raw data errors and missing data as part of the data preparation process, as data errors and missing data can influence the accuracy of the statistical analysis process.

From 1,400 invitations sent via email and posting an anonymous link in Facebook groups, 619 survey responses were received. Of these, only 310 responses were eligible for inclusion in the research analysis; the other responses had been provided by respondents who were not CEOs, owners, or managers, or their company was not an ICT company.

The screening process is continued by analysing missing value and unengaged value. At this stage, from the whole data (310 responses), there was only one missing value; this occurred because it is still possible to avoid answering a question. Although Qualtrics triggers an alert if respondents try to skip a question, it still provides two options: (1) continue without answering; and (2) answer the question. If the respondent selects the first option, they can continue to the next question. The missing value was identified using the COUNTBLANK function in Excel.

After identifying the missing value, the unengaged value was identified. An unengaged value means the respondent has provided the same answer for the whole

questions. For example, there are seven options (1 – Strongly disagree • 2 – Disagree • 3 – Somewhat disagree • 4 – Neutral • 5 – Somewhat agree • 6 – Agree • 7 – Strongly agree) for the questionnaire with multiple choice questions. Then, the respondents answer '4' for the whole questions which means the respondents do not want to think of the answer and they want to fill quickly the questionnairre.

To search the unengaged value, the researcher was using the function of standard deviation in Excel. The unengaged data is shown by zero value of standard deviation for each observation. The unengaged data means the respondents are answering the questions by the same way (Furnham, 1986). It can produce the bias data (James Gaskin, 2016). From the data collection, there is one missing value and four unengaged data as illustrated in Appendix 7. Based on this process, there were five data excluded. Therefore, the result of this stage are 305 data.

The next step was identifying the outlier of data. To this end, univariate and multivariate analysis was implemented to identify the extreme values that differed dramatically to the majority of observations or cases in the data set (Hair et al., 2010; Kline, 2011). Such values must be, and were, removed from the data set. Univariate outliers, or single variables with extreme variables, were identified by converting the score per variable into a standard score (z score) (Tabachnick and Fidell, 2007; Kusumawardhani, 2013). The value of outliers should be between -3.29 and 3.29 ($p<0.01$). As shown in Appendix 5, the data set contained eight univariate outliers, since the eight value of z (standard score) is below 3.29 ($p< 0.01$, two tailed test). After this step, 297 data sets remained to be analysed.

To identify multivariate outliers, Mahalanobis distance was utilised. The Mahalanobis distance using chi-square distribution with the degreed of freedom as the same as the number of variable measured (Ullman, 2010). In this research, the variables measured are seven. Therefore, the degree of freedom is also seven. Any outliers can be detected by looking for a probability below 0.001 or $p<0.001$. As can be seen from Appendix 6, all numbers of Mahalanobis distance probability using chi-square distribution were below 0.001. Therefore, no outliers could be identified at this stage. Therefore, 297 data sets remained to be analysed.

After evaluating the data outliers, the researcher evaluated the missing data using MS Excel and the Statistical Package for the Social Science (SPSS). The unengaged data was also tested using standard deviation. Skewness, shape and kurtosis were measured using SPSS to test the normality of the data (James Gaskin, 2016). The accepted skewness value is between +/- 3 (Kline, 2011). If the skew-index is more than 3 and the kurtosis index is more than 8, the value is categorised as "extreme" (Kline, 2011; Kusumawardhani, 2013). Appendix 5 shows the skewness and kurtosis scores, which, at between +/- 2.2, were acceptable.

Multicollinearity is another measurement applied in data screening. This measurement assesses the variance in independent variables, which identifies any overlapping between dependent variables (James Gaskin, 2016). It is measured via correlation matrices and collinearity and can be identified by VIF and tolerance. The data set can be said to have no multicolinearity if VIF < 10.0 and tolerance > 0.1 (Hair et al., 2010). As seen in Appendix 9, the data set for this research reveals had an VIF of less than 10 and tolerance of above 0.1.

6.3 Selecting the appropriate statistical methods for testing hypothesis

In quantitative research, it is important to determine the appropriate statistical methods before beginning the analysis process. The exact statistical technique used depends on the type of variables being studied and the hypothesis being tested (Easterby-Smith et al., 2008). Inappropriate statistical techniques, such as using paired analysis for unpaired data, will produce a weak result (Jaykaran, 2010; Shankar and Singh, 2014). Therefore, the researcher needs to select the appropriate statistical analysis to test the hypothesis and to the significant finding that answers the research questions and the research objectives.

6.3.1 The statistical technique

After the researcher had collected the data via Qualtrics, and prepared and screened the obtained data, a number of statistical techniques were applied, including such as Exploratory Factor Analysis (EFA), Confirmatory Factor Analysis (CFA), and path analysis. First, descriptive analysis was conducted to summarise the quantitative dataset. This process began with analysing the reliability and validity of the instrument using Cronbach's Alpha and Exploratory Factor Analysis (EFA). At this stage, SPSS, a statistical software tool, was utilised.

EFA was used to determine the single set factor of variables that were relatively independent of each other. The objective of using EFA is to determine from the data whether an unidentified relationship exist between the observed and latent variables (Hair et al., 2010). EFA can also cluster the variables based on the strength of the variables (Gaskin, 2016). The result is groups of variable constructs that share the same pattern of correlation of correlation per question. The relationships between variables are further revealed by factor loading. To produce cleaner loading factors for each group of variables, it is necessary to eliminate items with a negative loading factor, and those with cross loading factors. The results of EFA is shown in Appendix 11.

The validity and dimensionality of constructs was evaluated via Confirmatory Factor Analysis (CFA). Using CFA, the researcher examined the discriminant validity and dimensionality of the constructed variables. CFA is utilised to apprehend the variance in measured variables, and to maximise the amount of variance that can be explained (Bagozzi et al., 1991). Once clean and valid data has been obtained, the CFA results can be utilised for the next step in the statistical analysis process, Structural Equation Modelling (SEM). SEM is a statistical tool used to analyse and estimate a causal relationship from empirical data, integrating both factor analysis and path analysis (Wright, 1921). SEM can measure latent variable from the estimation of indicator, and the reliability and construct validity of the hypothesis model. SEM can involve factor analysis, regression analysis, and path analysis (Kline, 2011).

6.3.2 Measuring the reliability and validity of data

To measure the reliability of data, the researcher tested the internal consistency of the correlation between items. The correlation between each construct was analysed by calculating the average multi-item correlation. After all items had been clustered within a unidimensional model, Cronbach's Alpha was used to test their internal consistency. According to Loewenthal and Lewis (2001), an acceptable Cronbach's Alpha value is 0.6. Table 6.1 shows the rule of thumbs of Cronbach's Alpha to determine internal consistency (Field, 2009; Hair et al., 2010).

Table 6. 1 The rule of thumbs of Cronbach's Alpha in explaining internal consistency.

CRONBACH ALPHA (α)	INTERNAL CONSISTENCY
≥ 9	Excellent
≥ 8	Good
≥ 7	Acceptable
≥ 6	Questionable
≥ 5	Poor
< 5	Unacceptable

After the reliability had been measured, the eigenvalue and factor loading was examined by applying Exploratory Factor Analysis (EFA). Following EFA, the eigenvalues should be greater than 1, and the factor loadings should exceed 0.3 (Hair et al., 2010; Gaskin, 2016). The EFA process is presented in Table 6.2 below.

Table 6. 2 The guidance of Exploratory Factor Analysis (EFA)

EXPLORATORY FACTOR ANALYSIS (EFA)
1. Analyse the correlation between all items
2. Modify the total items >3
3. Carry out Exploratory Factor Analysis (EFA) for the whole dataset
4. Analyse the factor loading per group, reducing the cross loading
5. Analyse the reliability by Cronbach's Alpha, with α >0.6

6.4 Non-response bias

To identify non-response bias, statistical tools were utilised to identify significant differences between the two groups of relevant variables. The first group of respondents are collected between 1 May 2016 to 30 October 2016. The second group of respondents are collected on 1 July 2016 to 30 October 2016. The researcher measured significant differences by testing 10% of the data collected for both groups. An independent sample T-test was used to compare the average responses of both group of respondents, and then identify the statistically significant differences between them, which should be below 0.05. Appendix 8 shows the significant p value, which was below 0.05 ($p<0.05$).

6.5 Measures

According to Gilbert A. Churchill (1979), the development of new measure is undertaken if the existing scales are not applicable. In which case, the researcher should determine the constructs, the item grouping, and the measurement formats. The questionnaire items in this research were constructed based on previous literatures which were based on a resource-based view and dynamic capability theory. In addition, the question items were reviewed by several experts, consisting of both academics and practitioners, who provided feedback and suggestions to rectify, modify, and eliminate certain questions.

6.5.1 Control variables

This research employed controls for age and size of firm, since firm age can influence its innovation capability. The researcher identified the age of firms from their year of establishment. Older firms have an advantage in that they are more experienced than younger firms; however, younger firms can adapt more quickly to new environments and knowledge sources.

It was decided to use firm age as a control variable because it reflects the past product experience of the firms (Macpherson and Holt, 2007). Then, firm size reveals the effect of the company level which can affect the competitiveness, innovation capability and business performance (Leiblein & Madsen, 2009; Zhou et al., 2005). The size of each company was established based on the number of employees. Both knowledge acquisition and assimilation can be affected by firm size, as well as investment in intellectual capital, including human capital and social capital, where larger companies tend to invest more in intellectual capital. This in turn could lead to better innovation outcome (Subramaniam and Youndt, 2005).

6.5.2 Sample size

Determining the appropriate sample size is necessary to ensure the goodness of fit. Increasing the sample size increases, the power of statistical analysis; for example, in SEM, the sample size can influence the sensitivity of the statistical analysis (Hair et al., 2010). This is important, as an over-sensitive (too large a sample size) or under-sensitive (too small a sample size) analysis will impact the validity and reliability of the research results. SEM has different rules to the other multivariate approaches when it comes to specifying the sample size. It can also estimate the sampling error. (Hair et al., 2010).

Hair et al. (2010) provide five tests to analyse the sample size, involving: (1) the multivariate normality of the data; (2) the estimation method; (3) the model complexity; (4) missing data values; and (5) the average error of variance between the

reflective indicators. The minimum sample size suggested by previous authors is 300 (Hair et al., 2010; Barret, 2007). However, Hair (2010) classifies the sample size distribution for SEM in more detail, as shown in Table 6.3 below. In this research, a sample size of 297 was achieved; this falls into the second group in the table, with a minimum sample size of 150. This indicates that seven or fewer constructs were needed, with modest commonalities set at 0.50 or higher.

Table 6. 3 Sample sizes

Adapted from Hair et al. (2010)

Size	Models
Minimum sample size –100	Five or fewer construct each with more than three observed variables and high commonalities (.60) or higher.
Minimum sample size – 150	Seven or fewer constructs, modest commonalities (.50) or higher.
Minimum sample size -300	Seven or fewer constructs, lowest commonalities below (.45)
Minimum sample size – 500	A Large number of constructs, with some, has lower commonalities and having fewer than three measured items.

6.6 The measurement model

The researcher used Confirmatory Factor Analysis (CFA) and loading factors to appraise the measurement model in Structural Equation Modeling (SEM). In addition, the psychometric properties of processes were assessed via Confirmatory Factor Analysis (CFA) (Bagozzi et al., 1991; Gerbing & Anderson, 1988).

The researcher also used the maximum likelihood estimation technique of CFA. This technique is broadly used, and assumes multivariate normal data with a rational sample size, such as a sample size of 200 (J.J. Hox and Bechger, 1998). As part of this process, the researcher input the unprocessed data and reduce some items which had a very low factor loading and cross loading. This process was repeated until a clear pattern with no cross loading was achieved, meaning that the models have already fitted and adequate with the data. The detail relating to the constructed variables and

the engaged items is presented in Figure 6.1. A hypothetical model was developed using Structural Equation Modeling (SEM) to evaluate the hypothesis model for the relationships between intellectual capital, entrepreneurial orientation, and innovation capability.

Measurement models aim to evaluate the positive or negative effect of one factor on another factor. The measurement model in this research consisted of seven latent variables (human capital, social capital, risk-taking, proactiveness, openness, radical innovation, and incremental innovation). There are two observed variables for human capital and radical innovation. Then, three observed variables selected for social capital, openness, risk-taking, and incremental innovation respectively. Ultimately, four observed variables were matched with proactiveness.

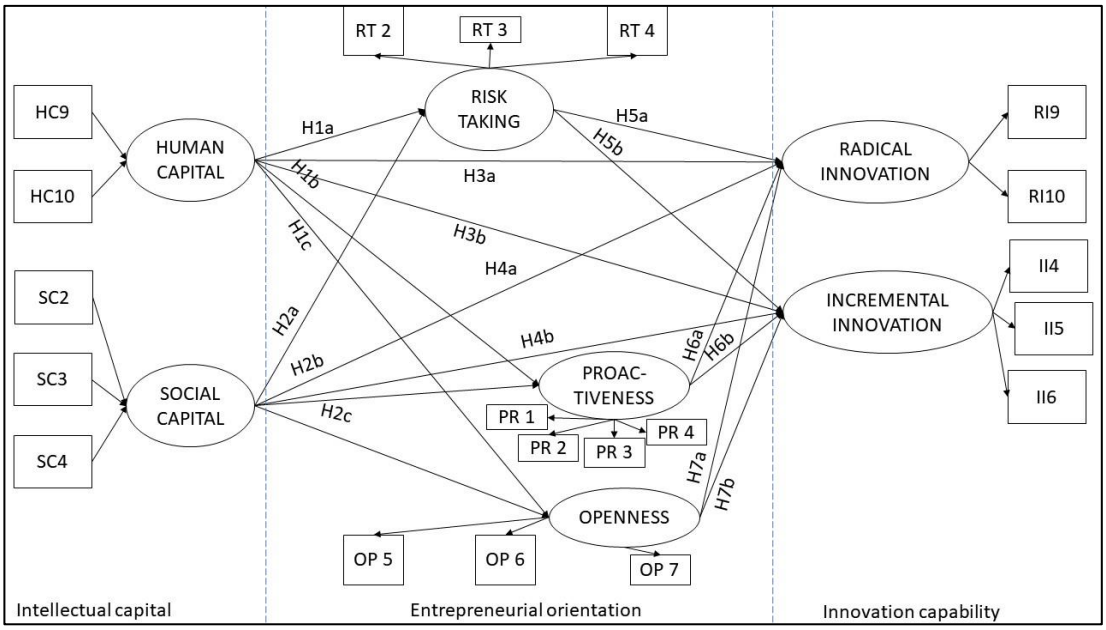


Figure 6. 1 The measurement model

Figure 6.1 present the measurement model of the research based on the following hypothesis.

- **Hypothesis (H1):** Human capital is positively related to entrepreneurship orientation: a) risk-taking, b) proactiveness, c) openness.

- **Hypothesis (H2):** Social capital is positively related to entrepreneurship orientation: a) risk-taking, b) proactiveness, c) openness.
- **Hypothesis (H3):** Human capital is positively related to innovation capability: a) radical innovation, b) incremental innovation.
- **Hypothesis (H4):** Social capital is positively related to innovation capability: a) radical innovation, b) incremental innovation.
- **Hypothesis (H5):** Risk-taking mediates the relationship between intellectual capital and innovation capability: a) radical innovation, b) incremental innovation.
- **Hypothesis (H6):** Proactiveness mediates the relationship between intellectual capital and innovation capability: a) radical innovation, b) incremental innovation.
- **Hypothesis (H7):** Openness mediates the relationship between intellectual capital and innovation capability: a) radical innovation, b) incremental innovation.

6.7 Demographic summary of sample firms in Indonesia

This study relied on a sample of 297 relevant ICT-SME firms in Indonesia. According to the ISIC code, the ICT sector can be broken into six groups. Table 6.4 provides a summary of the demographics of the sample firms that participated in this study. Completed surveys received from 297 respondents indicated that the relevant response rates by firms were received. This sample size indicates an adequate response rate of 46.6% (297/636) of ICT-SMEs in Indonesia.

The researcher selected the ICT-SME group as it is showing rapid growth in Indonesia (WIPO, 2013; Indonesia, 2017). The companies were clustered based on ISIC code. It is important to cluster companies according to the specialisation and specification of each industry (UN, 2013), as industry specialisation may influence the nature of innovation performance in ICT-SMEs (Yam et al., 2011).

The firms that participate in this survey were engaged in the innovation activities. The largest industry cluster is Information service industry by 35.01% of the

sample. This is followed by radio broadcasting, television programming, and other broadcasting industries, which account for 26.59%. The third largest industry cluster is the motion picture, video, and television programme production, sound recording and music publishing activities industry, at 19.86%. Finally, the book, software, newspaper, journal, and mailing list publishing industry accounted for 12.79%, and other industrial clusters accounted for less than 10%. These clusters are presented in detail in Table 6.4 below. In this table, the firm age is also given, based on the number of years since their establishment, and the firm size, based on number of employees.

Firms aged seven years and above account for 65.31% of the sample, which means most of the respondents represented a well-established company. The smallest proportion of the sample was respondents from companies less than three years old, representing 13.47% of the sample. Firm size is based on number of employees. Micro sized is represented by precentage of 0-9 workers number by .714 %. In addition, the small size firms with 10 to 49 number of employees has the largest proportion by 63.973%. Further, the medium size firms with 50-250 employees represented the proportion of the same, at 31.313%.

Table 6. 4 Demographic characteristics of the sample firms

(ISIC Code) RESPONSE		ICT-SMEs in Indonesia	
		N	%
58- Book, software, newspaper, journal, mailing list publishing activities		38	12.79
59- Motion picture, video and television programme production, sound recording and music publishing activities		59	19.86
60- Radio broadcasting, television programming, and other broadcasting activities		60	20.20
61- Telecommunication		11	3.70
62- Computer programming, consultancy, and related activities		25	8.42
63- Information service activities		104	35.02
Total		**297**	**100.00**
FIRM SIZE			
(1) 0-9 employees		14	4.714
(2) 10-49 employees		190	63.973
(3) 50-249 employees		93	31.313
Total		**297**	**100.000**
FIRM AGE			
(1) 1-3 Years	%	40	13.47%
(2) 4-6 Years		63	21.21%
(3) 7-10 Years		82	27.61%
(4) 10 Years and above		112	37.71%

6.8 Validity and reliability test

Before analysing the hypothesis, descriptive analysis should be undertaken to identify the distribution of the data. Table 6.5 presents the descriptive analysis of the data set based on the survey data gathered. The researcher also identified positive correlations between each variable in the convergent validity, which is consistent with the expectation. This is evidence that the data regarding intellectual capital represented the constructed variable. Then, the correlation between observed variables was analysed in order to validate the unidimensional of each construct via correlation

analysis of each item construct. In addition, composite structural second-order data was used to present the correlation between variables.

This chapter will analyse the relationship between intellectual capital (human capital and social capital) and innovation capability (radical innovation and incremental innovation). In addition, entrepreneurial orientation (risk-taking, proactiveness, and openness) will also be included, as the mediator of this relationship.

The relationship impact is identified via correlation analysis between indicators. Correlation analysis is an important test for identifying a positive or negative relationship, and also a significant or non-significant P-value. This is a preliminary analysis to demonstrate the potential construction of the variables. The results of the descriptive analysis, including the means and standard deviations, is presented in Table 6.5. This table also provides the loading factor and results of the reliability analysis using Cronbach's Alpha. This table provides the validation and reliability test in the preliminary analysis, the results of which are satisfactory.

Furthermore, the relationship between the variables was also analysed using Pearson's correlation technique, which tests the strength of the relationship between two variables (Field, 2009). All steps of the measurements in this analysis stage present the test reliability and also validation which comprises discriminant and convergent (Bagozzi & Phillips, 1982; Churchill, 1979). Regarding the hypothesis created, the regression result are presented in Figure 6.2 which describes the estimation of β as the parameter, t-value, and the fitness of the statistical model.

The central tendency of a single value to depict the central locus of data set was also measured; the mean results revealed the mid-point of each data set. Table 6.5 shows that the means for risk-taking (5.32) and incremental innovation (5.29) were the highest. This indicates that risk-taking and incremental innovation are the essential variables, and that the most important variable for entrepreneurial orientation is risk-taking. Meanwhile, the key attribute for innovation type is incremental innovation. Exploratory factor analysis was also undertaken to gain a clear view of a factor and test the inter-correlation of variables. In this phase, the researcher eliminated the variable that had cross and negative factor loading.

In loading the factors, the small coefficient was suppressed to below 0.3, and the same pattern of factor loading was clustered. The reliability measurement based on Cronbach's Alpha should produce a value for each item that is equivalent to or above 0.7. This test was used to evaluate the accuracy of measurement. Then, the unidimensional factor analysis was tested. The KMO (Kaiser-Meyer Olkin) was evaluated, which should be equal to or above 0.5. The KMO test is the sampling sufficiency measurement used to the size of the surveyed correlation coefficients. This test evaluates a few partial correlations between the variables (IBM, 2012). Table 6.5 shows that the minimum KMO value is 0.5, which indicates positive correlations between variables.

The correlation matrix that the researcher utilised, using Bartlett's test of sphericity, helped to evaluate the hypothesis. The value for each item in the identity matrix should have a significant value of equal to or below 0.05. The population of the correlation matrix does not show the identity matrix, and all items do not stand individually. Consequently, the result is satisfactory and adequate for the factor analysis. All of the descriptive analysis results are shown in Table 6.5. This table also shows the mean, standard deviation, and reliability of the components.

Table 6. 5 Descriptive statistics, composite reliability and confirmatory factor analysis

	N	Mean	Std. Dev	Load	Factor Average	Cronbach's Alpha	KMO
HC9	297	5.19	0.928	0.408	.905	0.779	0.500
HC10	297	5.28	0.837	0.945	.905		
SC2	297	5.20	1.009	0.579	.807	0.775	0.698
SC3	297	5.11	1.107	0.865	.863		
SC4	297	5.10	1.101	0.608	.821		
RT2	297	5.25	0.889	0.418	.802	0.781	0.695
RT3	297	5.28	0.839	0.742	.845		
RT4	297	5.32	0.868	0.922	.856		
PR1	297	5.15	0.935	0.577	.763	0.751	0.766
PR2	297	5.17	0.949	0.596	.780		
PR3	297	4.96	0.995	0.694	.742		
PR4	297	5.11	0.973	0.579	.742		
OP4	297	5.00	1.162	0.652	.844	0.683	0.632
OP5	297	4.70	1.377	0.657	.736		
OP6	297	5.07	1.167	0.612	.766		
RI8	297	5.02	0.785	0.541	.825	0.737	0.500
RI9	297	5.03	0.790	0.709	.825		
II4	297	5.10	0.935	0.762	.764	0.753	0.672
II5	297	5.23	0.941	0.715	.854		
II6	297	5.29	0.866	0.557	.835		

Table 6. 6 Correlations for the variables in the model for Indonesia

	HC9	HC10	SC2	SC3	SC4	RT2	RT3	RT4	PR1	PR2	PR3	PR4	OP4	OP5	OP6	RI8	RI9	II4	II5	II6
HC9	1																			
HC10	.640***	1																		
SC2	.392***	.362***	1																	
SC3	.345***	.351***	.554***	1																
SC4	.362***	.371***	.470***	.579***	1															
RT2	.422***	.439***	.283***	.335***	.222***	1														
RT3	.398***	.358***	.396***	.325***	.264***	.502***	1	.												
RT4	.473***	.495***	.354***	.331***	.277***	.525***	.607***	1												
PR1	.396***	.465***	.305***	.342***	.282***	.382***	.314***	.368***	1											
PR2	.451***	.430***	.273***	.323***	.316***	.374***	.447***	.464***	.498***	1										
PR3	.406***	.378***	.195**	.277***	.247***	.276***	.329***	.262***	.401***	.422***	1									
PR4	.504***	.411***	.339***	.275***	.263***	.431***	.371***	.299***	.404***	.422***	.435***	1								
OP4	.464***	.394***	.313***	.301***	.358***	.315***	.304***	.355***	.399***	.404***	.386***	.358***	1							
OP5	.250***	.162***	.188**	.268***	.330***	.213***	.154**	.159**	.138*	.135*	.182**	.183**	.451***	1						
OP6	.341***	.212***	.217***	.206**	.309***	.251***	.238***	.211**	.276***	.301***	.143*	.272***	.492***	.310***	1					
RI8	.345***	.334***	.253***	.209**	.234***	.382***	.417***	.487***	.360***	.371***	.321***	.418***	.311***	.201**	.185**	1				
RI9	.407***	.440***	.290***	.215***	.289***	.451***	.388***	.477***	.445***	.432***	.383***	.429***	.350***	.178**	.156**	.584***	1			
II4	.329***	.272***	.072	.098	.088**	.210**	.177**	.191**	.212***	.249***	.184**	.226***	.188**	.166**	.211***	.202**	.210**	1		
II5	.404***	.424***	.220***	.163**	.124***	.409***	.414***	.384***	.384***	.386***	.313***	.415***	.278***	.105	.159**	.311***	.433***	.476***	1	
II6	.491***	.435***	.214***	.174**	.123***	.336***	.418***	.399***	.369***	.436***	.309***	.417***	.339***	.086	.197**	.317***	.406***	.437***	.597***	1

***p< 0.001; **p< 0.01; *p< 0.05; one-tailed tests

6.9 Confirmatory factor analysis (CFA)

The CFA results are provided in Appendix 13. In CFA, the coefficient of Cronbach's Alpha should be greater than 0.7 (Hair et al., 2010). According to (Loewenthal and Lewis, 2001), the acceptable Cronbach's Alpha is 0.6. Therefore, the researcher set a minimum Alpha of 0.6, since it is still considered acceptable.

Table 6. 7 The parameter estimates for measurement relationship

Scale Items		Standard Loading
Human Capital (AVE=88.9%; CR=0.88)		
HC9	In my company, people identify skills they need for future work tasks.	0.889
HC10	In my company, people view problems in their work as opportunities to learn.	0.889
Social Capital (AVE=79.6%; CR=0.84)		
SC2	There is total agreement on this company's vision across all levels, functions, and divisions.	0.784
SC3	All employees are committed to the goals of this company.	0.815
SC4	Employees view themselves as partners in charting the direction of the company.	0.791
Risk Taking (AVE=79.8%; CR= 0.84)		
RT2	This company encourages innovative strategies, knowing well that some will fail.	0.779
RT3	This company does not like to "play it safe".	0.829
RT4	This company likes to take big risks.	0.787
Proactiveness (AVE=71.6%; CR= 0.81)		
PR1	Managers are constantly seeking new opportunities for the company.	0.816
PR2	Managers take the initiative to shape the environment to the company's advantage.	0.810
PR3	Managers are often the first to introduce new services	0.638
PR4	Managers usually take the initiative by introducing new administrative techniques.	0.601
Openness (AVE=76.1%; CR= 0.80)		
OP4	This company is always moving toward the development of new answers.	0.820
OP5	This company is open and responsive to changes	0.762
OP6	This company's, manager is always searching for fresh, new ways of looking at problems	0.701
Radical Innovation (AVE=85.1%; CR= 0.84)		
RI8	Learned product development skills and processes entirely new to the company.	0.851
RI9	Acquired entirely new managerial and organisational skills that are important for innovation	0.851
Incremental Innovation (AVE=77.8%; CR=0. 82)		
II4	Constantly surveys existing customer satisfaction	0.734
II5	Fine-tunes what it offers to keep its current customers satisfied	0.831
II6	Upgraded skills in product development processes in which the company already possesses significant experience	0.769

The Average Variance Extracted (AVE) was also analysed, which has minimum

value of 50% for each construct. AVE is the average of the squared value for each standard loading. Composite reliability (CR) has a minimum value of 0.7. In Table 6.7, the AVE and CR results shows values that are greater than the minimum standard. Therefore, the results can be considered reliable for all constructs.

6.9.1 The correlation for multi-item constructs

This subsection will explain the validation process through the correlation of multi-item constructs. Rigorous research findings should be evaluated by analysing the correlation between intellectual capital, entrepreneurial orientation and the innovation capability. The reliability and validity results are shown in Table 6.5.

The correlation that showed the highest impact occurred in the relationship between incremental innovation and radical innovation, at $r = 0.952$ and $p < 0.001$. The second highest was between proactiveness and human capital, at $r = 0.947$ and $p < 0.001$. Third highest was the relationship between human capital and radical innovation ($r = 0.941$; $p < 0.001$). This was followed by the relationship between human capital and incremental innovation, at $r = 0.926$ and $p < 0.001$. The other variables demonstrated high correlation with significant p values of less than 0.001. It is assumed that stronger or good relationships are indicated by higher correlation values (Taheri, 2011).

The control variables selected, i.e. firm age and firm size, did not have significant p values. Therefore, these control variables did not give significant impact to the model overall. Table 6.8 shows the correlation between the construct variables. The total r-value in Table 6.8 is above 0.6, which is more than the minimum value for standard reliability (0.3) (Hair et al., 2010).

Table 6. 8 Means, standard deviations, ranges and correlations for the variables

Constructs	HC	SC	RT	PR	OP	RI	II
1. Human capital (HC)	1						
2. Social Capital (SC)	.826***	1	.514***	.369***	.456***	.539***	.312***
3. Risk Taking (RT)	.888***	.745***	1				
4. Proactiveness (PR)	.947***	.783***	.897***	1	.317***	.349***	.311***
5. Openness (OP)	.783***	.801***	.717***	.897***	1		
6. Radical Innovation (RI)	.941***	.714***	.929***	.717***	.755***	1	.362***
7. Incremental Innovation (II)	.926***	.649***	.924***	.929***	.682***	.952***	1
Mean	4.63	4.18	4.09	5.18	5.02	2.99	4.58
S.D	0.76	0.71	0.62	0.84	0.93	0.48	0.76
Min	2.00	1.00	2.00	2.00	1.00	1.00	2.00
Max	6.00	4.00	5.00	7.00	7.00	4.00	6.00
N	297	297	297	297	297	297	297

***p< 0.001; **p< 0.01; *p< 0.05; one-tailed tests

6.9.2 The goodness-of-Fit Indices

The goodness-of-fit indices assess the overall model fit. Goodness-of-fit assesses the fitness of observation variables with the theoretical model. In this study, three types of goodness-of-fit measurement were employed (Chin, Peterson & Brown, 2008; Hair et al., 2010), as follows. All Structural Equation Modelling (SEM) results, including the goodness-of-fit indices and regression estimations are provided in Appendix 14.

a. Absolute fit gauges

Absolute fit indices evaluate the fit of the entire model. The assessment results provide a basic statistical analysis that attests to the appropriateness of the model, theory and the data observation. Absolute fit tests consist of the Chi-square ratio, the Chi-square value, goodness-of-fit index (GFI), and root means square error of approximation (RMSEA).

a.1. Likelihood-ratio Chi-square

The fundamental measure for the fit of the model overall is the Chi-square ratio. The number of respondents and the intricacy of the model influences the Chi-square value. A higher Chi-square value against the degree of freedom indicates that the correlations between the observed variables are significantly different. However, this also means that the model does not fit with the data observed. Therefore, a lesser Chi-square value indicates that the data observed supports the model proposed.

In this research, the Chi-square result was 14; the degree of freedom was 7; and the probability level was 0.047. Table 6.8 presents the minimum standard value for each measure, as well as the outcome of the goodness-of-fit measurement. From the table, it can be seen that the probability level should be 0.05 or greater. Then, the CMIN/DF illustrates the Chi-square ratio value divided by the degree of freedom. To indicate the model fit, as suggested by Byrne (1988), the CMIN/DF result should be less than 2. Schermelleh-Engel et al. (2003) consider a good or acceptable value to be between 2 and 3. Wheaton et al. (1977) also states that a result below 5 is an acceptable value. In this study, the researcher a CMIN/DF value of 2.031 was attained, which is acceptable for model fit.

a.2. The goodness-of-fit index (GFI)

The GFI is not related to sample size. A value of 0 indicates a poor fit, and 1.0 indicates a perfect fit. A good model fit is indicated by a value is higher than 0.90 (Hair et al., 2010). In this research, a value of 0.9 was achieved for all of the indices.

a.3. The root mean square error of approximation (RMSEA)

The root mean square error of approximation (RMSEA) is a measure that shows the model fit has been achieved if a value between 0.05 and 0.08 is reached (Hair et al., 2010). The results calculated by AMOS software showed an RMSEA of 0.059, which indicates model fit.

b. Incremental fit gauges

The incremental fit measure compares the estimated model with the null model, which is the model baseline (Ping, 2004). This comparison tests the fitness of both models. There are several indices in this gauge, i.e. adjusted goodness-of-fit (AGFI), normed fit index (NFI), comparative fit index (CFI), and the Tucker-Lewis Index (TLI) (Ping, 2004; Hair, 2010).

Adjusted goodness-of-fit is an extension of GFI that show the suitability of the degree of freedom ratio for the estimated model. The recommended value of AGFI, NFI and CFI is 0.9 or above. All three of these are comparison measures for the estimation and the null model. The Tucker-Lewis Index is also known as a non-normed fit index (NNFI). This gauge integrates the parsimony model and the null model. It has the same recommended value as the other incremental gauges. The running incremental fit gauge results from AMOS are shown in Table 6.9.

Table 6. 9 Model Fit Statistics

The model fit measures	Type	Acceptable value (Hair, 2010)	The model result
Chi-square (χ^2) with degree of freedom (df) and probability (p)	Absolute fit gauges	$p > 0.05$	$\chi^2 = 14.742$; $p = 0.039$; $df = 7$
Goodness-of-fit index (GFI)	Absolute fit gauges	≥ 0.9	0.989
The root mean square error of approximation (RMSEA)	Absolute fit gauges	0.03 to 0.08	0.059
Comparative fit index (CFI)	Incremental fit	≥ 0.9	0.998
Adjusted goodness-of-fit (AGFI)	Incremental fit	≥ 0.9	0.931
Normed fit index (NFI)	Incremental fit	≥ 0.9	0.997
Tucker-Lewis Index (TLI)	Incremental fit	≥ 0.9	.992

6.9.3 Construct Validity

The construct validity, or measurement validity, indicates whether or not the item observed reflects the theoretical model (Bryman and Bell, 2003). The main objective of undertaking confirmatory factor analysis (CFA) is to evaluate the measurement validity of the proposed estimated model (Hair et al., 2010). The evaluation of the measurement validity also implies the measurement of reliability (Bryman and Bell, 2003). If the items are unreliable, this also indicates an invalid result.

The validity measurement comprises convergent validity and discriminant validity. Convergent validity evaluates the association between the latent construct variables, which creates the same construct cluster of observed variables (Hair, 2010). On the other hand, discriminant validity is the measure of each item of question which is representative of the latent variables (Garver & Mentzer, 1999).

In this research, convergent validity and discriminant validity tests were used to evaluate the validity of the estimated model in terms of the link between intellectual capital, entrepreneurial orientation, and the innovation capability. The latent variables consist of seven constructs variables, which are loaded by confirmatory factor analysis. The convergent validity test yielded the positive value for all correlated items.

Overall, the results shown in Table 6.9 indicate a good fit of an acceptable value. For example, the values for CFI, GFI, AGFI, and TLI are 0.998, 0.989, 0.931, and 0.992 respectively, all of which are larger than 0.900. The RMSEA also indicated a good fit, with a value of 0.059. The factor loading also showed a good performance. The results show that the factor loading per item was not less than 0.6. Therefore, it did not miss the standard minimum for factor loading in social science, which is 0.4 (Ford et al., 1986).

6.9.4 Measure Reliability

Reliability is the consistency measurement for the items observed (Bryman and Bell, 2003). There are three factors in reliability measurement, which are stability, internal reliability, and inter-observed consistency. In this study, the internal reliability test was used, as it uses factor analysis to identify the strength of the connection between items (Loewenthal and Lewis, 2001).

Cronbach's Alpha is commonly used in internal reliability tests, where the Cronbach's Alpha should be greater than 0.7. However, 'openness' was only the construct variable that had an Alpha value of 0.683, which is close to 0.7. However, (Loewenthal and Lewis, 2001) suggests that the acceptable minimum Alpha value is 0.6. Therefore, the reliability result is considered acceptable.

6.9.5 The results of structural equation modeling analysis

The standardised estimation and Z-value for the hypothesis are provided in Table 6.9. The latent construct variable hypothesis is shown in the description of path section, which consists of twelve hypotheses. The others were controlled variable of firm age and firm size to the innovation. Some of the hypotheses were not significant, which means there was no significant effect between variables.

Hypothesis 1 describes the relationship between human capital and entrepreneurial orientation. Hypothesis 2 explains the link between social capital and entrepreneurial orientation, and the innovation capability. Hypotheses 3, 4, and 5 explain the mediating effect of risk-taking, proactiveness, and openness in mediating the relationship between intellectual capital and the innovation capability.

The outcome of this research is essential for the implication to the knowledge and the industry regarding the influence of intellectual capital on innovation. Although many studies have investigated the relationship between intellectual capital and innovation, the mediating effect of entrepreneurial orientation has been somewhat neglected. Therefore, in this study, the researcher evaluates the mediating role of

entrepreneurial orientation on the relationship between intellectual capital and innovation in ICT-SMEs in Indonesia.

The results show that human capital positively affects risk-taking, with $\beta = 0.699$ and p-value under 0.001, which is significant. This means H1a can be accepted. Other relationships to human capital - proactiveness (H1b) and human capital - openness (H1c) also produces the same result. Human capital positively influences proactiveness and openness, with $\beta = 1.033$ and $\beta = 0.464$ respectively.

The link between social capital and risk-taking, as well as proactiveness, produced an insignificant p-value. This means that social capital does not influence risk-taking and proactiveness, indicated by a p-value > 0.1, and so H2a and H2b are not accepted. However, social capital influences openness at 0.487 of β coefficient. This means H2c is supported. All of the entrepreneurial orientation aspects are positively related to radical innovation and incremental innovation, except for openness. The link between openness and both types of innovation are negative, even though they have a significant p-value. A detailed description of the path and the statistical analysis results is provided in Table 6.10.

Table 6. 10 Statistical results for the hypothesised model

H	Description of path	Coef-β	Z-stats	p-value		Result
H1a	Human capital – risk-taking	0.699***	19.193	***	+	Significant
H1b	Human capital – proactiveness	1.033***	28.854	***	+	Significant
H1c	Human capital - openness	0.464***	6.592	***	+	Significant
H2a	Social capital – risk-taking	0.029	0.708	.479	+	Not Significant
H2b	Social capital – proactiveness	0.004	0.093	.926	+	Not Significant
H2c	Social capital - openness	0.635***	8.451	***	+	Significant
H3a	Human capital – radical innovation	0.127	6.589	***	+	Significant
H3b	Human capital – incremental innovation	0.444	12.281	***	+	Significant
H4a	Social capital - radical innovation	-0.109	-9.304	***	-	Significant
H4b	Social capital - incremental innovation	-0.320	-14.622	***	-	Significant
H5a	Risk-taking - radical innovation	0.204***	13.597	***	+	Significant
H5b	Risk-taking - incremental innovation	0.439***	15.285	***	+	Significant
H6a	Proactiveness - radical innovation	0.442***	22.189	***	+	Significant
H6b	Proactiveness - incremental innovation	0.507***	13.597	***	+	Significant
H7a	Openness - radical innovation	-0.054***	-5.655	***	-	Significant
H7b	Openness - incremental innovation	-0.130***	-7.339	***	-	Significant

Controls	Coefficient-β	Z-statistics
Firm age - radical innovation	-0.002	0.849
Firm age - incremental innovation	0.005	0.828
Firm size - radical innovation	-0.010	0.157
Firm size - incremental innovation	0.003	0.828

*(***p< 0.001; **p< 0.01; *p< 0.05; one-tailed tests) *Coef: Coefficient-β*

6.10 Nested model tests

The nested model test was employed as a fitness test through implementing sequential Chi-square. This test distinguishes each model tested, such as the null model, saturated model, and hypothesis models, which are the direct path eliminated, mediation model, and direct effect model (Steiger et al., 1985; Loehlin, 2004). The default model refers to the original complete model. The saturated model reflects the model predictor of the data point. It should be fit, and generate the best results (J.J. Hox and Bechger, 1998). In Table 6.11 below, the summary of the nested test results are presented.

Table 6. 11 Nested model results

Model	χ^2	P	df	GFI	NFI	CFI	Normed χ^2
1. Null model	5.982	.425	6	.996	.999	1.000	. 997
2. Saturated (measurement model)	.000	.000	0	1.000	1.000	1.000	1.000
3. Hypothesis (mediation model)	346.883	.000	10	.850	.922	.923	34.688
4. Next-best constrained (direct effect model)	4436.866	.000	36	.230	.000	.000	123.246

6.11 Analytical procedures

The test of mediating effect revealed a significant p-value for all mediating variables, excluding risk-taking and proactiveness, in mediating social capital. This means that these mediating variables do not mediate social capital and innovation. Regarding the direct effect, only human capital had a positive estimation β with incremental innovation, and thus has a negative effect on radical innovation. The result aligned with Subramaniam and Youndt (2005), that yield human capital negatively affected radical innovation. However, in with Subramaniam and Youndt (2005), the relationship between social capital and innovation were positive and it was different than this research result which yields negative influence on innovation. This differences maybe due to the Subramaniam and Youndt (2005)'s study was undertaken in U.S which has different culture with Indonesia. In addition, the mediating variable revealed the negative impact of openness on innovation. This means that openness is not a good mediating variable.

Table 6. 12 Mediation test and comparison of the standardised path coefficients

Description of path			Direct Model	Hypothesised Model	Saturated Model
Human Capital	-	Radical Innovation	-.093***		-.101***
Human Capital	-	Incremental Innovation	.466***		.533***
Human Capital	-	Risk-Taking		**.699*** **	.844***
Human Capital	-	Proactiveness		**1.033*** **	.939***
Human Capital	-	Openness		**.464*** **	.376***
Social Capital	-	Radical Innovation	- .107***		-.036**
Social Capital	-	Incremental Innovation	- .322***		-.359**
Social Capital	-	Risk-Taking		.029ns	.050ns
Social Capital	-	Proactiveness		.004ns	.008ns
Social Capital	-	Openness		.635***	**.**488***
Risk-Taking	-	Radical Innovation		.203***	.205***
Risk-Taking	-	Incremental Innovation		.439***	.283***
Proactiveness	-	Radical Innovation		.444***	1.130***
Proactiveness	-	Incremental Innovation		.503***	.530***
Openness	-	Radical Innovation		-.057***	-.251***
Openness	-	Incremental Innovation		-126***	**-.**113***

****p< 0.001; **p< 0.01; *p< 0.05; one-tailed tests. The number in bold indicates the instances where mediation is positive.*

6.12 The Sobel mediator test and bootstrapping

To measure the mediating effect of the proposed model, the Sobel mediator test and bootstrapping were used. This generates an empirical estimation of the population distribution to determine the accuracy of statistical estimation. The researcher carried out the Sobel test and bootstrapping using SPSS.

The researcher used this test to evaluate the mediating effect of risk-taking, proactiveness, and openness on the relationship between intellectual capital and the innovation capability. In addition, it provided an estimation of direct effect, indirect effect, and total effect of the mediator. MacKinnon and H. Dwyer (1993) introduced this test to provide the prevailing, and proper prediction of mediating effect. It is more

powerful than the mediating process used by Baron and Kenny (1986), which utilises four criteria that are not systematic.

6.12.1 Direct, total and bootstrapped approaches

The control variables were firm age and firm size. These two control variables, along with entrepreneurial orientation (risk-taking, proactiveness, and openness) were evaluated to determine the mediating effect on the relationship between intellectual capital and the innovation capability. An illustration of mediating effect is presented in Figure 6.2 below:

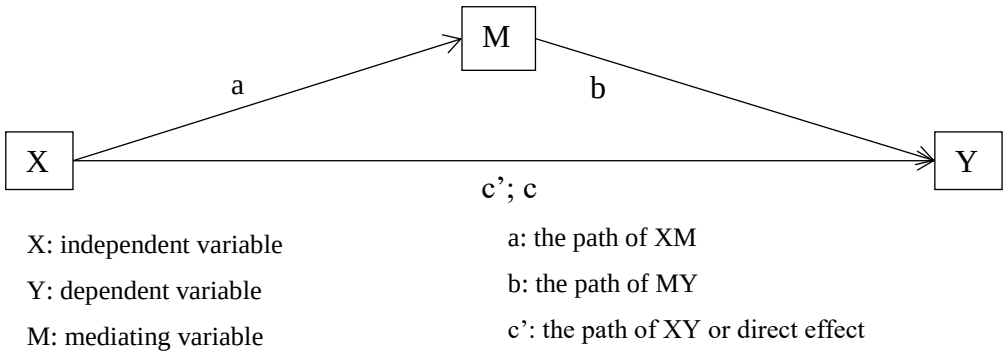


Figure 6. 2 The mediating effect
Adopted from Baron and Kenny (1986)

The elimination of modification item should produce the significant value, according to Lin et al. (2013). The full and partial mediation should also be significant. Therefore, the Sobel mediating test and bootstrapping tests are beneficial to test the significance of the mediating effect, and to measure the partial or full mediating effect.

The results of the Sobel mediating test and bootstrapping tests are presented in Table 6.12. The results for direct effect show that most of the paths have a significant value, except for the path of openness (OP) on radical innovation (RI), and the path of social capital (SC) on radical innovation (RI). For indirect effect, all paths had a significant p-value except openness when mediating human capital and radical innovation. The confident interval used for bootstrapping was 95%.

Table 6.13 shows the findings for the significant variance of the mediating variables. This was achieved using the Sobel test. The mediating effect of risk-taking on the relationship between human capital and radical innovation is significant ($Z=.2499$; $p < 0.001$). Further, the other relationships show a significant effect of the mediating variable, except for openness on the relationship between human capital and radical innovation. In addition, there was a negative Z value for the effect of openness on the relationship between human capital and incremental innovation, although it showed a significant p-value.

Table 6. 13 Mediation test and comparison of the standardised path coefficients

Step	Variables	Coefficient	S. E	T	P
1	XY (HC- RI) c' path or "direct effect"	.3481	.0219	15.9198	.0000***
2	XM (HC - RT) a path	.7218	.0217	33.2437	.0000***
3	MY (RT - RI) b path	.3462	.0269	12.8622	.0000***
4	X-M-Y (HC – RT - RI) c	.5980	.0125	47.7400	.0000***
1	XY (HC - RI) c' path or "direct effect"	.1205	.0257	4.6883	.0000***
2	XM (HC - PR) a path	1.0362	.0205	50.6231	.0000***
3	MY (PR - RI) b path	.4609	.0235	19.6261	.0000***
4	X-M-Y (HC – PR - RI) c	.5980	.0125	47.7400	.0000***
1	XY (HC - RI) c' path or "direct effect"	.5738	.0201	28.5869	.0000***
2	XM (HC - OP) a path	.9548	.0442	21.5872	.0000***
3	MY (OP - RI) b path	.0253	.0165	1.5408	.1244ns
4	X-M-Y (HC – OP - RI) c	.5980	.0125	47.7400	.0000***
1	XY (HC - II) c' path or "direct effect"	.4933	.0383	12.8639	.0000***
2	XM (HC - RT) a path	.7218	.0217	33.2437	.0000***
3	MY (RT - II) b path	.5835	.0472	12.3622	.0000***
4	X-M-Y (HC – RT - II) c	.9144	.0217	42.2133	.0000***
1	XY (HC - II) c' path or "direct effect"	.3583	.0582	6.1557	.0000***
2	XM (HC - PR) a path	1.0362	.0205	50.6231	.0000***
3	MY (PR - II) b path	.5367	.0532	10.0891	.0000***
4	X-M-Y (HC – PR - II) c	.9144	.0217	42.2133	.0000***
1	XY (HC - II) c' path or "direct effect"	.9999	.0343	29.1793	.0000***
2	XM (HC - OP) a path	.9548	.0442	21.5872	.0000***
3	MY (OP - II) b path	-.0895	.0281	-3.1852	.0016**
4	X-M-Y (HC – OP - II) c	.9144	.0217	42.2133	.0000***
1	XY (SC - RI) c' path or "direct effect"	.0330	.0219	1.5087	.1325ns
2	XM (SC - RT) a path	.6467	.0337	19.1610	.0000***
3	MY (RT - RI) b path	.6986	.0252	27.7665	.0000***
4	X-M-Y (SC – RT - RI) c	.4847	.0277	17.4927	.0000***
1	XY (SC - RI) c' path or "direct effect"	-.0855	.0138	-6.1729	.0000***
2	XM (SC - PR) a path	.9162	.0423	21.6443	.0000***
3	MY (PR - RI) b path	.6224	.0118	52.5685	.0000***
4	X-M-Y (SC – PR - RI) c	.4847	.0277	17.4927	.0000***

Table 6.13 Continued

Step	Variables	Coefficient	S.E	T	P
1	XY (SC - RI) c' path or "direct effect"	.2058	.0417	4.9355	.0000***
2	XM (SC - OP) a path	1.0449	.0454	22.9939	.0000***
3	MY (OP - RI) b path	.2669	.0320	8.3474	.0000***
4	X-M-Y (SC – OP - RI) c	.4847	.0277	17.4927	.0000***
1	XY (AC - II) c' path or "direct effect"	-.0933	.0348	-2.6804	.0078**
2	XM (SC - RT) a path	.6467	.0337	19.1610	.0000***
3	MY (RT - II) b path	1.2029	.0401	30.0053	.0000***
4	X-M-Y (SC – RT - II) c	.6846	.0468	14.6405	.0000***
1	XY (SC - II) c' path or "direct effect"	-.2362	.0313	-7.5546	.0000***
2	XM (SC - PR) a path	.9162	.0423	21.6443	.0000***
3	MY (PR - II) b path	1.0050	.0267	37.5924	.0000***
4	X-M-Y (SC – PR - II) c	.6846	.0468	14.6405	.0000***
1	XY (SC - II) c' path or "direct effect"	.3015	.0731	4.1232	.0000***
2	XM (SC - OP) a path	1.0449	.0454	22.9939	.0000***
3	MY (OP - II) b path	.3666	.0561	6.5374	.0000***
4	X-M-Y (SC – OP - II) c	.6846	.0468	14.6405	.0000***

Total Indirect Effect	**X on Y**	**Value**	**S.E**	**LL 95% CI**	**UL 95% CI**	**Z**	**Sig (two)**
Risk-taking (RT)	HC-RI	.2499	.0324	.1857	.3112	11.9909	.0000***
	HC-II	.4212	.0529	.3254	.5305	11.5824	.0000***
	SC-RI	.4518	.0335	.3875	.5191	15.7636	.0000***
	SC-II	.7779	.0546	.6774	.8880	16.1428	.0000***
Proactiveness (PR)	HC-RI	.4776	.0296	.4204	.5374	18.2959	.0000***
	HC-II	.5561	.0574	.4427	.6680	9.8927	.0000***
	SC-RI	.5702	.0360	.4971	.6397	20.0111	.0000***
	SC-II	.9208	.0577	.8083	1.0336	18.7524	.0000***
Openness (OP)	HC-RI	.0242	.0214	-.0183	.0652	1.5353	.1247ns
	HC-II	-.0854	.0351	-.1550	-.0176	-3.1478	.0016**
	SC-RI	.2789	.0405	.1985	.3577	7.8398	.0000***
	SC-II	.3830	.0680	.2534	.5220	6.2827	.0000***

The significant p-value: $p < 0.1^{+}$; $p < 0.5^{*}$; $p < 0.01^{**}$; $p < 0.001^{***}$. This result is the unstandardised result for all paths.

6.12.2 The mediating effect

Intellectual capital, which comprises human capital and social capital, was used as the predictor. These factors are related to the innovation capability (radical innovation, and incremental innovation), which is the outcome variable. However, because there was no consensus in perspectives regarding this relationship, in this research, entrepreneurial orientation was used to mediate the relationship between intellectual capital and innovation capability. In this research, risk-taking, proactiveness, and openness were treated as elements of entrepreneurial orientation.

Figure 6.3 illustrates the result of regression analysis, including the significant value and the coefficient of all paths. This path describes the relationship between intellectual capital, entrepreneurial orientation, and the innovation capability. The mediators have partially satisfied on the relationships since only one path is not significant.

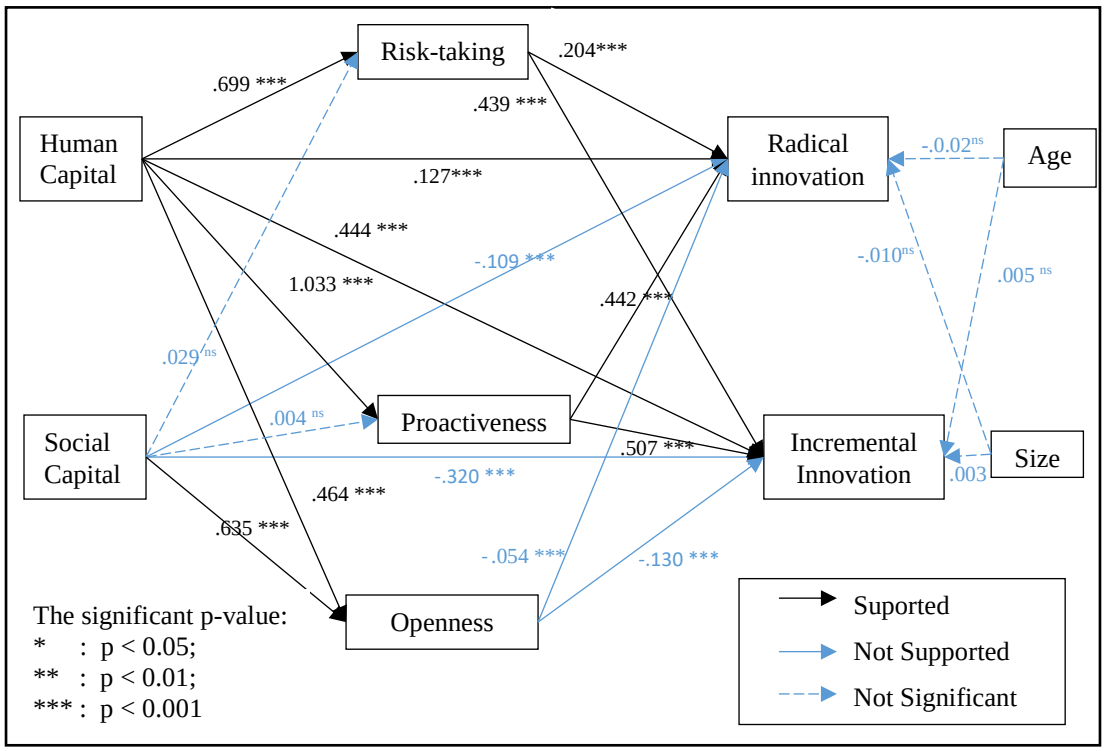


Figure 6. 3 The result of mediating test of risk taking, proactiveness, and openness

6.13 Summary of the result

This section will summarise the results relating to the overall hypothesis. Table 6.14 presents all the hypotheses, and the related findings. The direct effect of human capital and innovation capability is positive. In contrast, social capital negatively influence innovation. The mediating effect of risk-taking and proactiveness improved the relationship between human capital, radical innovation, and incremental innovation. Only openness had a negative effect on both types of innovation capability; even though it has significant p-value, it is not a good mediating variable.

By contrast, risk-taking and proactiveness had no significant effect on social capital. This means that proactiveness and risk-taking could not mediate the relationship between social capital and innovation. Openness had a significant p-value, but a negative impact as a mediating variable on the relationship between social capital and innovation. Further, both control variables (firm size and firm age) showed no significant effect on radical innovation and incremental innovation. This means that the control variables do not have an impact on innovation.

Table 6. 14 Results summary

Hypotheses		Findings (Supported?)
H1a	Human capital positively affects risk-taking	Y
H1b	Human capital positively affects proactiveness	Y
H1c	Human capital positively affects openness	Y
H2a	Social capital positively affects risk-taking	N
H2b	Social capital positively affects proactiveness	N
H2c	Social capital positively affects openness	Y
H3a	Human capital positively affects radical innovation.	Y
H3b	Human capital positively affects incremental innovation.	Y
H4a	Social capital positively affects radical innovation	N
H4b	Social capital positively affects incremental innovation	N
H5a	Risk-taking mediates the relationship between human capital and social capital, and radical innovation	Y
H5b	Risk-taking mediates the relationship between human capital and social capital, and incremental innovation	Y
H6a	Proactiveness mediates the relationship between human capital and social capital, and radical innovation	Y
H6b	Proactiveness mediates the relationship between human capital and social capital, and incremental innovation	Y
H7a	Openness mediates the relationship between human capital and social capital, and radical innovation	N
H7b	Openness mediates the relationship between human capital and social capital, and incremental innovation	N
Ctrl Variable	Age of firms.	N
	Size of firms.	N

CHAPTER 7 DISCUSSION AND CONCLUSION

- Introduction
- Summary of findings
- Key findings and insight
- Contribution to knowledge
- Managerial implication
- Limitation and future research
- Quality of research
- Reflection
- Conclusion

7.1 Introduction

This final chapter aims to address the research question and objectives by summarising and discussing the key findings. This chapter will be divided into two parts. The first part will discuss the results and the key findings from the empirical work presented in Chapter 6. In this part, the researcher will attempt to address the research question by discussing the individual hypotheses. The second part will conclude the thesis by discussing the contribution to knowledge, managerial implications, the limitations of the research, and future research opportunities.

The research question addressed in this research was: *In the context of a developing country, how do intangible resources affect innovation capability in SMEs?* As discussed in Chapter 2, the existing literature highlights the relationship and impact of intangible resources on the innovation capability of organisations. However, previous literature has also produced mixed results in regard to the nature of this relationship.

Authors such as Wiklund and Shepherd (2003) have argued that there is a dearth of research studying the nature of the link between intangible resources and

organisational performance. In this regard, several authors, including Teece (2007), Wu, Chang and Chen (2008), and Teece (2009) have discussed Entrepreneurial Orientation (EO) as a theoretical lens that can help explain the way in which resources (both tangible and intangible) can be managed to achieve competitive advantage. These arguments are based on the effect that key dimensions of EO (risk-taking, proactiveness, and openness) have on strategic decision-making. Taking this into account, in this study the researcher argues that EO is a useful construct with which to study the relationship between intangible resources and innovation capability and to explain the mediating role of EO. More specifically, this research aimed to understand the relationship between intellectual capital (human capital and social capital) and EO (risk-taking, proactiveness, and openness) on a firm's innovation capability (radical innovation and incremental innovation) in the context of SMEs in developing countries.

7.2 Summary of findings

As presented in Chapter 6, the researcher conducted a survey-based analysis of ICT SMEs in Indonesia. Owners, CEOs, directors, and managers were asked to complete the survey. After conducting data screening, there were 297 valid responses. The hypotheses were then tested by collecting data through an online survey. The results showed the validity of the model (χ^2 = 14.742; p > 0.05; and df = 7) and revealed an acceptable goodness of fit (GFI = 0.989; CFI = 0.998; AGFI = 0.931; NFI=0.997; TLI = 0.0.992). The validity of the model was presented in Table 6.9 in Chapter 6.

Figure 6.3 showed that intellectual capital significantly affects innovation capability. However, the results were mixed for the individual variables of intellectual capital. This study has shown that human capital can positively affect radical innovation and incremental innovation, but social capital has a negative effect on radical innovation and incremental innovation. These results support the findings of some previous studies (Coleman, 1988; Hayton, 2005; Leitner, 2011; Gómez and Vargas, 2012) but contradict those of other studies (Subramaniam and Youndt, 2005;

Wu et al., 2008; Akçomak and ter Weel, 2009). The latter reported results suggesting that human capital has a negative impact on innovation capability whilst social capital has a positive impact (Subramaniam and Youndt, 2005). In light of the mixed results reported in previous studies of intellectual capital (human capital and social capital) and innovation capability (radical innovation and incremental innovation), the researcher then included EO as the mediator of the relationship between intellectual capital and innovation capability. According to Boso et al. (2013), entrepreneurial orientation can strengthen knowledge and social ties to promote performance, especially in developing countries. However, in this study, the results showed that EO, such as risk-taking and proactiveness, can mediate relationship between intellectual capital and innovation capability, with the exception of openness. As Hayton et al. (2002) observed that national culture can influence the characteristics of entrepreneurial behaviour - also a possible explanation for the varying results of previous study - the researcher utilises the national culture from Hofstede (1984) to explain the finding further. On this point, Anderson and Eshima (2013) argued that EO may affect companies' performance differently across national context due to their different cultures. Hayton et al. (2002) utilised Hofstede's model of national culture. Further, this research adopted the theory of national culture, and specifically Hofstede's model of national culture, to discuss the findings and compare and contrast these with previous literature. Some studies connect innovation capacity and national culture across different countries based on Hofstede's model (Herbig and Dunphy, 1998; Kusumawardhani et al., 2012; Tekin and Tekdogan, 2015). The present study also employed the dimensions of Hofstede model to explain the differences in the results.

7.3 Key findings and insights of testing the hypothesis

This section will discuss the key findings in relation to the hypothesis regarding the influence of intellectual capital on innovation capability, as presented in Chapter 6. This section also presents the mediating impact of entrepreneurial orientation on the relationship between intellectual capital and innovation capability.

7.3.1 The relationship between human capital and risk-taking

H1a: Human capital is positively related to risk-taking
Finding: Supported

The finding of this research has revealed that human capital has a positive impact on risk-taking (β=0.699; t=33.2437; $p<0.05$). This result supports H1a. This means that human capital, such as skills, knowledge, and experiences are positively related to risk-taking behaviour. This result aligns with the findings of Hayton (2003), Avlonitis and Salavou (2007), Cao, Simsek and Jansen (2015), Calantone, Tamer Cavusgil and Zhao (2002), and Morgan and Strong (2003), who revealed that human capital can promote individual risk-taking. For instance, the investment of human capital skill and knowledge, through training and knowledge exchange, can equip managers with decision-making abilities. The more experienced and skilled a CEO is, the more capable they are in selecting strategy and pursuing the entrepreneurial initiatives.

Managers must be in possession of information and knowledge to identify opportunities and utilise resource to attain competitive advantage. Based on this, they need to decide what strategy should be followed. Willingness to take a risk is important attribute of managers and can encourage them to be more innovative. The managers who are comfortable with risk tend to implement more radical innovation, while managers who choose low-risk strategies are more inclined to apply incremental innovation.

By contrast, previous studies such as those by Chakraborty, Sheikh and Subramanian (2007), Chen and Zheng (2014), John, Litov and Yeung (2008), Filippetti and Guy (2016), May (1995), and Bloom and Milkovich (1998) have reported a negative relationship between human capital and risk-taking. For example, the managers take a risk to invest on human capital by training and educating employees. This investment can fail or succeed; a failed investment of human capital can cause high cost of investment and high expectation in human capital, but a low

return on investment (Dess and Sha, 2001). Furthermore, the managers can have the risk-averse which is the unwillingness in taking a risk. This could be because managers are afraid of their decision having a negative impact on the company.

The results of this research indicate a positive effect of human capital on risk-taking. This can be explained by the dimension culture (Geert Hofstede et al., 2010), i.e. uncertainty avoidance. According to Lumpkin and Dess (2001), risk-taking is the tendency to take action in regard the uncertain situation, where lower uncertainty avoidance means the willingness of the managers to take a risk is higher. In Indonesia, the uncertainty avoidance is low, i.e. 48. This means that Indonesian people are courageous in facing the uncertain and volatile situation; they can adapt and cope with any condition. In addition, Indonesia has the high level of political and economic risk (Kreiser et al., 2010). This encourages managers to be more risk-tolerant, because they can be tougher in addressing market changes and seizing opportunities.

7.3.2 The relationship between human capital and proactiveness

H1b: Human capital is positively related to proactiveness
Finding: Supported

Human capital was found to have a positive impact on proactiveness (β=1.033; t=50.6231; $p<0.05$). This means that the H1b is supported. This result also supported by Seibert, Grant and Kraimer (1999), who identified a positive effect of salary and career success on proactiveness. By contrast, human capital can negatively affect proactiveness if the individual shows the low self-efficacy (Rakowska, 2014). Low self-efficacy is the personal behaviour that can terminate the attempt earlier to do the task (Stajkovic and Luthans, 1998). For example, the managers who has low self-efficacy tends to be highly motivated to anticipate an uncertain future and will suspend their efforts if the problem becomes complex.

In an uncertain future, companies need to be more proactive in taking opportunities to attain a competitive advantage. This proactive action can be embedded

in the manager as the decision maker. Proactiveness is an individual personality trait of reacting proactively to a changing environment. For example, a proactive manager searches for more information and knowledge about the situation in the market environment in order to identify market needs. In this case, the proactive manager can decide faster which strategies should be implemented to take advantage of opportunities and attain the competitive advantage.

The results of this study suggest that human capital positively affects proactiveness. In term of Hofstede model, Indonesia has the high score, 62, for long-term orientation. Therefore, many managers in ICT-SMEs in Indonesia have the proactive attitude; they anticipate the future and are proactive in searching opportunity can make the company to be success.

7.3.3 The relationship between human capital and openness

H1c: Human capital is positively related to openness
Finding: Supported

In this study, human capital was found to have a positive impact on openness (β=0.464; t=21.5872; $p<0.05$). This finding is aligned with studies by Xu, Lai and Qi (2008), and Lin *et al.* (2013), which explain that the synergy between human capital and openness can improve economic growth and productivity. Openness includes open-mindedness in accepting external knowledge and the willingness to create new ideas (Moore and McElroy, 2012). The curiosity that can be embedded in individuals can trigger those individuals to search for new information and new knowledge. By contrast, studies of Sonmez and Sener (2009) and Jadoon, Rashid and Azeem (2015) have argued for the negative impact of human capital on openness, which can be due to less-skilled workers being resistant to change and not being open to something new. It might cause the employees reluctant to the changes.

In this study, openness can be related to uncertainty avoidance in Hofstede model. The low level of uncertainty avoidance in Indonesia can be because of the

curiosity of individual, even though the individual has a high tolerance of differences. This high tolerance can cause Indonesian people to accept change and eventually can open their minds. Open-mindedness can be difficult, initially, to foster; however, employees typically want to please their manager, so they are likely to accept any change.

7.3.4 The relationship between social capital and risk taking

H2a: Social capital is positively related to risk-taking
Finding: Not Supported

The finding showed that social capital has no significant effect on risk-taking (β=0.029; t=19.1610; p>0.05), even though β was positive. Social capital was shown to have a positive impact on risk-taking, but very little effect or almost none to risk-taking. This means that risk-taking cannot support social capital. According to Camps and Marques (2014), social capital is promoted by risk-taking in exploration which encourages people to create new ideas. This is because trust amongst the individuals in an organisation create feelings of safety and comfort. Cao, Simsek and Jansen (2015) also agree that social capital, which is represented by strong bonds between CEOs, supports a comprehensive understanding to evaluate firm risk. CEOs can be more confident and comfortable taking risks in their decision-making.

Regarding the Hofstede model, Indonesian people have lower score for individualism. This means that people in Indonesia prefer to work together. People in Indonesia like to live in harmony because they do not like social conflict (ITIM International, 2017). This is also strengthened by another dimension, masculinity, in which the score was low (46). This means that Indonesia is a largely feminine country; this type of country is more focused on consensus, equality, and solidarity; and less on wealth. Social conflict is solved by consensus, rather than fighting against each other. In this context, people do not want to take high risk in their relationship with other people. It is ambiguous with other dimension such as uncertainty avoidance, where the

score was lower, 48, which means Indonesian people can accept change that is associated with high risk. In the Hofstede Model, since social capital can affect risk-taking differently, this research finds that social capital cannot be supported by risk-taking.

7.3.5 The relationship between social capital and proactiveness

H2b: Social capital is positively related to proactiveness
Finding: Not Supported

The results showed that social capital has no significant effect on proactiveness (β=0.004; t=21.6443; p>0.05), even though the result was positive. This result aligns with a study by Jawahar and Nigama (2011), who found no significant between social capital and proactiveness in SMEs India. SMEs play important role in the growth of the economy in all countries in the world, including Indonesia, a developing country. The low level of individualism means these countries are characterised by collectivism, implying that people tends to work together as a group. Indonesia has the characteristics of the more collectivist society and has strong social capital ties.

Social capital includes the interaction between individuals, units, or institution. Also, the interaction require proactiveness to anticipate the needs between a member in the network (George et al., 2001). For example, the company should identify the new opportunity in the market by collaborating with other companies. Google is a good example of the company that succeed in the inter-organisational collaboration to be proactive in innovation. Therefore, the companies should utilise social capital and proactiveness to take advantage. In Indonesia, the taxi online company such as Gojek also has collaboration with restaurants to provide delivery service. In this case, Gojek can also be categorised as the company that implement social capital and proactiveness. It provides the delivery service to deliver foods to the customer. However, sometimes Gojek respond the fake call from customer which can harm the driver. In this case, trust is important thing to support social capital and proactiveness.

In Indonesia, people are categorised as the feminine society, they are living in the harmony. In such context, people are not overly ambitious in seeking opportunities, as these might cause conflicts and competitions with colleagues or relatives. Since proactiveness is related to opportunity-seeking, the researcher finds that proactiveness cannot support social capital.

7.3.6 The relationship between social capital and openness

H2c: Social capital is positively related to openness
Finding: Supported

Social capital was positively related to openness (β=0.635; t=22.9939; $p<0.05$). This result is aligned with those Lebedeva, Osipova and Cherkasova (2013) and Love, Roper and Bryson (2011) who also found that social capital positively influences openness. By developing trust and through mutual learning, teams can share their idea to create the new idea.

Strengthening trust and collective knowledge can emerge where there is openness between individuals. For example, ICT-SMEs in Indonesia created the group in Facebook namely Suwec. In this group, communication and collaboration are developed, such as training for the group members. Sometimes they discuss the problems regarding their business or ask for collaboration on a project.

Based on the Hofstede model, in Indonesia the national culture is collectivism; in this context, trust is necessary to build strong ties. Trust enables people to be more open with new information and knowledge. In a team, environment diversity and conflict can appear; with strong ties, people in Indonesia can minimise this conflict.

7.3.7 The relationship between human capital and radical innovation capability

H3a: Human capital is positively related to radical innovation
Finding: Supported

Human capital was shown to have a positive impact on radical innovation capability (β=0.127; t= 15.9198; $p<0.05$). This result supports H3a, which means that knowledge, skill, and attitude at the individual (i.e. CEO) level support radical innovation capability. This finding is aligned with those of Aminullah et al. (2017) and Dakhli and Dirk De Clercq (2004), who agree that the enhancement of knowledge and skill increases innovative activity, and, ultimately, innovation capability. Training and education can increase creativity and lead to new ideas. It also can enhance the ability to capture opportunities in a changing market. However, this result contrasts with the findings of Subramaniam and Youndt (2005), who demonstrated a negative influence of human capital on radical innovation because of trust. However, this difference could be explained by the fact that Subramaniam and Youndt's (2005) study was conducted in a developed country with a different culture to Indonesia, as a developing country.

Under the Hofstede model, Indonesia scored highly for power distance, which means the authority in decision-making is dominated by the CEO in most of the companies in Indonesia, including ICT-SMEs. However, the uncertainty avoidance is very low, which means people in Indonesia, particularly CEOs, particularly CEOs are able to adapt to the fast-changing environment. This behaviour can be a potential strength, enabling companies to be more innovative. In this case, the individual who has authority in decision-making and takes control of innovation capability should be the CEO. In addition, many previous studies agree that SMEs have a non-formal structure, which enable them to be more flexible in adapting to a fast-changing environment. This should represent an advantage for SMEs in the ability to take opportunities to innovate.

7.3.8 The relationship between human capital and incremental innovation capability

H3b: Human capital is positively related to incremental innovation
Finding: Supported

Human capital was found to have a positive impact on incremental innovation capability (β=0.635; t= 12.8639; p<0.05). This result supports H3b. Regarding financial support, SMEs in Indonesia support their own business with their own budget. Therefore, SMEs are not strong in terms of investment in innovation. The ability of SMEs to innovate lies mainly in developing an existing product. In addition, infrastructure in Indonesia is limited, for example, the internet is underdeveloped. Therefore, SMEs utilise their existing facilities to develop new products.

This result aligns with the study by Aminullah et al. (2017), who found that human capital in the majority of manufacturing industries and service industries positively influences innovation activity. According to Aminullah et al. (2017), in Indonesia, only around 38% of companies have a formal R&D practice In addition, there are limited researchers in R&D in most industries in Indonesia (Aminullah et al., 2017), because the expenses of R&D activities is costly. Further, the companies expect to receive the revenue in a short time. However, the activities of R&D require a long time to get back the revenue. In this case, SMEs utilises their existing resources to implement incremental innovation. In addition, many CEOs in SMEs, have general knowledge, skills, and abilities which can enable incremental innovation.

According to Autio, Pathak and Wennberg (2013), uncertainty avoidance can enable incremental innovation. It is because SMEs are aware of the possibility to be failed in producing a new product. In this case, they encourage incremental innovation, which is less risky than radical innovation. In this research, it was found that because SMEs have less ability to invest in R&D, they tend to implement incremental innovation.

7.3.9 The relationship between social capital, radical innovation capability and incremental innovation capability

H4a: Social capital is positively related to radical innovation H4b: Social capital is positively related to incremental innovation
Finding: Not supported

Social capital was found to have a negative effect on radical innovation capability (β=-0.320; t=1.5087; p<0.05) and incremental (β=0.635; t=4.9355; p<0.05) innovation capability. This result contradicts that of Subramaniam and Youndt (2005), who found that social capital positively affects innovation capability. This may be because the context of the aforementioned study was a developed country. By contrast, another study that also investigated the effect of intellectual capital on innovation demonstrated a negative impact of the relationship between social capital and innovation capability. According to Andreeva and Garanina (2016) and Siahaan (2017), developing countries are facing the same situation of "brain drain". This situation has occurred because developing countries lack skilled and experienced talent, as the more skilled individuals have sought out opportunities overseas.

Another explanation emerges from the Hofstede model. Based on the Hofstede model, Indonesia scores highly for power distance (78 over 100). In Indonesia, there is a big gap between managers and employees. The communication between the lower level of organisational structure to the top level is not explicit because the employees are afraid to criticise something to their manager. In this case, the employees do not have opportunities to share their ideas. It is because the power is centralised, residing in the manager, and the employees do not want to share their idea. This situation will inhibit innovation.

7.3.10 The mediating role of Entrepreneurial Orientation

7.3.10.1 Risk-taking

H5a: Risk-taking mediates the relationship between intellectual capital and radical innovation capability H5b: Risk-taking mediates the relationship between intellectual capital and incremental innovation capability
Finding: supported

The results revealed that risk-taking mediates the impact of intellectual capital on radical innovation capability, i.e., supporting H5a (β=0.204, t=27.7665, ρ<0.05) and H5b (β=0.442, t=30.0053, ρ<0.05). Martín-de Castro et al. (2013) found the strong relationship between HC and product innovation if it is mediated by innovation culture such as climate that stimulates employees' creativity, responsive to the risk, and promotes individual improvement constitutes.

In a fluctuating market, generating innovation is important to attain a competitive advantage. The launch of a new product can succeed or fail, due to the uncertainty of the market, and a newly released product may fail to meet expectations and demand. For example, in 2017, Apple launch the new feature of I-phone such as Face ID which was known as failed demo (Richardson, 2018). In this example, Apple was unsuccessful in launching their product. It can be categorised as the obstacle of innovation (D'Este et al., 2012). Then, some obstacle of innovations such as financial, market, regulation and knowledge can be emerged automatically in the volatile market. It causes a risk and the manager should have the encouragement in taking a risk.

A manager must take a risk if they want to implement innovation. Thus, without taking risks, innovation can be inhibited (Hughes and Morgan, 2007). If a company does not innovate, its products will become obsolete and left be behind, and the company will lose its competitive advantage. The level of risky is depending on the radicalness of innovation capability that companies want to be developed.

7.3.10.2 Proactiveness

H6a: Proactiveness mediates the relationship between intellectual capital and radical innovation capability H6b: Proactiveness mediates the relationship between intellectual capital and incremental innovation capability
Finding: Supported

The results revealed that proactiveness mediates the impact of intellectual capital on radical innovation capability, i.e. supporting H6a (β=0.760, t=52.5685, ρ<0.05) and H6b (β=0.561, t=37.5924, ρ<0.05). The fluctuating market forces SMEs to be proactive in searching for new opportunities (Setiawan et al., 2015). To successfully seize opportunities, companies must be innovators, not adopters. For example, some ICT-SME start-ups attempt to promote agricultural product such as TerralogiQ, AiRi, Regopantes, Vasham, CiAgriculture, Libelium, Petani, LimaKilo and TaniHub, Eragano, Cybreed, iGrow, and 100integrity (Singh, 2018). Indonesia is agrarian country, and these ICT-SMEs support the farmers and fishers by providing ICT products and services, such as e-commerce and agronomic data, aiming to grow the agricultural sector in Indonesia and increase farmers' and fishers' wealth.

7.3.10.3 Openness

H7a: Openness mediates the relationship between intellectual capital and radical innovation capability H7b: Openness mediates the relationship between intellectual capital and incremental innovation capability
Finding: Not supported

The results revealed that openness mediates the impact of intellectual capital on radical innovation capability, i.e. not supporting H7a (β=-0.103, t=8.3474, ρ<0.05) or H7b (β=-0.161, t=6.5374, ρ<0.05). Innovation requires certain features of

organisational culture, such as flexibility, openness, collaboration, and sharing, to take advantage of opportunities, as these features promote the values, behaviours, and norms that can foster creativity (Hurley and Hult, 1998; Schein, 2004).

In Hofstede theory about Indonesian culture, the individual's score is very low which is 14. It means Indonesia has collectivism culture in the social community. It should have the openness among the members of the group because of their loyalty to the group. However, the result of this research shows the conflicting phenomena which openness cannot mediate the relationship between intellectual capital and innovation capability. It may because openness in a business environment is different within the social community. The other attribute of Hofstede theory explains power distance in Indonesia is high. Therefore, it may inhibit the employees to reveals their idea. According to Hofstede (2011), the separation internal appearance and external is different because Indonesian people do not like to have a conflict. Therefore, they cannot enable innovation.

7.4 The contribution to knowledge

This study has examined the relationship between intangible resources and innovation capability. Since the most studied intangible resource is intellectual capital, this research has explored the relationship between intellectual capital (human capital and social capital) and innovation capability (radical innovation and incremental innovation). Intellectual capital needs the mediator to enable innovation capability. Therefore, in this study, the researcher included entrepreneurial orientation (risk-taking, proactiveness and openness) as the mediator of the relationship between intellectual capital and innovation capability. Entrepreneurial orientation, as an organisational behaviour, should be embedded in the decision-maker, such as the CEO, manager, and the owner. It is important to include this behaviour to enable innovation such as how the managers can proactively seize the opportunity, then, they can generate new ideas and innovation. In addition, maybe the managers must decide to take a risk, whether they need to implement radical innovation or to apply

incremental innovation. This requires the skill and knowledge of managers, as well as the collaboration and communication amongst managers, and among companies.

There are few previous studies that include the entrepreneurial aspect of the relationship between intellectual capital and innovation. This study has attempted to fill this gap by conducting an empirical study in the context of ICT-SMEs in a developing country, in this case Indonesia.

This study makes three key contributions to knowledge. First, this study contributes to the resource-based view in innovation literature, since EO plays an important role in mediating the relationship between intellectual capital and innovation capability and, more specifically, the relationship between human capital and innovation capability (not social capital and innovation capability). The relationship between social capital, risk-taking and proactiveness was found not to be significant. This means that risk-taking and proactiveness have a minimal effect, if any, on innovation. Therefore, this dimension cannot be utilised as a mediating variable in the relationship between social capital and innovation capability. Second, risk-taking and proactiveness can mediate the relationship between human capital and innovation capability. Risk-taking and proactiveness can strengthen the relationship between human capital and innovation capability. However, another EO dimension, namely openness, cannot mediate the relationship between human capital, social capital, and innovation capability. This may be because of the characteristics of Indonesian people, who avoid expressing directly negative feedback or criticism in order to protect their feeling of others. In addition, they like to live in harmony in the society. This can be seen from the low level of individualism and masculinity in Indonesian society. Third, entrepreneurial orientation is a useful construct to explain the above relationship but is limited to explaining context-based differences only. Alternative approaches ,such as Hofstede's national culture model, should be considered to explain other variables that seem to affect this relationship.

7.5 Managerial implications

The results of the study also have beneficial managerial implications for policy-makers in the companies and the government. CEOs/managers/owners need to be proactive in developing innovation capability. The most important source of ideas is human capital. Therefore, investment in training and empowering employees will be beneficial in improving human capital. The same is true for social capital. Meetings, brainstorming, and benchmarking can sometimes result in conflict. However, the manager can use this to develop new ideas. The manager can manage conflict to make it a source of creativity. Some beneficial contributions for the managers, CEOs, and owners of firms, and policymakers is shown as follow.

a) Most of the previous studies have discussed the nature of intangible resources and innovation capability in developed countries only, and there has been little research that studies intangible resources and innovation capability in developing countries. Since ICTs products are improving, a more comprehensive knowledge is necessary to accelerate ICT innovation.

b) For the managers, CEOs, and owners of companies, this study explains which variables can promote innovation capability. These findings provide guidance on how to promote innovation capability.

c) The implementation of entrepreneurial orientation can be embedded in the employee's behaviour to enable innovation. It is also can affect in the process of recruitment of employees. So, the company should make sure to recruit the employees who have proactive, open-mindedness, and risk-taking behaviour.

d) Currently, the practitioner and academics are aware of the important role of network among industries to enable innovation. As Table 2.8 showed, the innovation network is currently growing among the companies. It would those be useful for the policymakers to develop the system that support the mechanism in innovation network, particularly in SME.

From government perspective, the implications of this study are that innovation capability in ICT-SMEs in Indonesia can be promoted by human capital, risk-taking, and proactiveness. In Indonesia, the main problem faced by SMEs is the lack of skilled resources. In addition, most of the ICT-SMEs in Indonesia are in the field of information service activities, such as web portals, data processing, and web hosting. Since the ICT sector is one of the main pillars of the Indonesian economy (Indonesia Ministry for Economic Affairs, 2011), the government needs to develop the necessary infrastructure and resources, such as human capital.

For policymakers, the findings of this study can help to guide policy regarding the development of ICT companies within the scope of regional and national ICT innovation. The variables represent intangible resources and the innovation capability of ICT-SMEs in Indonesia. The research findings highlight the priorities and methods that should be used to promote the development of innovation in Indonesia. The findings of this study can thus lead to the development of more effective policy on ICT innovation.

7.6 Limitation and future research

This research has certain limitations, which suggest future research agendas and areas. First, this research investigated the effects of intangible resources only, namely intellectual capital (human capital and social capital) and entrepreneurial orientation (risk-taking, proactiveness, and openness) on innovation capability (radical innovation and incremental innovation). Intangible resources are classified as an internal aspect for innovation capability. Further investigation is required to study how does an external aspect such as of market orientation, customer orientation, and product lifecycle can affect innovation.

The second limitation of this study is the methodology: this research applied quantitative methods within a cross-sectional study. Quantitative methods are typically used to confirm existing theory; further explanation of the results should rely upon another method, such as a qualitative method. Furthermore, a longitudinal study may

have been beneficial to identify the effect of intellectual capital and entrepreneurial orientation on innovation capability.

The third limitation relates to the unit of analysis, as SMEs. The nature of SMEs is different to that of larger companies. It is important to also test the hypothesis of the conceptual model in larger companies in order to identify the interaction effect and determine whether the results are different to in SMEs.

Fourth, the context of this research was limited to one country. In future research, several countries could be compared, since each country has a different culture and may yield different results.

Fifth, the researcher relied on a definition of SMEs based on EU and OECD definitions. The Indonesian government has defined SMEs based on the Central Bureau of Statistics and the State Ministry of Cooperative and SMEs, however this definition was not utilised in this research because the ISIC code was used to determine the industrial code to group the ICT companies, and ISIC uses the EU and OECD definition of SMEs.

Sixth, as mentioned above, the definition of SME used in this research was provided by the European Commission, which differs from the definition given by Central Bureau of Statistics and the State Ministry of Cooperatives and SMEs in Indonesia. It will be advisable to use the definition of SME based on Indonesian government to be more significant with the context of this study which is Indonesia.

Finally, the respondents of this study were all CEOs/managers/owners. The results are thus based only on the perceptions of top-level managers. The results may have been different if the respondents had been employees, since the power distance in Indonesia, based on the Hofstede model, is high. In addition, a future study could examine to what extent the Hofstede model can influence intangible resources for innovation capabilities.

7.7 Quality of research

It is important to determine whether the research meets the quality criteria. The quality criteria for doctoral research are shown in Table 7.1, provided by Easterby-

Smith, Thorpe and Jackson (2015). The quality criteria comprise reliability, construct validity, internal/content validity, external/criterion validity, contribution to the practical domain and theoretical domain/knowledge. The quality criteria were explained in detail in chapter 5.

Table 7. 1 Quality criteria for doctoral research

Quality Criteria	**Criteria achievement of survey study in this research**	**Yes/ No**
Reliability	The questions in the questionnaire were based on the reputable question from the previous studies.	Yes
Construct validity	The planning of survey method is robust, using a research design and pilot study that are appropriate for quantitative research.	Yes
Internal/ content validity	Selecting the correct research method: Quantitative method. Selecting the correct research tools: a web-based survey. A pilot study was undertaken to improve the questionnaire by obtaining and responding the feedback from the experts.	Yes
External/ criterion validity	Demographic information: the types of businesses Language: using bilingual languages (English and Bahasa Indonesia)	Yes
Contribution to the practical domain	Implementation of the finding in this study can result in new policies for the manager and the country.	Yes
Contribution to the knowledge	The novelty of research is adding the new mediator which is entrepreneurial orientation to mediate the relationship between intellectual capital and innovation capability.	Yes

7.8 Conclusion

This section will summarise the findings of this research. Intangible resource is a powerful resource for enabling innovation, not only in large companies but also in SMEs. In SMEs, the lack of skilled resources is a key problem, and requires a policy, in the company and the country, of improving innovation by utilising human capital, social capital, and entrepreneurial orientation. This research focused on ICT-SMEs in Indonesia. Investment in intellectual capital and a policy of organisational behaviour can empower better resource utilisation within innovation capability.

Studies of intangible resource are challenging, because it needs to be integrated with the capability to attain the competitive advantage. An incorrect configuration will lead to reduced competitiveness, and financial loss for the company. The findings from this research indicate a clear direction for potential efforts that should be considered to create innovation capability in SMEs.

7.9 Reflection

My personal reflection on the research is that it has improved my skills and abilities as the researcher. I faced many obstacles during PhD journey, all of which improved my problem-solving abilities. I acquired new knowledge about innovation management and statistical tools such as factor analysis and structural equation modelling. The research process also improved my critical thinking skills and refined my ideas about the research topic, which is intellectual capital, entrepreneurial orientation, and innovation capability. Further, I learned to manage my time and developed self-confidence.

Since English is not my first language, I have attempted to improve my communication skills by participating in conferences, building networks with other PhD students, and improving my writing skills by writing conference papers. I participated in the British Academy of Management (BAM) conference in the UK (2014 and 2015). In the second year of my PhD studies, I received an award for the 'best developmental paper' at the BAM Conference in 2015. I was immensely proud of this, since I was competing against other participants. Afterwards, I had more confident in presenting my research and participating in other conferences, such as the International Conference on Industrial Engineering and Engineering Management (IIEM) in Bali-Indonesia (2016), and the European Operation Management Association (EUROMA) conference in the UK (2017), during my PhD journey. From these conferences, I gained much feedback on how to improve the quality of my research.

Every activity in the PhD journey has encouraged me to be bolder. Also, my PhD studies have enabled me to understand how to carry out research. I have more

confidence as a researcher, and much curiosity and desire for more knowledge, particularly in the field of innovation management.

7.10 Summary of the whole chapters

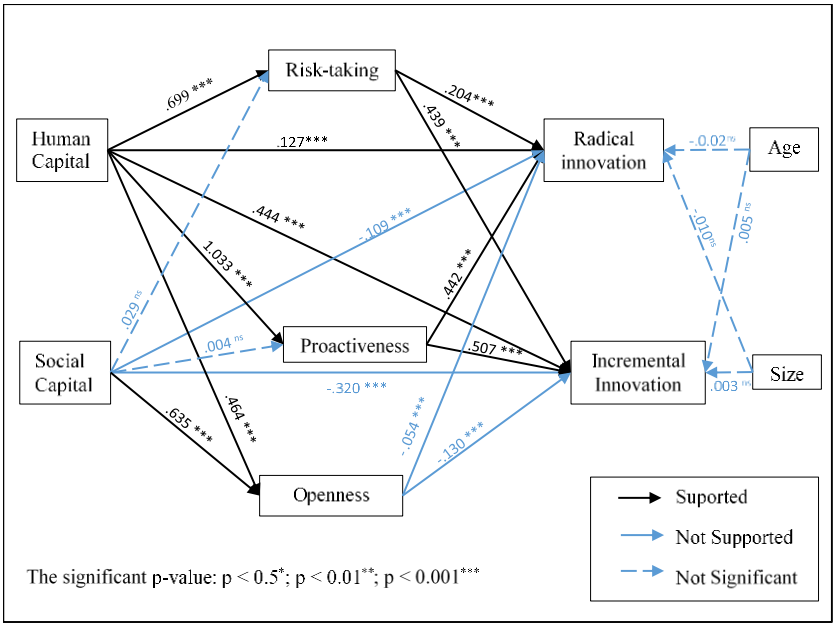
Chapter 1: Introduction	
Objectives	To identify the background and the motivation of the thesis.
Key findings	Overview of the conceptual foundation, the background of the study, research problem, the scope of study and thesis outlined.

Chapter 2: Systematic Literature Review	
Objectives	To review the topic of intangible resource and innovation capability. To identify the drivers of innovation capability. To identify the key themes and the gaps in the area of intangible resource and innovation capability. To identify the research questions.
Key findings	Introduction to innovation capability and intangible resource definition. The research gaps: **Research Gap 1:** Research on innovation capability should be explicit examine how intangible resource influences innovation capability in SMEs in the developing country. **Research Gap 2:** Research on innovation capability should explicitly explain the mediating role played by entrepreneurial orientation in the relationship between intangible resource and innovation capability Research question in this research. "In the context of SME in developing country, how do intangible resource affect innovation capability?"

Chapter 3: The Development Research Model	
Research Objectives	To develop the hypothesis based on the results of Chapter 2. To construct a conceptual model based on the results on Chapter 2 and on the Resource-Based View (RBV).
Key findings	**Hypothesis (H1):** Human capital is positively related to entrepreneurship orientation a) risk-taking, b) proactiveness, c) openness. **Hypothesis (H2):** Social capital is positively related to entrepreneurship orientation a) risk-taking, b) proactiveness, c) openness. **Hypothesis (H3):** Human capital is positively related to innovation capability a) radical innovation, b) incremental innovation. **Hypothesis (H4):** Social capital is positively related to innovation capability a) radical innovation, b) incremental innovation. **Hypothesis (H5):** Risk-taking mediates the relationship between intellectual capital and innovation capability a) radical innovation, b) incremental innovation. **Hypothesis (H6):** Proactiveness mediates the relationship between intellectual capital and innovation capability a) radical innovation, b) incremental innovation. **Hypothesis (H7):** Openness mediates the relationship between intellectual capital and innovation capability a) radical innovation, b) incremental innovation.

Chapter 4: Research Methodology and Philosophy	
Research Objectives	To provide a clear understanding of the research paradigm that informs the current study about the nature of philosophical assumptions, the research techniques, the research instruments, the data collection and the statistical tools used in this research.
Key findings	Ontological: Objective Epistemology: Positivist Principle: Deductive and theory testing Data Collection: Quantitative survey methods

Chapter 5: Research Design	
Research Objectives	To outline and justify the research design which comprises the research preference, research strategies, and the research design procedures, the techniques of data collection and the research methods.
Key findings	Method of data collection: Survey questionnaires Independent variable comprises human capital and social capital; and dependent variable includes risk taking, proactiveness, openness, radical innovation, and incremental innovation. The aim of this study to evaluate the relationships between intellectual capital, entrepreneurial orientation, and innovation capability.

Chapter 6: Quantitative Findings	
Research Objectives	To analyse the data gathered from the survey, and determine whether the data fits with the conceptual model?
Key findings	The research investigates the relationships between intellectual capital, entrepreneurial orientation, and innovation capability in ICT-SME in Indonesia. The statistical software utilised was SPSS 24 and AMOS 24 The hypothesis testing results in the coefficient of β as the following figure. 

Chapter 7: Discussion and Conclusion	
Research Objectives	The research aims to understand the relationship between intellectual capital and entrepreneurial orientation, and their impact on firm's innovation capability.
Key findings	In a developing country such as Indonesia social capital negatively affect radical and incremental innovation because of the lack of trust and the strong centralised leadership. By contrast, human capital positively affects incremental innovation, but negatively affects radical innovation. The results also reveal whether risk taking and proactiveness can mediate the relationship between intellectual capital and innovation capability. However, openness negatively impacts innovation capability.

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APPENDICES

APPENDIX 1. SYNTHESING OF SYSTEMATIC LITERATURE REVIEW

No	Author	Title	Keywords / Theme	The purpose of the study	Motivation of work	Key contribution/ key findings	The author's main argument/claim	Limitation (methodology, findings, conclusion, assumption)
1	**Karen A. Bantel; Susan E. Jackson**	**Top Management and Innovations in Banking: Does the composition of the top team make a difference?**	Innovation, TMTs, cognitive, demographic, Social capital/ Intellectual capital	To evaluate the relationship between the composition of social capital in the top management teams and innovativeness	Previously, the study of leaders' characteristics and innovation has been widely investigated. Particularly, the existing studies analyse how the psychological attributes and demographic maters of the leader could attain the organisational outcome. This paper studies the composition of TMTs that can create innovation.	The level and the diversity of expertise are beneficial for solving the complex problem. The heterogeneity positively affects innovativeness and creative thinking in the decision making of TMTs.	The resource level and the diversity of characteristics in TMTs is beneficial for innovation.	This study is not comprehensively discussing how the leaders' characteristics as individual and as a team affect the innovativeness. This study also focusses on the technical innovation and administrative innovation as the innovation outcome.
2	**Thomas Schott; Mahdokht Sedaghat**	**Innovation embedded in entrepreneurs' networks and national educational systems**	Entrepreneurs, Innovation, Networks, Social capital, Private sphere, Public sphere / Entrepreneurship	To distinguish between networking in the public sphere and networking in the private sphere and hypothesize that innovation benefits from public sphere networking but suffers from private sphere networking.	Innovation is considered as the outcome of some inputs such as institutions, human capital and research, infrastructure (ICT, energy and general infrastructure), market sophistication (credit, investment, trade, and competition), and business sophistication	Innovation is decreased by private sphere networking and increased by networking in the public sphere.	a. The national system of education and training raises human capital and also raises social capital by promoting knowledge flows in the national system of innovation. b. Innovation in society may increase or hinder by some cultural values.	The author employs 61 samples of the countries which include in Global Entrepreneurship Monitor (GEM). However, it was not clear enough why they choose such countries? And is it representative of the worldwide?
3	**Alberto Marcati, Gianluigi Guido, Alessandro M. Peluso.**	**The role of SME entrepreneurs' innovativeness and personality in the adoption of innovations**	Entrepreneurship, Innovativeness, Innovation adoption, Small- and Medium-sized Enterprises. /Entrepreneurship	To study the entrepreneurs' psychological characters, by referring to the propensity to innovate in general or in their professional life and the specific management domain	The limited understanding of the role of psychological determinants embedded human capital to explain entrepreneurship and entrepreneurs' intention to adopt innovation.	"Entrepreneurs' innovativeness is significantly related to their basic personality traits and entrepreneurs with different tendencies to innovate – regarding both GI and SI – have noticeably different personality profile."	General innovation is the degree of openness to newness	This study investigates psychological characters from the perspective of human capital.

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4	**Sascha G. Walter, Jörn H. Block**	**Outcomes of entrepreneurship education: An institutional perspective**	Entrepreneurship education, Entrepreneurial activity, Model of entrepreneurial action, Institutional theory, Multilevel analysis. / Entrepreneurship	to build and test a multilevel model on the outcomes of entrepreneurship education	The mixed findings suggest that environmental conditions play a role in the effects of entrepreneurship education	entrepreneurship education has stronger relationships with subsequent entrepreneurial activity in seemingly entrepreneurship-hostile institutional environments.	Many countries invest in entrepreneurship education to promote innovation and reduce unemployment.	There were lacks information on firm characteristics, such as industry, size, growth, and financial performance.
5	**Kuen-Hung Tsai**	**Collaborative networks and product innovation performance: Toward a contingency perspective**	Collaborative network, Product innovation performance, Absorptive capacity. / Strategy and innovation	To propose a possible framework to address the value of absorptive capacity in explaining the relationship between collaborative networks and product innovation performance	An increasing number of studies have examined the impact of collaborative networks on product innovation performance but have produced inconsistent results.	1. Absorptive capacity positively moderates the effect of vertical collaboration on the performance. 2. Absorptive capacity negatively affects the relationship between customer and performance. 3. Absorptive capacity positively affects the relationship between competitor collaboration and performance	Organizations with a greater absorptive capacity usually have a sufficiently developed technology base that enables them to have rich and detailed communications with their suppliers during the knowledge-sharing process.	this study divides the measure of product innovation performance into two categories based on degree of innovativeness and further explores the effect of absorptive capacity on the relationships between collaborative networks and product innovation performance by firm size and industry type.
6	**Aija Leiponen**	**Control of Intellectual Assets in Client Relationships: Implications for Innovation**	Knowledge; Innovation; Intellectual property rights; Supply relationships; Business services; Property rights theory. / Strategy and innovation	To examine the determinants and effects of contractual arrangements in business-to-business service relationships.	The contractual characteristics which control the intellectual assets in client relationship are found to have significant effects on business service firms' innovation outcomes. Theoretical work in economics has focused on performance contracts as a source of incentives in economic relationships, but these kinds of contracts may be impractical in many situations because of measurement problem.	Contractual arrangements depend on the service firm's bargaining power, R&D orientation, and role in client projects.	The arrangements to control the intellectual assets created or used in a supply relationship between two firms affect the partners' incentives to build on that knowledge.	Limited evidence for the hypothesis that the ability to innovate is driving control right allocation, although this result may be specific to the sample of business service firms.

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7	**Robert Huggins, Piers Thompson**	**Entrepreneurship, innovation and regional growth: a network theory**	Networks, Entrepreneurship, Knowledge spillovers, Innovation, Regions, Growth/ Entrepreneurship	"to argue that the relationship between entrepreneurship, innovation and regional economic growth is governed by a series of network dynamics relating to: (1) the nature of the firms established by entrepreneurs; (2) the nature of the knowledge accessed by firms; and (3) the spatial nature of the networks existing between those accessing and sourcing knowledge."	Even though entrepreneurship is the important driver in innovation, the role of the network in this process is overlooked.	In term of network capital, the investments in strategic relations to create knowledge can mediate the relationship between entrepreneurship and innovation-based regional growth.	"the nature of the network capital formed by entrepreneurial firms may be pivotal in determining the permeability of the knowledge filter proposed by the knowledge spillover theory of entrepreneurship, with regional rates of innovation consisting of the interaction between underlying rates of entrepreneurship and network capital."	This study is the conceptual model and need empirical study which can prove the theory resulted.
8	**Craig Lee, Rob Hallak, Shruti R. Sardeshmukh**	**Innovation, entrepreneurship, and restaurant performance: A higher-order structural model**	Innovation, Restaurant performance, Entrepreneurship, Hospitality, Partial Least Squares, Structural Equation Modelling/ Entrepreneurship	To examines a higher-order structural model investigating business innovation, the owners' entrepreneurial self-efficacy (ESE), and human capital as drivers of restaurant performance.	Restaurants can improve quality and reputation, cut costs, and increase sales and profits through 'innovation.'	The PLS-SEM analysis found restaurant innovation activities and the owner's self-efficacy (ESE) to positively influence restaurant performance.	Increasing the entrepreneurial capabilities of restaurant owners creates entrepreneurial restaurants that focus on creativity, innovation, and adding value.	1. The sample for this study came from small, independently owned cafe and restaurant businesses in Australia. 2. The analysis of the structural model is based on a soft-modeling approach through PLS-SEM. PLS-SEM still lacks an overall Goodness-of-Fit index.
9	**Oswald Jones**	**Manufacturing regeneration through corporate entrepreneurship**	Change management, Entrepreneurs, Experience, Middle managers, Social interaction, Strategic planning / Entrepreneurship	To investigate the role played by corporate entrepreneurs in the strategic renewal of mature manufacturing companies.	There are certainly few studies which explicitly examine the role of middle-managers as corporate entrepreneurs in mature manufacturing firm	Corporate entrepreneurs (CEs) can exploit "structural holes" for the benefit of the organisation rather than for career advancement; newcomers are more effective than insiders in overcoming the relational inertia caused by lack of external links; the bridging actions of CEs are important for linking internal activities as well as for accessing external knowledge.	Open networks are typified by "structural holes" which occur when there are communication gaps in a social network. Social capital is important to corporate entrepreneurship because it encourages risk-taking without fear of sanction.	While this study primarily reports on the activities of one individual, it is important to acknowledge that MFD performance improvements resulted from a combination of factors.

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10	**Mikael Samuelsson; Per Davidsson**	**Does venture opportunity variation matter? Investigating systematic process differences between innovative and imitative new ventures**	Entrepreneurship, New venture creation, Venture opportunity variation, Longitudinal Growth Modelling/ Entrepreneurship	To study the differences between innovative versus imitative ventures in venture creation process.	The process of new venture creation is still under-theorized.	The models using HC, SC, and certain controls are relatively successful explaining progress in the creation process for the minority of innovative ventures but achieve very limited success for the imitative majority. This may be due to a rationalistic bias in conventional theorizing and suggests that there is need for considerable theoretical development regarding the important phenomenon of new venture creation processes.	"What we in a dichotomization call imitative ventures are not completely identical to what already exists on the market (or in the industry or population) and many instances of less radical forms of innovation may fit better in the imitative than in the innovative category as these groups have been described above."	As regards the sample, the unequal sample sizes and the relatively small sample of innovative ventures are weaknesses because it makes it harder to establish group differences with satisfactory levels of statistical certainty.
11	**Dirk De Clercq, Narongsak Thongpapanl, Dimo Dimov**	**Contextual ambidexterity in SMEs: the roles of internal and external rivalry**	Ambidexterity, Knowledge, Rivalry, Contingencies, SMEs/ Intellectual Capital	to investigate the research on SMEs and the ambidexterity by exploring contingency factors that affect the relationship between contextual ambidexterity and performance.	There was no research systematically studies whether and how certain factors, internal or external to the firm, stimulate managers to exchange knowledge during the application of an ambidextrous posture.	1). A negative effect between contextual ambidexterity and internal rivalry on SME performance was because individual managers perceive a need to compete for the same resources and protect their functional field. Therefore, they avoid investing in productive exchanges that could solve and leverage function-specific knowledge, as required by contextual ambidexterity. 2). The nexus between contextual ambidexterity and SME performance became negative when the firm confronts low levels of external rivalry.	A better understanding of the relationship between ambidexterity and firm performance requires the specification of the underlying contingencies that can spur managers to share function-specific knowledge on an ongoing basis	By focusing on two specific contextual dimensions, this study ignores other factors that may be relevant to the successful conversion of contextual ambidexterity into SME performance, such as owner and top management team characteristics, the extent to which managers depend on colleagues in other functional areas to accomplish their jobs or the level of competitive dynamism in the external market.

No	Author	Title	Keywords / Theme	The purpose of the study	Motivation of work	Key contribution/ key findings	The author's main argument/claim	Limitation (methodology, findings, conclusion, assumption)
12	**Petra Andries, Dirk Czarnitzk**	**Small firm innovation performance and employee involvement**	Employee involvement, Upper echelon, Non-managerial employees, Innovation performance, Small firm. / Strategy and innovation	To investigate to which extent the utilisation of CEOs', managers' and non-managerial employees' idea affects small firms' innovation performance.	A better understanding of the relationship between ambidexterity and firm performance requires the specification of the underlying contingencies that can spur managers to share function-specific knowledge on an ongoing basis	The ideas contributed to innovation performance is not only from CEO's and managers but also non-managerial employees. However, contributions depend heavily on the individuals' area of expertise and on whether product or process innovation is desired.	Configuration pertains to incremental innovation and maintaining coherence among current activities, whereas adaptability includes a drastic reconfiguration of activities to innovate radically	The ideas used are from the individual without controlling the quality of these idea.
13	**Beatriz Forés, César Camisón.**	**Does incremental and radical innovation performance depend on different types of knowledge accumulation capabilities and organizational size?**	Internal knowledge creation capability, Absorptive capability, Radical innovation performance, Incremental innovation performance, Size. / Strategy and innovation	to identify the effect of organisational size on radical innovation performance and incremental innovation performance. Also, this research aims to reveal the effect of organisational size on the main knowledge accumulation capabilities that determine them. It will unravel in detail the complex antecedents and their intervention in the innovation process development.	The previous studies acknowledge the importance of knowledge accumulation capabilities in innovation performance; the existing research is failed to empirically identify its role regarding the different types of the innovation performance.	While knowledge accumulation capabilities and size positively affect incremental innovation performance, the absorptive capability has a positive direct effect on radical innovation performance. However, size has a negative non-significant effect on innovation performance. Then, the effect of size on knowledge accumulation capabilities also turns out to be mixed.	Radical innovation performance is more uncertain and riskier. It requires intangible assets and tacit knowledge.	1). The evaluation from the single respondent (the firms' manager) may cause the internal validity problems. 2). The sample is limited to Spanish firms which are from different industries. 3). Although the results confirmed the hypotheses, the study is to some degree exploratory as two new scales were developed for inherently difficult to measure organizational processes.

No	Author	Title	Keywords / Theme	The purpose of the study	Motivation of work	Key contribution/ key findings	The author's main argument/claim	Limitation (methodology, findings, conclusion, assumption)
14	**Isabella Hatak, Teemu Kautonen, Matthias Fink, Juha Kansikas**	**Innovativeness and family- firm performance: The moderating effect of family commitment**	Innovativeness, Entrepreneurship, Family business, Commitment, Performance. / Strategy and innovation	To unravel the moderator effect of the owner family's commitment to the relationship between the innovativeness and performance relationship.	The previous research identified innovativeness affect the family-firm performance positively. Also, there was a lack of understanding about how the characteristics that differentiate family firms from non-family enterprises influence the innovativeness–performance relationship	The study results from the U-shaped of the moderating effect of the owner family's commitment to the relationship between innovativeness and firm performance. It means the moderating effect of family commitment is strongest at the level of either low or high. This signifies that owner families should avoid their level of commitment in the middle of the low and high level.	Strategic behaviour can be used to be the long-term strategic criteria in the proses of the resources' allocation which will lead to the flexibility of innovation strategic.	1. The size of the sample is relatively small, and this limits the power of the statistical tests used in the study. 2. The generalizability of the results is limited by the focus on a single country.
15	**Adegoke Oke; Gerard Burke; Andrew Myers**	**Innovation types and performance in growing UK SMEs**	Innovation, Performance management, Small to medium-sized enterprises, United Kingdom/ Strategy, and innovation	The study aims (1) to explore the types of innovation whether they are predominantly radical or incremental innovation, (2) to study the effect of these radical or incremental innovation on firms' performance.	The assumption that SMEs focus more on radical innovations than incremental innovations has not been empirically researched.	This research results that the SMEs is more on incremental innovation rather than radical innovations.	In improving radical innovation, the companies require to adjust into their design which allow for the flexibility and the capability to manage the requisites to develop radical innovation.	This research evaluates the contextual model which was only implemented on a group of SMEs.
16	**Lutfihak Alpkan; Cagri Bulut; Gurhan Gunday; Gunduz Ulusoy and Kemal Kilic**	**Organizational support for intrapreneurship and its interaction with human capital to enhance innovative performance**	Organizational development, Human capital, Turkey, Innovation/ Strategy and innovation	to investigate the direct and interactive effects of organizational support and human capital on the innovative performance of companies.	Most studies investigated the individual effects of OS and HC on organizational performance separately.	Among the individual direct effects of the dimensions of organizational support, management support for idea development and tolerance for risk-taking are found to exert positive effects on innovative performance. When the levels of both HC and OS are high, innovative performance does not increase any further.	Human capital is the important driver of innovative performance especially when the organisational support is limited.	Theoretical model was proposing some direct and moderating effects among HC, OS, and innovativeness. All the variables in the model are measured through the perceptions of single respondents representing their firms, at the same point in time.

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17	**Fabian Eggers, Sascha Kraus, Jeffrey G. Covin**	**Traveling into unexplored territory: Radical innovativeness and the role of networking, customers, and technologically turbulent environments**	Radical innovativeness, Networking, Customer responsiveness, Technological turbulence, Manufacturing, SMEs/ Strategy and innovation	To investigate the knowledge in innovation management by identifying if networking can increase the radical innovativeness of SMEs and if the responsiveness of customer needs and technological turbulence can moderate the relationship between networking and radical innovativeness.	The availability of specific resources supports the enhancement of radical innovations. Knowledge resources can drive radical innovations. The networks access the resources.	A Networking, customer responsiveness, and technological turbulence have a positive interactive effect on radical innovativeness. Particularly, the highest level of radical innovativeness is occurring when networking, customer responsiveness, and technological turbulence are concurrently high	Networking enhances a radical innovativeness, and that this link is moderated by technological turbulence and a firm's responsiveness towards customer needs.	Since the multi-country as the context of this research, invariance testing indicates the factor structure of the items used in this measurement scales are not equivalent across all countries represented in the sample.
18	**Chung-Ming Lau, Daphne W. Yiu, Ping-Kwong Yeung, Yuan Lu**	**Strategic orientation of high-technology firms in a transitional economy**	Strategic orientation; High-technology firms; Transitional economy, China/ Strategy, and innovation	To investigate the antecedence of strategic orientation from the perspective of socio-cognitive and resource-based view.	Strategic orientation is a critical factor for a firm's competitiveness in a transitional economy context, but it is understudied in the current literature.	A firm's top management cognition characterized by their favourable evaluation of the external and internal environments, as well as the firm's commitment in devoting resources in R&D infrastructure are important antecedents of a firm's strategic orientation. Also, technological alliance and international experience of top managers, though marginally significant, are also associated with stronger strategic orientation.	In the high-technology industry, networks and alliances are instrumental in learning for value-creation and innovation	The sample gathered from a sample of high-technology firms in China. This group of high-technology firms. However, it is comprised of firms from several major technology-based industries. There may be subtle differences among these industries (though the effects of industry are not statistically significant in the models) that were not studied.

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19	**Sidhartha R. Das, Maheshkumar P. Joshi**	**Process innovativeness in technology services organizations: Roles of differentiation strategy, operational autonomy and risk-taking propensity**	Service operations; Operations strategy; Business strategy; Empirical research/ Strategy and innovation	To examine the effect of differentiation strategy on process innovativeness in technology services organization (TSOs).	The previous studies suggest leadership drives ‘‘people’’ as well as ‘‘service process’’. Based on Roth model, this research examines the synergies (or strategic complementarities) implied in this model by proposing that providing ‘‘people’’ with broader latitude in their behaviours can enhance the relationship between strategy and process.	Both differentiation strategy and operational autonomy are positively related with process innovativeness, while an organisation’s risk-taking propensity has no such relationship. Also, operational autonomy moderates the relationship between differentiation strategy and process innovativeness, while no evidence was found for the moderating effect of risk-taking propensity on this relationship.	"Top management has already decided the choice of an appropriate business strategy, and in turn, we exclude these decisions taken by the top management team from the purview of our research framework."	1. The available data is limited. The sample describes from firms in the mid-Atlantic region, and it requires to be seen if the results can be validated. 2. The common method bias may not have been completely eliminated due to the use of single respondents.
20	**Joakim Wincent, Sergey Anokhin, Daniel Örtqvist**	**Does network board capital matter? A study of innovative performance in strategic SME networks**	Board capital, Human capital, Relational capital, network board, Network innovation. / Intellectual capital	To studies the relationship among network board capital (i.e., human capital and relational capital) on total, radical and incremental network innovative performance.	The difficulty of SMEs network in managing the group of SMEs can be one of the disadvantages perceived by SMEs. Although in general SMEs may be disadvantaged regarding their ability to innovate on par with larger incumbents, participation in SME networks is believed to improve SMEs' innovative positions significantly.	A network board's diversity of expertise and education level are important for improving all components of innovative performance (total, radical and incremental) in smaller networks.	The important role that different aspects of network board capital play in the innovative performance of strategic SME network members.	Although a longitudinal sample is used, the analysis does not fully consider temporal effects beyond careful statistical control.
21	**Mary M. Crossan and Marina Apaydin**	**A Multi-Dimensional Framework of Organizational Innovation: A Systematic Review of the Literature**	Innovation leadership, innovation process, innovation outcome, systematic literature review/ Strategy, and innovation	To establish connections in the different literature, and to identify gaps between disparate research streams. Also, this research explores the difference between innovation processes and outcomes: the former precedes the latter and should be separated to avoid circular arguments	The limited study discusses systematic review and metaheuristic in the topic of innovation.	This study yields the comprehensive multi-dimensional framework of organizational innovation – linking leadership, innovation as a process, and innovation as an outcome.	Innovation is production or adoption, assimilation, and exploitation of a value-added novelty in economic and social domains; renewal and enlargement of products, services, and markets; development of new methods of production; and establishment of new management systems.	1. The detailed propositions linking of the elements (leadership, innovation as a process, and innovation as an outcome) have not been provided. 2. The filtering process employed may have also neglected some relevant research, such as a large stream of the entrepreneurship literature.

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22	**Keld Laursen; Francesca Masciarelli; Andrea Prencipe**	**The paradox of openness: Appropriability, external search, and collaboration**	Appropriability strategy, Innovation, Breadth of openness, Innovation collaboration Competitor collaboration/ Strategy and innovation	To examine how the type of external engagement that firms choose is connected to the relationship between appropriability strategy and openness, suggesting that the negative effect of the link between appropriability and openness is stronger for formal collaboration breadth than for external search breadth.	The innovation process includes the combinations of knowledge or technology. This entails organizations to work with and draw knowledge from many actors outside of their organization. Therefore, the arrangement of internal processes and the external environment is important to enable the successful absorption of knowledge from external sources	The concave effect is stronger for a breadth of formal collaboration than for the external search. There is also partial evidence suggesting that the relationship is less pronounced for both external search and formal collaboration if firms do not draw ideas from or collaborate with competitors.	Appropriability and openness generally go hand-in-hand, but that high levels of appropriability are associated with decreasing levels of openness.	1. There was no a direct measure of firm scope, that is, whether the firm is engaged across a range of industries or products in the dataset. Therefore, it was difficult to control directly for firm scope. 2. There was no information on stocks of IP held by each firm; it is possible that IP stock shapes the firm's approach to engaging with external actors.
23	**Benn Lawson & Danny Samson**	**Developing Innovation Capability in Organisations: A Dynamic Capabilities Approach**	Innovation, Dynamic capabilities, Cisco, New Technology Introduction/ Strategy and innovation	To propose the framework of innovation capability to depict the ability of high-performing innovators to attain the effective performance.	The priority of the companies to focus on innovation is increasing. However, the obstacle to attain success is also increased significantly. The high commitment to innovation is needed simply to stay in the same place, much less improve competitive position. However, it is difficult to manage the complex and risky process of innovation.	This paper results the contextual framework which consisted of the process of innovation capability. In this case, innovation capability can be considered to have some seven aspects, namely vision and strategy, harnessing the competence base, organisational intelligence, creativity and idea management, organisational structure and systems, culture and climate, and the management of technology.	The ability of the innovation capability to integrate newstream and mainstream is therefore ever more important. The newstream enables the creation of new products and services while the focus on lowering costs and improving quality reinforces the need for strong mainstream capabilities.	This study was using single case study, which can be different with the other companies.

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24	**Meysam Poorkavoos, Yanqing Duan, John S. Edwards, Ramakrishnan**	**Identifying the configurational paths to innovation in SMEs: A fuzzy-set qualitative comparative analysis**	Innovation, Innovation management, Inter-firm networks, Knowledge transfer, fsQCA/ Strategy and innovation	To study the effect of inter-organisational knowledge transfer networks and the internal capabilities in the organisation on various types of innovation in SMEs.	Most research has studied network effects on overall innovation performance. Only a few articles have considered the effects of inter-firm networks on different types of innovation.	Although individual factors are important, there is no need for a company to perform well in all the areas. The fuzzy-set qualitative comparative analysis (fsQCA), which enables the examination of the impacts of different combinations of factors, reveals that there are some paths to achieve better incremental and radical innovation performance.	It is important to consider both internal factors and external influences in studying innovation in SMEs.	1. Using the key informant method for the data collection could cause the subjective data and different types of innovation. 2. Using the ego network to study the network effects.
25	**Subramanian, Ashok Nilakanta, S.**	**Organizational Innovativeness: Exploring the Relationship Between Organizational Determinants of Innovation, Types of Innovations, and Measures of Organizational Performance**	Innovation, management, management of innovation, organizational studies, measurement, methodology / Strategy and innovation	To evaluate the relationships between innovativeness, the organisational characteristics, and performance.	Previous studies that examine the relationships between innovativeness, the organisational characteristics, and performance, have yielded conflicting results. It may be due to a narrow definition of the construct of innovativeness.	Innovativeness can improve organisational performance.	Technical and administrative innovations have different relationships with organizational characteristics.	This research focused on technical innovation and administrative innovation as the type of innovation.
26	**Nobuya Fukugawa**	**Determining Factors in Innovation of Small Firm Networks: A case of Cross-Industry Groups in Japan**	Network characteristics, innovation, cross-industry groups, small firm networks, knowledge sharing/ Strategy and innovation	To examine the relationship between network characteristics and innovation under different phases of innovation.	Since the theory that discuss the relationship between innovation and networks suggest different benefit of different networks to innovation.	Close-knit networks, represented as dense communication and a high level of commitment among members, are correlated with initiating joint product development.	CIGs consisted of homogeneous members have more knowledge in common about technical skills of other members, which is preferable for identifying appropriate R&D partners and initiating joint product development.	The study was conducted in Japan which was maybe different with other country.

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27	**Dimitris Skuras, Kyriaki Tsegenidi, Kostas Tsekouras**	**Product innovation and the decision to invest in fixed capital assets: Evidence from an SME survey in six European Union member states**	SMEs, Innovation, Investment, Peripheral areas, / Strategy, and innovation	To investigate whether innovative activity is complementary or competitive to the decision to invest in fixed capital assets, among a sample of over 500 SMEs located in six European Union member states.	Not only investment, innovation also affect the firms' performance. However, the study which focused on the relationship between human capital and R&D expenditures as the input of the innovation process was limited.	The existence of product innovation decreases the probability to invest. A firm's size employs a direct, inverted U-shape effect on the probability to invest and an indirect effect through the linear effect of size on the probability to innovate.	An entrepreneurial society allocates resources to capital and innovation by sustaining rivalry between capital accumulation and innovation within a firm and, in turn, this firm-specific rivalry gives rise to economy-wide complementarities of capital and innovation.	The econometric analysis framework does not allow for a formal causality test.
28	**Juan A. Martı´nez-Roma´n, Javier Gamero, Juan A. Tamayo**	**Analysis of innovation in SMEs using an innovative capability-based non-linear model: A study in the province of Seville (Spain)**	Innovation, Innovative firm, Innovative capability/ Strategy, and innovation	To develop a model which describes the realistic manner of the innovative outcomes of any business.	There was insufficient data about the innovative outcome using technological innovation of SMEs in local economies with a low level of technological and R&D activities.	It is resulting an interactive model based on innovative capability and innovative outcomes which may be employed in the context of SMEs in all sectors.	Three dimensions of the innovative capability, i.e.: (1) knowledge, (2) The organizational structure, (3) Human capital.	These studies indicate that the complexity of the innovative phenomenon may only be understood when working in the firms in a homogeneous environment.
29	**Jose-Luis Hervas-Oliver, Francisca Sempere-Ripoll, Carles Boronat-Moll**	**Process innovation strategy in SMEs, organizational innovation and performance: a misleading debate?**	Process innovation strategy, Organizational innovation, Production performance, Embodied knowledge, Resource-based view, Organizational innovation, CIS data/ Strategy, and innovation	To explore the less-researched subject of process innovation strategy and its effects on production-oriented innovative performance in small manufacturing firms, including the effects of the synchronous co-integration of organizational innovation and process technologies.	Most studies directing innovation in SMEs are solely technology-oriented and not address the potential for asynchronous co-adoption of technological and organizational innovation.	Process innovation strategy is created by knowledge, which performs as a key process for responding firms' weak internal capabilities.	Process innovation strategy is mainly created by capabilities attained from access to and recombination of external sources of knowledge together with organizational innovations complementing and reinforcing those innovation capabilities.	The process of innovation in small firms is considered limited to R&D investments.

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30	**Bat Batjargal**	**Internet entrepreneurship: Social capital, human capital, and performance of Internet ventures in China**	Social capital; Human capital; Internet; Entrepreneurship; China/ Intellectual capital	To examine the interaction effects of social capital and human capital (experience) of entrepreneurs on the performance of Internet ventures.	There is a substantial gap in the literature on how structural properties of entrepreneurs' networks affect venture performance, and how network structures interact with human capital of entrepreneurs and influence outcome variables.	The interaction of social capital and Western experience of entrepreneurs has a positive effect on the survival likelihood of Internet firms whereas the interaction of social capital and start-up experience of entrepreneurs has a negative effect on firm performance.	This study shows that the network closure advanced by Coleman (1988) and the network brokerage advocated by Burt (1992) are not mutually exclusive, and both can be effective depending on the context.	The sample size is small, and standard deviations for some variables are rather high.
31	**Kayhan Tadjedini**	**Effect of customer orientation and entrepreneurial orientation on innovativeness: Evidence from the hotel industry in Switzerland**	Customer orientation, Entrepreneurship, Innovativeness, Hotel industry, Switzerland/ Entrepreneurship	to examine the impact of customer orientation, entrepreneurial orientation, and innovativeness upon hoteliers' performance in Switzerland.	While researchers have explored the relationship between customer orientation, entrepreneurship and innovativeness with business performance in different organizations, few such studies exist on the hotel industry.	Customer orientation does not influence innovativeness.	Customer orientation, entrepreneurial orientation, and innovativeness should be encouraged by managers and owners in the hotel industry to improve performance if they perceive innovativeness regarding openness to new ideas as an integral part of corporate strategy	The study is limited to Swiss hotel industry, and all data were collected in a cross-sectional method.
32	**Ayalla A. Ruvio, Aviv Shoham, Eran Vigoda-Gadot, and Nitza Schwabsky**	**Organizational Innovativeness: Construct Development and Cross-Cultural Validation**	Organizational innovativeness, innovation, creativity, openness, future orientation, risk-taking, and proactiveness/ Strategy and innovation	To identify the conceptualize and operationalize organisational innovativeness.	There were limited systematic efforts have been made to conceptualize and develop a valid organisational innovativeness measure.	The conceptualizes organisational innovativeness as a five-dimensional construct (creativity, openness, future orientation, risk-taking, and proactiveness)	Organisational innovativeness represents the organisational climate, which refers to the organisation's ability to generate ideas and innovate continually over time.	The range of developed subdimensions for organisational innovativeness may have been overlooked.
33	**Joon Mo Ahn, Tim Minshall, Letizia Mortara**	**Understanding the human side of openness: the fit between open innovation modes and CEO characteristics**	Strategy and innovation	To examine the relationships between the CEO characteristics and each of the Open Innovation modes.	1. Open innovation is not a single innovation activity. 2. The research investigating the determinants of open innovation has focused on contingent factors	CEOs' positive attitude, entrepreneurial orientation (EO), patience and education can play important roles in facilitating open innovation in SMEs.	Open innovation must be understood as a wide innovation spectrum, and, to increase opportunities for successful open innovation adoption, CEOs must attempt to compensate for characteristics they may lack by recruiting appropriate complementary top management.	Since this was the first to attempt to link different literature domains, open innovation and Upper Echelon Theory (UET), the tested CEO characteristics are mainly borrowed from the UET literature.

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34	**Thanti Mthanti, Kalu Ojah**	**Entrepreneurial orientation (EO): Measurement and policy implications of entrepreneurship at the macroeconomic level**	Entrepreneurial orientation, Innovativeness, Proactiveness, Risk-taking, Economic growth, development/ Entrepreneurial orientation	To investigate whether entrepreneurial orientation is more accurate characterization/measure of Schumpeterian entrepreneurship.	The empirical evidence on the entrepreneurship—growth nexus is inconclusive.	The entrepreneurial orientation has a positive and robust impact on economic growth.	Low-expectation start-ups do not create, diffuse or exploit new production knowledge; and thus, only high expectation start-ups may be an appropriate proxy for Schumpeterian entrepreneurship.	1. The data availability and problems with discriminant validity of the sub-constructs. 2. At the level of EO's sub-construct, the presence of cross-loading among the indicators of proactiveness, risk-taking, and innovativeness, suggests a possible problem with discriminant validity.
35	**Mei-Chih Hu**	**Knowledge flows and innovation capability: The patenting trajectory of Taiwan's thin film transistor-liquid crystal display industry**	Knowledge flow, Innovation capability, TFT-LCD industry, Taiwan Patents. / Strategy and innovation	to understand not only the overall country and industry levels of innovation capability but also both the aggregate and inter-firm variation in the knowledge flow of Taiwan's TFT-LCD industry.	The perspectives of knowledge flows are various of fields, but the processes of knowledge diffusion tend to focus on the flow of knowledge within and across firms, thus encouraging economic development and innovation capability in the related nations. However, not all knowledge diffusion causes advantages, and if it does, the diffusion rate and speed are often various and difficult to persist.	Taiwan as the latecomers of TFT-LCD industry have internalised external knowledge from the US and Japan on specific core technologies, while the knowledge relationship between source and recipient is not comparable.	In chasing economies of scale, Taiwan's TFT-LCD firms are integrating into the industrial value chain (particularly in the upward value chain associated with China)	This study indicates that the patenting history of Taiwan's TFT-LCD industry does not show the important effect of their initial knowledge sources.
36	**Thorsten Semrau, Tina Ambos, Sascha Kraus**	**Entrepreneurial orientation and SME performance across societal cultures: An international study**	Entrepreneurial orientation, Performance, National context, Societal culture, Multilevel analysis/ Entrepreneurial orientation	To propose and examine the link of societal culture—performance-based culture (PBC) and socially supportive culture (SSC).	many empirical studies report a positive relationship between EO and performance in different national contexts. Empirical research, however, a few studies addresses which country-level contingencies affect the EO–performance link.	PBC positively moderates the relationship between EO and performance whereas SSC has no moderation effect.	The strength of this positive association, however, varies considerably across national contexts, and cultural contingencies can explain significant variance in the EO–performance link.	The study uses data for just seven national contexts and employs cross-sectional study. Also, this study only investigates SMEs and not large enterprises.

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37	**Yi-Ching Wu, Bou-Wen Lin, and Chung-Jen Chen**	**How Do Internal Openness and External Openness Affect Innovation Capabilities and Firm Performance?**	Innovation capabilities, open innovation, openness/ Strategy and innovation	to elucidate explicitly how a firm's openness strategies, impact its innovation capabilities and investigate how to advance innovation capabilities through openness to enhance performance.	Few studies have explored the way in which this indirect effect of innovation capabilities acts through the relationship between openness and firm performance.	The innovation capabilities of these firms derive from the accumulation of external openness and internal openness.	The role of innovation capabilities in mediating the effect of openness strategies on firms' performance.	This study uses one sector and cross-sectional study
38	**Patrick M. Kreiser, Louis D. Marino, Donald F. Kuratko, K. Mark Weaver**	**Disaggregating entrepreneurial orientation: the non-linear impact of innovativeness, proactiveness, and risk-taking on SME performance**	Entrepreneurial orientation, Innovativeness, Proactiveness, Risk-taking, Individualism, Small-and-medium sized enterprises (SMEs)/ Entrepreneurial orientation	to examine the role of the individualist-collectivist dimension of national culture on the entrepreneurial process by examining its moderating influence on the relationship between the dimensions of EO and SME performance.	The mixed result of several studies which have suggested a positive relationship and non-linear relationship between unidimensional EO and firm performance.	Individualism was found to direct the relationships between innovativeness-performance and proactiveness-performance positively.	Organizations required to be cognizant of possible cultural influences when attempting to predict the efficacy of their competitors' entrepreneurial strategies, as well as the performance ramifications of their strategies.	The use of self-reported data and the threat of common method bias.
39	**Tomasz Mickiewicz, Arnis Sauka, Ute Stephan**	**On the compatibility of benevolence and self-interest: Philanthropy and entrepreneurial orientation**	Entrepreneurial orientation, Motivation, Philanthropy, Transition, Values/ Entrepreneurial orientation	To examine the philanthropy of owner-managers of small and medium-sized enterprises (SMEs) whether and why more entrepreneurially oriented SMEs are also more likely to participate in philanthropic activities.	There are limited studies focus on philanthropic giving by particularly wealthy entrepreneurs, predominantly in the United States and the United Kingdom.	A positive link between entrepreneurial orientation (EO) and philanthropy in a representative sample of 270 Lithuanian SMEs controlling for alternative explanations.	Philanthropy can be the expression of owner-managers' altruistic values; these values can be compatible and even mutually reinforcing with entrepreneurship	The cross-sectional nature of the data implies caution in forming any judgments on causality
40	**Chao Miao, Joseph E. Coombs, Shanshan Qian, David G. Sirmon**	**The mediating role of entrepreneurial orientation: A meta-analysis of resource orchestration and cultural contingencies**	Entrepreneurial orientation, Firm resources, National culture, Meta-analysis/ Entrepreneurial orientation	To enhance understanding of the individual-level aspects which impede academic scientists from commercializing their discoveries and how these impediments can be overcome based on existing entrepreneurial approaches.	Even though the individual-level characteristics and the attention is significantly increase in the scope of entrepreneurship literature, the individual-level differences of academic scientists have been relatively neglected in the academic entrepreneurship literature.	These two models capture the extremes of a continuum populated by a variety of intermediate situations where scientists are unwilling completely to let go of their findings but also do not want to become full-time entrepreneurs.	Traditional models of technology transfer assume that scientists prefer either to 'go it alone' and become entrepreneurs (the inventor-entrepreneur model) or to let go of their technologies to people interested in their commercialization (the surrogate entrepreneur model).	The cases are based on scientists who have spent the major part of their working life in academia.

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41	**Peng Shan, Michael Song, Xiaofeng Ju**	**Entrepreneurial orientation and performance: Are innovation speed a missing link?**	Entrepreneurial orientation, Innovation speed, Firm performance, New venture / Entrepreneurial orientation	To develop a conceptual model in examining how innovation speed mediates the relationship between entrepreneurial orientation and performance.	The results of studies in this research result are mixed. Some find that there is a strong relationship between EO and performance, that is, that new ventures with strong EO will perform better than those that do not adopt EO	1. Innovation speed is a missing link between EO and performance. 2. The curvilinear relationship between proactiveness and innovation speed is important because the finding challenges the general assumption that the relationship between EO dimensions and performance is simply linear.	Although product innovation bringing many uncertainty and resource consumption, new ventures should focus on technological process innovation to respond the market demands quickly.	1. The sample is only the new ventures. 2. The study focused on effect of five EO dimensions on innovation speed. 3. Data are cross-sectional, longitudinal data could be helpful to test the true causality of our model.
42	**Burcu Kör**	**The mediating effects of self-leadership on perceived entrepreneurial orientation and innovative work behavior in the banking sector**	Entrepreneurial orientation Perceived entrepreneurial orientation, Self-leadership, Innovative work behavior, Innovative behavior, Banking sector/ Entrepreneurial orientation	To advances research on innovative work behaviour by examining the mediating role of self-leadership in the relationship between perceived entrepreneurial orientation and innovative work behaviour.	Emergence of innovation behaviour in the workplace is a critical factor in helping organizations to gain competitive advantage. Surprisingly, few empirical studies focus on what motivates or enables innovative behaviour in the workplace.	Individuals are more likely to engage in innovative behaviour when firms have high levels of EO.	Individuals' perceptions of entrepreneurial activities (e.g., innovativeness, proactiveness, and risk-taking) facilitate empowerment, thinking 'outside of the box,' coping with uncertainty and complexity associated with the innovation process without fear of punishment or failure, and proactively participating in the innovation processes, thereby exhibiting innovative work behaviour.	Self-reported data from a single source may pose potential problems such as CMV. However, as discussed in the "Methods" section, the results of the study did not provide any indications of common method variance (CMV). Although EO and SL have an important effect on IWB, the other individual and contextual factors affecting IWB can be identified.

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43	**Zeki Simsek, Ciaran Heavey, John (Jack) F. Veiga**	**The Impact of CEO Core Self-Evaluation on The Firm's Entrepreneurial Orientation**	Core self-evaluation, entrepreneurial orientation, environmental dynamism/ Entrepreneurial orientation	To proposed and tested a model examining the impact of CEO core self-evaluation on the entrepreneurial orientation.	The limited previous studies are facets of personality together. Also, researchers have not confirmed the direct influence of CEO core self-evaluation on organizational outcomes such as entrepreneurial orientation.	CEOs whose personalities reflect higher core self-evaluations have a stronger positive influence on their firms' entrepreneurial orientation. This influence is particularly strong in firms in the dynamic environments but lower in stable environments.	CEO core self-evaluation would play an even greater role in moulding the firm's entrepreneurial orientation in dynamic environments.	The respondents are from the CEO level which needs more investigation at the different level.
44	**Jing A. Zhang, Fiona Edgar, Alan Geare, Conor O'Kane**	**The interactive effects of entrepreneurial orientation and capability-based HRM on firm performance: The mediating role of innovation ambidexterity**	Entrepreneurial orientation, Capability-based HRM, Innovation ambidexterity, Firm performance. / Entrepreneurial orientation	To explore the antecedents and performance outcomes of innovation ambidexterity	The limited understanding about how these important organizational attributes might relate to affect ambidexterity, and whether ambidexterity is a mechanism through which Entrepreneurial Orientation and Human Resource Management together result in improvements in firm performance	1. EO and HRM interactively affect innovation ambidexterity 2. The ambidexterity in innovation could attain performance benefits if the firms can select and develop the capability-based HRM appropriately	EO is to benefit the development of innovation capabilities; firms need to find a way to direct their resources towards firm innovativeness, proactiveness, and risk-taking.	1. The research focused on the importance of inter-relation between EO and capability-based HRM in developing innovation ambidexterity. 2. The use of a single combination index such as an additive index of ambidexterity is fairly common in the literature.
45	**Tommy Clausen, Tor Korneliussen**	**The relationship between entrepreneurial orientation and speed to the market: The case of incubator firms in Norway**	Entrepreneurial orientation, New product development, Market launch, Speed to market, Incubation/ Entrepreneurial orientation	to investigate to what extent entrepreneurial orientation is related to speed to the market for incubator firms.	Although speed to the market is an important performance criterion for incubator firms, there has been limited empirical studies on this issue within the literature. A clearer understanding of how incubator firms can improve their speed to the market is thus warranted.	The entrepreneurial orientation has a statistically significant positive effect on ability to bring technology and products quickly to the market.	entrepreneurial orientation is not only related to new entry firm but also to how fast new entry is accomplished.	1. The study is limited to analyse the effect of entrepreneurial orientation on speed to the market among Norwegian incubator firms at one point of time. 2. There is limited information in the survey about whether the product idea may have been established in a context other than the incubator firm.

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46	**William J. Wales, Pankaj C. Patel, Vinit Parida, Patrick M. Kreiser**	**Nonlinear Effects of Entrepreneurial Orientation on Small Firm Performance: The Moderating Role of Resource Orchestration Capabilities**	Entrepreneurial orientation, Small firms, curvilinearity, firm performance, firm capabilities, resource orchestration/ Entrepreneurial orientation	To investigate the nature of the relationship between entrepreneurial orientation (EO) and small firm performance.	Many studies generally suggest a positive effect of EO on firm performance. However, the focus in the context of small firms remains limited. As well as, the limitation of small firms on organising resource and accessing requires investigation to employ an EO-focused strategic approach successfully.	The maximum positive effect of EO on performance, at least regarding small firm growth, appears at lower levels of EO than would be expected based on previous research efforts that have suggested either a linear relationship or reducing performance gains at high levels of EO	Information and Communication Technology (ICT) capability and Network Capability (NC) serve to decrease the resource constraints that impede the effective utilization of EO in small firms and, thereby, alter the nature of the EO-small firm performance relationship.	The study did not provide a direct test of the resource availability hypothesis beyond our post hoc analysis, which posits firm size as a proxy for firm resource levels.
47	**Martin Würmseher Group**	**To each his own: Matching different entrepreneurial models to the academic scientist's individual needs**	Technology transfer, University spin-off, Surrogate entrepreneurs, Founding angels, Academic entrepreneurship. / Entrepreneurship	To examine the obstacles that prevent scientists from commercializing their technologies and how they can be reduced.	It is surprising that, despite the significance of individual-level characteristics and the attention they have received in the wider entrepreneurship literature, the individual-level differences of academic scientists have been relatively neglected in the academic entrepreneurship literature.	The two models (the inventor-entrepreneur model and the surrogate entrepreneur model) describe the extremes of a continuum populated by a variety of intermediate situations where scientists do not want to let go of their findings completely, but also unwilling to become full-time entrepreneurs.	Commercialization would be more likely when encouragement from experienced entrepreneurs was available, and scientists do not have to cope alone.	The cases studied in this paper and most of the interviewees were from one large technical university in Switzerland. Thus, the findings in this paper may not utilize equally to other university settings that do not benefit from similar support, and where the management of conflicts of interests is less clearly defined.
48	**G. T. Lumpkin and Gregory G. Dess**	**Clarifying the Entrepreneurial Orientation Construct and Linking It to Performance**	Entrepreneurial orientation	to identify the nature of the entrepreneurial orientation (EO) construct and to suggest a contingency framework for examining the relationship between EO and firm performance.	The classification system shows the various dimensions of the entrepreneurial process. However, they have not directed to the consensus about how to characterize entrepreneurship.	An effective combination of autonomy, innovativeness, risk taking, proactiveness, and competitive aggressiveness could render the firm to be entrepreneurial. An entrepreneurial orientation, as reflected in the organizational processes and decision-making style of a firm, can be a source of competitive advantage or strategic renewal, even for firms that are not involved in launching new ventures.	EO may be more strongly associated with performance when it is combined with both the appropriate strategy and the proper environmental conditions.	This research is conceptual framework which requires empirical study.

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49	**George J. Avlonitis, Helen E. Salavou**	**Entrepreneurial orientation of SMEs, product innovativeness, and performance/ Entrepreneurial orientation**	Entrepreneurial orientation; Product innovativeness; Product performance; SMEs; Cluster analysis/ Entrepreneurial orientation	To investigate the entrepreneurial orientation (EO)-performance link and to identify EO profiles of SMEs to suggest variations in product innovativeness dimensions of different performance potential.	Despite the widely acknowledged importance of EO in small business research, the empirical literature lacks evidence regarding the way SMEs are classified according to EO and approach product innovativeness for responding to expectations of better performance.	The two opposite groups of SMEs according to the EO construct, namely the active and the passive entrepreneurs, verified the viewpoints stated by industry experts in the context of Greece.	The variations in product innovativeness dimensions of different performance potential could help top managers to calibrate the overall strategic philosophy that clarifies how existing firms should operate on tactical manifestations, including the basis on which they compete (e.g., proactive vs. reactive, risk-taking vs. risk-aversion, me-too-ism vs. product differentiation)	The sample of SMEs is from a single national context, notably Greece.
50	**Brian S. Anderson, Yoshihiro Eshima**	**The influence of firm age and intangible resources on the relationship between entrepreneurial orientation and firm growth among Japanese SMEs**	Entrepreneurial orientation, Firm growth, Firm age, Intangible resources, Configurational model/ Entrepreneurial orientation	To investigate the moderating influence of firm age and intangible resources on the EO-firm growth relationship among small and medium-sized enterprises (SMEs) in Japan.	SMEs tend to be constrained in their tangible and slack resources, what intangible resources (such as intellectual property, brand identity, and reputation) they do possess take on strategic significance. This is also the case because intangible resources are often argued to be a significant source of competitive advantage intangible resources are inherently rarer and more difficult to imitate.	While younger firms, more entrepreneurial firms that possess a resource advantage exhibit higher levels of growth, among older firms, there is not a meaningful change in the level of growth irrespective of resource endowment and strategic posture.	Younger firms are also able to leverage their strategic adaptability and temporally salient market knowledge to overcome intangible resource disadvantages and achieve growth objectives.	The use of cross-sectional data, which prohibits the identification of the underlying directions of causality between the constructs of interest.
51	**Anis Khedhaouria, Ca˘lin Gura˘u, Olivier Torre `s**	**Creativity, self-efficacy, and small-firm performance: the mediating role of entrepreneurial orientation**	Self-efficacy, Creativity, Entrepreneurial orientation, Firm performance, Mediation/ Entrepreneurial orientation	to examine how an entrepreneur's creativity, self-efficacy, and EO affect small-firm performance.	Some studies posit that EO is more important than personality traits, whereas other researchers outline the central role of entrepreneurial traits in achieving small-firm performance. This study integrated two entrepreneurial traits with EO to clarify their interrelated associations with small-firm performance	Self-efficacy and EO are positively and directly associated with firm performance, whereas EO fully mediates creativity and firm performance.	Entrepreneurs with high level of EO may lead their firms to high levels of performance and growth. The pursuit of growth by creative entrepreneurs requires entrepreneurial orientation that leads to superior firm performance.	Although a substantial amount of the variance in performance is explained by creativity, self-efficacy, and EO in the model (R2 = 12.9 %), explanatory power and overall goodness of fit could be improved. Many antecedent factors of performance were not included in the model.

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52	**Wouter Stam, T. Elfring**	**Entrepreneurial Orientation and New Venture Performance: The Moderating Role of Intra- and Extra industry Social Capital**	Entrepreneurial orientation, New venture performance, Extra industry social capital, Intra industry social capital/ Entrepreneurial orientation	to examine how the social capital that is embedded in the intra- and extra industry ties of a new venture's founding team influences the relationship between the firm's entrepreneurial orientation and its performance.	Many previous studies focused on the moderating role of environmental and organizational factors, and limited studies have examined how a firm's embeddedness in interfirm networks influences the wealth creation potential of its entrepreneurial orientation	the combination of high network centrality and extensive bridging ties strengthened the focal link. Among firms with few bridging ties, centrality weakened the relationship between entrepreneurial orientation and performance.	The importance of fit between entrepreneurs' social capital resources and the unique resource needs associated with an entrepreneurial orientation.	(1) Data collection on independent and dependent variables through the same survey may have introduced common method bias. (2) This study's performance measures could be improved by considering more specific performance dimensions. (3) The study only examined a single, emerging high-tech industry.
53	**Bruce H. Kemelgor**	**A comparative analysis of corporate entrepreneurial orientation between selected firms in the Netherlands and the USA**	Corporate entrepreneurship, strategic management, comparative culture, organizational culture. / Strategy and innovation	To examine how the firm's strategic management practices, influence its entrepreneurial behaviour as compared to an international competitor.	Corporate entrepreneurship genesis and objectives are found in the corporation' s external relationships to its competitive environment, that is, as part of the firm' s competitive strategy.	The significant difference between the Netherlands US firms in entrepreneurial orientation. Also, there is a link between corporate entrepreneurship and three measures of performance, such as number of patents, return on sales and number of innovations.	Culture may play in facilitating corporate entrepreneurship and adaptable organizational practices.	The limitation of this research is very small sample size, six of the 19 managers and 8 of the 30 employees opted.

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54	**Shad S Morris, Scott A Snell**	**Intellectual capital configurations and organizational capability: An empirical examination of human resource subunits in the multinational enterprise**	HRM strategy; human/knowledge capital; capabilities and capability development; knowledge stocks and flows/ Intellectual capital	to develop and test a framework that studies the relationship between intellectual capital configurations and organisational capabilities in human resource (HR)	Much of the literature on international HR parallels the global/ local debates that characterizes organizational and strategic-level decisions – that is, which practices should be globally integrated, and which should be locally adapted within the MNE.	Intellectual capital dimensions vary in their usefulness for generating, sharing, and implementing HR management practices. While certain resources may help in the development of one capability, they may harm the development of another.	Developing organizational capabilities depends, in part, on how people (human capital), relationships (social capital), and systems (organizational capital) are configured	This research undertakes cross-sectional way to gather the data. As well as, this study has potential bias showed by single-source data.
55	**Vı´ ctor J. Garcı´a-Morales, Francisco Javier Llore´ ns-Montes, Antonio J. Verdu´ -Jover.**	**Influence of personal mastery on organizational performance through organizational learning and innovation in large firms and SMEs**	Organizational innovation, Organizational learning, Personal mastery, Performance, Size/ Strategy and innovation	To examine the influences of personal mastery on organizational performance, both directly and indirectly through the dynamic capabilities of organizational learning and innovation.	Although these indirect interrelations are very important for improving organizational performance, they are not usually explored in research	(1) personal mastery influences organizational performance directly and indirectly through organizational learning and innovation; (2) organizational learning influences organizational performance positively, both directly and indirectly through organizational innovation; (3) organizational innovation influences organizational performance positively.	CEO's perception of personal mastery, organizational learning and innovation is fundamental to encouraging organisational learning and innovation capabilities.	1. This study focused on four sectors (food-farming, manufacturing, construction, and services) 2. Survey data based on self-reports may be subject to social desirability bias
56	**Susanna Camps, Pilar Marques**	**Exploring how social capital facilitates innovation: The role of innovation enablers**	Social capital, Innovation, Qualitative, methods Case, studies SME. / Intellectual capital	to respond to calls for further research on intra-organizational differences in social capital, examining the group level, in both formal and informal definitions, building considerably on data obtained at the individual level.	The literature supports the importance of social capital for the development of innovation capabilities but pays little attention to how this process takes place. Furthermore, many studies assume a homogeneous level of social capital within an organization, and focus on the structural dimension, minimising the relational and cognitive dimensions.	The mediating role of innovation enablers—a set of general capabilities that support innovation.	Social capital is defined as the sum of the actual and potential resources embedded within, available through, and derived from the network of relationships possessed by an individual or social unit	This research relied on a single organization.

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57	**Phyra Sok, Aron O'Cass**	**Achieving superior innovation-based performance outcomes in SMEs through innovation resource–capability complementarity**	Resources-Capabilities, Complementarity, Learning, Innovation, Performance. / Strategy and innovation	To examine the link between innovation resource–capability complementarity and innovation-based performance.	Many of the RBV literature has highlighted performance in the form of revenue and the like, to the neglect of performance at disaggregated levels, such an approach may lead to the misleading conclusion	There was a significant effect of innovation resource–capability complementarity on innovation-based performance. Also, firms that possess superior learning capability are willing to question their operational processes and routines and adjust following the feedback obtained from customers and channels; thereby enhancing their abilities to develop more new products and increase their speed in delivering products to the customers.	The focus on innovation-based performance is important because the speed of product development, newness of products and number of new products are all associated with the firm's resource investment and capabilities that drive product associated outcomes.	1. A cross-sectional research design does not offer the same insight into the dynamics of the innovation R–C complementarity, learning capability and innovation-based performance with a firm as does a longitudinal design. 2. The study focuses on SMEs in emerging country (Cambodia) which may have different characteristics from other emerging or developed countries.
58	**Mikko Moilane, Stein Østbye, Kristin Woll**	**Non-R&D SMEs: external knowledge, absorptive capacity, and product innovation**	Non-R&D innovators, External knowledge, Absorptive capacity, Peripheral regions. / Strategy and innovation	To examine whether absorptive capacity plays a mediating role between different external knowledge inflows and innovative performance.	Understanding the mechanisms behind the effect of external knowledge on innovation performance is therefore of importance for informing relevant innovation policies directed at SMEs.	The external knowledge inflows that improve SMEs' innovation performance come from a multitude of sources including customers, trade organizations and personal networks.	SMEs can improve innovation performance by managing both their institutional and their networks with care.	This research cannot include any of the measures that relate to the definition of absorptive capacity at this stage because of limitations in the data. Also, the limited information about who the gatekeepers are for different kinds of knowledge partnerships

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59	**Ping-Chuan Chen, Shiu-Wan Hung**	**Collaborative green innovation in emerging countries: a social capital perspective**	Collaboration, New product development, Knowledge management, Environmental management, Capabilities. / Strategy and innovation	to examine how environmental collaboration across organizational boundaries affects green innovation from the social capital perspective.	The new paradigm for green innovation has already shifted to a collaborative model. Due to the environmental collaboration's need for more exchanges of resources, organizations should perform collaboration activities across organizational boundaries to attain information, resources, and knowledge.	Structural capital and cognitive capital have a positive effect on relational capital. Also, relational capital plays a significant role in green management and in turn leads to greater innovation. The companies should leverage their social capital to produce additional competitive advantages through environmental collaboration.	Companies can acquire information, resources, and knowledge by combining direct or indirect interfirm network interactions with relationship development. In the context of green management, much valuable knowledge is socially embedded in the form of institutional practice.	First, this study did not measure how social capital and knowledge sharing change over time. Second, the findings of this study may only reflect the situation of Taiwanese companies. Third, companies should not only manage the accumulation of external knowledge for triggering green innovation but also adapt their absorptive capabilities to succeed with strategic innovation.
60	**Qing Cao, Zeki Simsek, Justin J. P. Jansen**	**CEO Social Capital and Entrepreneurial Orientation of the Firm: Bonding and Bridging Effects**	Entrepreneurial orientation; CEO social capital; Environmental instability. / Entrepreneurial orientation	To develop and examine a CEO social capital model of EO, suggesting that a firm's EO is differently shaped by the CEO's bonding and bridging social capital.	Previous investigations reveal the role of the different facets of CEOs' individual characteristics in determining a firm's entrepreneurial orientation (EO). This research complements the previous investigations by theorizing and testing the impact of CEOs' social capital on EO.	The CEO's bonding social capital with organisational members from various functional units has an inverted U-shaped relationship with firm EO, while the CEO's bridging social capital with the firm's diverse set of external stakeholders has a positive association with EO. Also, this research finds that the relationship between CEO bridging social capital and EO becomes stronger as the firm's environmental instability increases.	Firms that pursue greater innovation display greater willingness to undertake somewhat risky initiatives and strategic commitments and proactively beat competitors are viewed as entrepreneurially oriented.	The cross-sectional study emerges the concern of reverse causality.

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61	**Miriam Delgado-Verde, Gregorio Martín-de Castro, Javier Amores-Salvadó**	**Intellectual capital and radical innovation: Exploring the quadratic effects in technology-based manufacturing firms**	Intellectual assets, Intellectual capital, Human capital, Technological capital, Vertical social capital, Radical innovation. / Intellectual capital	To build a novel theoretical and empirical exploration of the quadratic effects of intellectual capital, both individually and collectively and internal and external to the firm, on radical innovations, from the perspective of the Intellectual Capital- Based View.	After two decades of research, the complex question of the link between intellectual capital and radical innovation remains unsolved.	The relationship between human capital and radical innovation is linear and positive. Also, the chemical industry has a positive influence on radical innovation, revealing the importance of this industry regarding innovations and technical changes.	Firm innovation has therefore been the result of technological capital because it represents the application of attained and produced technological knowledge and its materialization in new products and processes. In	The limitations of this research consist of the use of reflective measures and collected perceptual and subjective primary data
62	**Wenpin Tsai, Sumantra Ghoshal**	**Social Capital and Value Creation: The Role of Intrafirm Networks**	Social Capital, Intrafirm Networks, Product innovation/ Intellectual capital	To examine the relationships among the structural, relational, and cognitive dimensions of social capital and between those dimensions and the patterns of resource exchange and product innovation in the company	As previous studies have focused on physical and human capital, social capital is a productive resource, facilitating performances that range from an individual's occupational achievement to a firm's business operations.	Social interaction, a manifestation of the structural dimension of social capital, and trust, a manifestation of its relational dimension, were significantly related to the extent of interunit resource exchange, which in turn had a significant effect on product innovation.	Common values and a shared vision, the major manifestations of the cognitive dimension of social capital, may also encourage the development of trusting relationship.	1. With only 15 business units in the sample, the study also suffered from the problem of small sample size. 2. Product innovation was the only outcome of resource exchange and combination we examine
63	**Henny Romijn, Manuel Albaladejo**	**Determinants of innovation capability in small electronics and software firms in southeast England**	Innovation measurement, Technological capability, High-tech small firms; Networks, Clusters. / Strategy and innovation	To explore the determinants of innovation capability in small UK electronics and software firms	There is still little empirical evidence about how companies improve their innovation capacity.	A range of internal and external factors were found significantly related to the innovative performance of the electronics and software development firms that were analysed in this paper. Among the internal factors, the importance of prior experience in a scientific environment stands out. A dominance of staff with science and engineering degrees in the enterprise was also found to have a positive effect.	Adequate medium-term R&D funding is crucial for sustained innovation and learning and, ultimately, for achievement of technological excellence in a specialised niche that can lead to competitiveness in leading international markets.	The study did not provide much support for the contention that overall intensity of external networking would be conducive to innovativeness, nor that proximity to network partners in a general sense would contribute to this.

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64	**Krsto Pandza, Stuart Horsburgh, Kevin Gorton, Andrej Polajnar.**	**A real options approach to managing resources and capabilities**	Resources, Dynamics, Strategic management, Open systems, Case studies. / Strategy and innovation	To examine the capability development process and more implicitly networking and investment decisions in manufacturing technology.	It is difficult to find genuine empirical research driven by resource-based view (RBV) and the dynamic-capabilities approach (DCA) in the field of operations management.	The process of how a firm acquires its capabilities cannot be separated from how it acquires its knowledge. Much of the knowledge we have been concerned with comes from experience as managers learn to solve problems and in doing so accumulate knowledge and acquire capabilities which are used to build up the firm's resource base	The introverted orientation of both RBV and DCA enable them to emancipate the ignored strategic importance of operations. Since RBV and DCA represent two leading efficiency approaches in strategic management, they enable us to understand resources and capabilities embedded in operations as something more than strategizing around product market.	Knowledge is problematic, and therefore uncertain. It gathers the process of purposeful trial and error. In this respect, the knowledge obtained by the firm represent estimations, and like any speculation, they are imperfect, as they are subject to continuous testing in the market
65	**Manuela Presutti, Cristina Boari, Luciano Fratocchi**	**Knowledge acquisition and the foreign development of high-tech start-ups: A social capital approach**	Social capital, Start-up, Born global, Knowledge acquisition, Knowledge exploitation, Foreign development, / Intellectual capital	to verify whether social capital may be considered as a critical source of knowledge acquisition abroad.	A few studies have been carried out so far to find the potential factors which consent this acquisition of profitable knowledge during the growth process abroad	While the structural dimension of social capital is positively associated with greater knowledge acquisition, both relational and cognitive dimensions are negatively linked to knowledge acquisition.	Global start-ups can employ the inter-organizational social capital to emphasise their international presence, accelerating the process of both knowledge acquisition and exploitation abroad.	The study tangled to the difficulty in assessing social capital and knowledge acquisition since in literature are often imprecise proxies for these constructs of interest.
66	**Weichieh Su, Cheng-Yu Lee**	**Effects of corporate governance on risk taking in Taiwanese family firms during institutional reform**	Outside directors, Agency theory, Risk taking, Corporate governance reform. / Entrepreneurial orientation	to study the internal corporate governance mechanisms (such as boards of directors) and external corporate governance mechanisms (such as institutional reform) can promote risk-taking behaviour in Asian family firms.	Limited studies have been explored pertaining the effects of corporate governance on family firms' risk-taking behaviour in newly industrialized economies in Asia, where there is high technological innovation	The concentration of family ownership and involvement fails to enable a family firm's risk-taking behaviour. In contrast, the weak risk-taking in these firms, which might be explained by a desire to protect the family's wealth, leads to a conflict of interests between the family (majority) and shareholders (minority)	Despite the importance of outside directors in corporate governance, it is crucial for policymakers to design a mechanism to distinguish affiliated outside directors from non-affiliated outside directors.	The study used the ICT industries as a sample. Because firms in the ICT industries have relatively high levels of risk taking, this study provides conservative inferences.

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67	**Sung-Coon Kang, Scott A. Snell**	**Intellectual capital Architectures and Ambidextrous Learning: A Framework for Human Resources Management**	Intellectual capital	to create a framework for investigating how firms might achieve (contextual) ambidextrous learning through managing human resources.	The interest in studying the way to acquire ambidextrous learning within the firm for both of researchers and managers are increasing significantly. In this case, exploring new knowledge domains while exploiting current ones are simultaneously conducted.	There are two distinctive architectures of intellectual capital that combine human capital with social capital. One architecture, referred to as refined interpolation, consists of specialist human capital, cooperative social capital, and organic organizational capital. The other architecture, referred to as disciplined extrapolation, consists of generalist human capital, entrepreneurial social capital, and mechanistic organizational capital.	Individual knowledge (human capital) is increased and complemented by a firm's unique social structures (social and organizational capital) to expand dual behavioural capacities of individuals for ambidextrous learning.	Ambidextrous learning does not just occur on its own, and these combinations of human, social, and organizational capital may not be naturally happening.
68	**Yuan-Hui Tsai, Sheng-Wuu Joe, Cherng G. Ding, Chieh-Peng Lin**	**Modeling technological innovation performance and its determinants: An aspect of buyer–seller social capital**	Social capital, Customer knowledge development, Commitment to innovation, Survey research. / Intellectual capital	to clarify the indirect relationship between buyer–seller social capital and innovation performance via the two mediators, which has not yet been previously explored.	Even if social capital ultimately leads to improve such outcome as innovation performance, the strength and characteristics of this association through its potential mediators remain under-examined.	Innovation performance is positively influenced by shared norms and trust through the mediation of customer knowledge development. Accordingly, innovation performance is also positively influenced by social interaction and shared norm through the mediation of the commitment to innovation.	Understanding buyer-seller social capital is helpful for innovators (i.e., sellers) to leverage such social capital to effectively improve their innovation performance, because today's customers are likely to affect the success or failure of the innovation.	1. The conclusions may not be fully generalizable to employees in organizations of other types (e.g., financial industry) or those from other countries. 2. Practical empirical considerations relating to field-based data collection restricted the set of variables examined in this study to a cross-sectional study

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69	**Enrico Santarelli, Hien Thu Tran**	**The interplay of human and social capital in shaping entrepreneurial performance: the case of Vietnam**	Human capital, Social capital, Entrepreneurship, Performance of entrepreneurial firms, Vietnam. / Intellectual capital	to investigate the effect of the interaction of human and social capital on entrepreneurial performance.	Thus, the literature on the interplay of human and social capital as drivers of successful entrepreneurship is still relatively limited, with some scholars arguing that they are substitutes, and others seeing them as complements.	(i) human capital strongly predicts firm success, with learning exhibiting a statistically significant positive association with operating profit, (ii) benefits from weak ties outweigh those from strong ties, (iii) interaction of human capital and social capital displays a statistically significant positive effect on new-firm performance.	Human capital categorized into education, experience, and learning plays a significant role as key determinant of successful entrepreneurship. Measuring the effect of social capital as the benefits obtained from personal strong-tie and weak-tie networks	The limitations of available data may exclude some dimensions of social capital and of human capital which may be substitutable.
70	**Hsiang-Lan Chen, Wen-Tsung Hsu, Chiao-Yi Chang**	**Independent directors' human and social capital, firm internationalization and performance implications: An integrated agency-resource dependence view**	Internationalization, Independent director, Board human capital, Board social capital, Agency theory, Resource dependence theory. / Intellectual capital	To examine the performance implications of the fit between independent directors' human and social capital and firm internationalization.	A few papers have investigated the effect of board capital on internationalization, but their findings are inconsistent.	Independent directors' industry-specific experience, international experience, and interlocking directorate ties are positively associated with internationalization and that an inverted U relationship exists between independent directors' tenure overlap and internationalization.	Human and social capital of independent directors may render them best able to not only effectively monitor and advise managers with varied intellectual counsel on international issues but also qualified to help acquire essential resources for internationalization	This study focuses on Taiwanese firms in the electronics sector, limiting the generalizability of the findings.
71	**Robert F. Hurley, G. Tomas M. Hult**	**Innovation, Market Orientation, and Organizational Learning: An Integration and Empirical Examination**	Strategy and innovation	To presents an in-depth integration of the constructs regarding organizational culture and innovation with the research on market and learning orientations.	Research on market orientation and organizational learning addresses how organizations adapt to their environments and develop competitive advantage. A significant void exists in current models of market orientation because none of the frameworks incorporates constructs related to innovation.	The higher levels of innovativeness in the firms' culture are associated with a greater capacity for adaptation and innovation (number of innovations successfully implemented). Also, higher levels of innovativeness are associated with cultures that emphasize learning, development, and participative decision making.	Introducing innovation into models of market orientation and performance could supplement or possibly even replace organizational learning constructs.	1. The variables that could be analysed such as market orientation in the conceptual model could not be examined empirically. 2. The data has a problem of generalizability. The data are rare and employ many informants in each group.

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72	**Janine Nahapiet and Sumantra Ghoshal**	**Social Capital, Intellectual Capital, and the Organizational Advantage**	Intellectual capital	(1) To integrate these different facets to define social capital in terms of three distinct dimensions; (2) to describe how each of these dimensions facilitates the creation and exchange of knowledge; and (3) to argue that organizations, as institutional settings, can develop high levels of social capital in terms of all three dimensions.	The investigations of the theory of the firm have begun to highlight the sources and conditions of what has been represented as "the organizational advantage," rather than focus on the causes and effects of market failure.	1. Regarding social capital, our analysis has concentrated primarily, although not exclusively, on how social capital assists the creation of new intellectual capital 2. Regarding intellectual capital, this research focuses on creation, rather than its diffusion and exploitation. 3. The exploration of organizational advantage began with the proposition that knowledge and knowledge processes are major foundations of such advantage.	The roots of intellectual capital deeply embedded in social relations and the structure of these relations	Social capital may have significant negative consequences. Furthermore, the creation and maintenance of some forms of social capital, particularly the relational and cognitive dimensions, are expensive.
73	**Lee, Choonwoo Lee, Kyungmook Pennings, Johannes M.**	**Internal capabilities, external networks, and performance: A study on technology-based ventures**	entrepreneurship capabilities, social capital, social networks, start-up companies, innovation. / Intellectual capital	to identify the role of entrepreneurial strategies—especially strategies in creating internal capabilities and in improving external networks—in the value creation process.	The previous studies have investigated the value-creating process of a new venture without exposing its entrepreneurial strategies. However, the value-creating entrepreneurial strategies is still overlooked.	Technological capabilities and financial resources invested during the development period are positively associated with the start-up's performance. Entrepreneurial orientation has a positive and marginally statistically significant effect on performance. Among social capital indicators, the only statistically significant predictor of performance is the linkage to venture capital companies.	Connections to other enterprises through strategic alliances do not have any main effects or interaction effects with internal capabilities. However, connections to venture capital companies have very strong main effects and interaction effects with internal capabilities.	The sample is not large enough to be analysed. Also, the informal networks based on East Asian culture, such as school ties, geographical ties, and affiliation ties, could be more important to organizational growth than formal inter-organizational ties in Korea

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74	**Helena Yli-Renko, Erkko Autio, Harry J. Sapienza**	**Social capital, knowledge acquisition, and knowledge exploitation in young technology-based firms**	Social capital, Knowledge acquisition and knowledge exploitation, Young technology-based firm. / Intellectual capital	To study the impact of social capital in the key customer relationship on knowledge acquisition and knowledge exploration	Knowledge is pivotal for technology-based firms: to generate and to exploit knowledge in high-technology sectors demands that knowledge be continually replenished. Since the knowledge acquisition and knowledge exploitation are mainly social processes, social capital may be critical for the long-term success of technology-based firms.	The social interaction and network ties dimensions of social capital are related to the greater knowledge acquisition, but that the link of quality dimension is negatively related to knowledge acquisition. Knowledge acquisition affect positively on knowledge exploitation for competitive advantage through new product development, technological distinctiveness, and sales cost efficiency. Also, the knowledge acquisition performs a mediating role between social capital and knowledge exploitation.	Aspects of social capital such as social interaction, relationship quality, and network ties) embedded in relationships of young technology-based firms with key customers increase the young firms' knowledge acquisition from these relationships, and that knowledge acquisition may then be exploited for competitive advantage through new product development, improved technological distinctiveness, and reduced sales costs.	1. The cross-sectional nature of research design inhibits assessing the direction of relationships 2. Possible survivor bias: the sample comprises only young technology-based firms that have survived, and it may be that dissimilar result emerges if failed firms had been included in the sample.
75	**Per Davidsson, Benson Honig**	**The role of social and human capital among nascent entrepreneurs**	Nascent entrepreneurship; Start-up process; Social capital; Human capital. / Intellectual capital	1). To examine, at the individual level, tacit and explicit human capital factors, as well as bridging and bonding social capital. 2). To compare the control group of non-nascent entrepreneurs. 3). To conduct longitudinal study of a population of nascent entrepreneurs.	Previous studies ignore many of the efforts that eventually result in termination before the emergence of the firm. Therefore, many investigations about the theory of knowledge of entrepreneurship, suffers from selection bias, the outcome of sampling only successful emergent entrepreneurs or enterprises.	The effects of both tacit and explicit knowledge primarily during entrepreneurial discovery, i.e., in differentiating the nascent population from the general population. Swedish nascent entrepreneurs were better educated reflecting more explicit knowledge.	While both elements of human capital are important for entrepreneurial discovery, tacit knowledge gained from previous start-up experience is particularly influential.	This study uses cross-sectional study that cannot determine at what stages of the entrepreneurial process different aspects of human and social capital are influential.
76	**Soo-Hoon Lee, Poh-Kam Wong, and Chee-Leong Chong**	**Human and social capital explanations for R&D outcome**	Human capital, research and development (R&D) outcomes, social capital. / Intellectual capital	To assesses the extent to which human capital (education, work experience, and training) and social capital (level of interconnectedness, relationship, and shared expectations with others) impact on research and development outcomes.	There were no empirical studies have contrasted an individual's knowledge base against his/her expertise obtained from working with others on R&D performance.	Education has the greatest impact on R&D outcomes as the human capital variable, while the structure in which one interacts with others has the greatest impact on R&D outcomes as the social capital variable.	The ability of individuals to leverage their capabilities depends in some part on how well, to whom, and from whom they exchange information.	There was the single-item measure for the relational dimension of social capital.

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77	**Roger J. Calantone, S. Tamer Cavusgila, Yushan Zhao**	**Learning orientation, firm innovation capability, and firm performance**	Learning orientation, Innovation, Firm performance. / Strategy and innovation	To investigate the relationships among learning orientation, firm innovativeness, and firm performance, through a model drawn from organisational learning theory and the new product literature.	A systematic investigation of the link between learning orientation and firm innovation has not been carried out for two reasons. First, there is no compromise on how to define and organise the learning orientation construct. Second, the role of learning orientation in firm innovativeness remains vague.	This study does not address the issue of how organizational learning should be carried out. Further, the study is limited to the effect of learning orientation on firm innovativeness, but the general outline can be applied to other types of activities, such as marketing, and their linkage with organizational learning.	Learning orientation is proposed to be an important antecedent of firm innovativeness, which in turn influences firm performance.	This study emphasizes the importance of learning orientation and links it with innovation and performance, but it does not address the issue of how organizational learning should be carried out.
78	**Mourad Dakhli, Dirk De Clercq**	**Human capital, social capital, and innovation: a multicountry study**	Social capital, Human capital, Innovation, cross-country comparison. / Intellectual capital	To study the impacts of two forms of capital, i.e., human capital and social capital, on innovation at the country level.	Most previous studies analysed human and social capital within a given country.	The finding reveals the strong support for the positive relationship between human capital and innovation and partial support for the positive effect of trust and associational activity on innovation.	The value of human and social capital on society often stems from the dynamics that occur in tightly-knit social groups. However, the economic development and output at the national level is the result of the aggregate activity of individual regions within a country.	This study utilise secondary data published by academic and international organisations to analyse the operationalisation of three constructs which are human capital, social capital, and innovation
79	**Li-min Hsueh, Ying-yi Tu**	**Innovation and the Operational Performance of Newly Established Small and Medium Enterprises in Taiwan**	Strategy and innovation	To explore the relationship between innovation and the performance of new enterprises.	The existing studies have not yet understood whether the number of new enterprises established in 2001 so far is greater than the number of enterprises which have closed down. However, up until 2000, the number of new enterprises being established in Taiwan was greater than the number of enterprises going out of business, although the difference between them has got smaller in the last three years.	Three main areas of innovation which were grouped from the nine activities by principal component analysis all had a positive relationship with operational performance of new enterprises.	A new enterprise will have greater willingness to innovate, and the ability to accept innovation is much more readily accepted than an established enterprise. Thus, innovation will have more impact on the performance of a new enterprise.	The study was undertaken in Taiwan which is different with other countries. Therefore, the result cannot be generalised.

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80	**Mohan Subramaniam, Mark A. Youndt**	**The Influence of Intellectual Capital on the Types of Innovative Capabilities**	Intellectual capital	To analyse how aspects of intellectual capital influenced radical, innovative capabilities and incremental innovative capabilities in organizations	The ties between research on knowledge and research on innovation, in fact that in recent years scholars have seen a blurring of the boundaries between these areas.	human, organizational, and social capital and their interrelationships selectively influenced incremental and radical innovative capabilities. As anticipated, organizational capital positively influenced incremental innovative capability, while human capital interacted with social capital to positively influence radical innovative capability. In contrast, human capital by itself was negatively associated with radical innovative capability.	An organization's efforts at hiring, training, work design, and other human resource management activities may need to focus not only on shoring up their employees' functional or specific technological skills/expertise, but also on developing their abilities to network, collaborate, and share information and knowledge.	1. The sample size was relatively small. 2. The measures of the different aspects of intellectual capital and the types of innovative capabilities were perceptual, based on key informants.
81	**James C. Hayton**	**Competing in the new economy: the effect of intellectual capital on corporate entrepreneurship in high-technology new ventures**	Intellectual capital	To examine the relationship between IC and entrepreneurial behaviour of high-technology new ventures (HTNVs) empirically	Despite the widespread recognition of the importance of IC for promoting entrepreneurship among new ventures, this issue has not been the focus of empirical validation.	These firms' top management team human capital diversity and organizational reputation are of greatest significance for their entrepreneurial performance. Interestingly, these factors far outweigh the insignificant effect observed for intellectual property on subsequent innovation and venturing activities.	Intellectual Capital (IC) is defined as 'a bundle of organizational resources comprised of human capital, intellectual property, and reputational capital that are tangible and intangible and can be leveraged to create value.'	Even though data were drawn over multiple years, sample size remains a limitation in this study.
82	**Peter Moran**	**Structural vs. Relational Embeddedness: Social Capital and Managerial Performance**	Social capital; Embeddedness; managerial performance. / Intellectual capital	To examines the impact of managers' social capital on managerial performance.	Beyond the broad consensus about the importance of one's social relations, there is debate surrounding several issues regarding social capital's operational definition and the mechanisms through which it has its impact.	Both elements of social capital influence managerial performance, although in distinct ways: structural embeddedness plays a stronger role in explaining more routine, execution-oriented tasks (managerial sales performance), whereas relational embeddedness plays a stronger role in explaining new, innovation-oriented tasks (managerial performance in product and process innovation).	'Networking' and building social capital are not synonymous, for some activities, it is vital to find the time to cultivate enduring, intimate ties.	The problems of reverse causality cannot be entirely ruled out. Further, this study takes place within a single corporation within the pharmaceutical industry, and the results may not generalize to other industries or companies.

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83	**Oana Branzei, Ilan Vertinsky**	**Strategic pathways to product innovation capabilities in SME**	SME; Capability; Innovation/ Strategy and innovation	To examines which specific types of innovation strategies help trigger, augment, or modify SMEs' dynamic capabilities.	Prior research has documented the positive influence of different types of dynamic capabilities on small firms' survival prospects and their innovative, financial, and market performance but paid scarce attention to the up-stream association between specific strategic choices and advances or alterations in firms' sets of dynamic capabilities.	Human capital development efforts catalyse both the external absorption and the internal emergence of novel capabilities. Stronger emphasis on product features and broader market access stimulate the effective replication of extant capabilities, yielding immediate payoffs.	Human capital strategies stimulate the emergence of novel capabilities.	1. This study advise caution in generalizing the findings to manufacturing SMEs that operate in different geopolitical and economic environments or nonmanufacturing SMEs in Canada and elsewhere. 2. The findings are time-delimited. The 1997–1999 had several unique characteristics that could have motivated higher than average levels of innovative activities among respondent firms.
84	**Judy A. Siguaw, Penny M. Simpson, Cathy A. Enz**	**Conceptualizing Innovation Orientation: A Framework for Study and Integration of Innovation Research**	Strategy and innovation	to define the domain of innovation orientation, to develop an operational definition, to create a framework for examining innovation orientation, and to offer a corresponding propositional inventory.	The term innovation orientation has been frequently used in the innovation literature, but with a mix of conceptualizations and meanings.	First, the article examines the vast innovation literature to arrive at a clear definition of the innovation orientation construct to provide a consistent conceptualization for future research. Second, the article develops a comprehensive, organized framework for understanding innovation orientation and its effects.	Innovation orientation is defined as a multidimensional knowledge structure composed of a learning philosophy, strategic direction, and trans functional beliefs that, in turn, guide and direct all organisational strategies and actions, including those embedded in the formal and informal systems, behaviours, competencies, and processes of the firm to promote innovative thinking and facilitate successful development, evolution, and execution of innovations.	Until this measure is developed and verified, the role of innovation orientation on any aspect of firm performance will remain a mystery.
85	**Adegoke Oke**	**Innovation types and innovation management practices in service companies**	Innovation, Product innovation, New products, Service industries, United Kingdom. / Strategy and innovation	To investigate the different types of innovation that are predominant in companies in the UK services sector, the degree of innovativeness, the practices associated with the pursuit of innovation and their relationship with company performance.	Studies on innovations in the service sector, however, have received little attention from academic researchers.	Product innovations are emphasized more in telecommunications and financial sectors than in transport and retail sectors while service innovations are emphasized more in retail and transport sectors. Radical and incremental innovations were found to be related to innovation performance. Radical innovations were also found to be related to innovation management practices.	A formal practice is set up to foster the development of radical innovations although both me-too and incremental innovations are also related to innovation performance represents an interesting contribution.	Although we provided definitional guidance for service and product innovations in the survey, one cannot completely rule out the possibility of respondents confusing or using the terms interchangeably.

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86	**Gabrijela Leskovar-Spacapan, Majda Bastic**	**Differences in organizations' innovation capability in transition economy: Internal aspect of the organizations' strategic orientation**	Strategy; Innovation; Sustainable competitive advantage; Organizational capability; Slovenia. / Strategy and innovation	To identify whether strategic orientation of Slovenian companies is reinforced by important internal capabilities which enable them to achieve innovation success and sustained competitive advantage.	There were only a few studies exist in the literature which utilize data from smaller and or/transition countries in various stages of development.	Companies with innovation-strategic-orientation are not significantly more successful in many aspects regarding their innovation capability and sustained competitive advantage compared to companies with quality- and cost-strategic-orientation. Also, internal organizational capabilities represented in this research by organizational culture, entrepreneurship, and market orientation are only slightly more supportive in companies declaring innovation- strategic-orientation compared to other two strategic groups.	Management concepts/tools/practices supporting innovation-oriented culture, entrepreneurship, and market orientation are not used at all or are used less efficiently in emerging economies compared to competitors in developed economies	1. The classification of companies into three strategic groups was not the subject of the objective source of judgement as it was done by defining the most important strategic objective by managers of the companies (innovation, quality or cost). 2. This study only includes data obtained in Slovenian companies, which should be taken into consideration when generalizing its results to other (transition) countries.
87	**Jaakko Simonen, Philip McCann**	**Innovation, R&D cooperation and labor recruitment: evidence from Finland**	Innovation, Labor, Cooperation, R&D. / Strategy and innovation	To identify the role which labour acquisition plays in promoting innovation, after controlling for other firm-specific characteristics, including face-to-face contact with other firms and organizations.	Both knowledge transfer mechanisms, namely knowledge spillovers or the acquisition of embodied human capital, are assumed to be mediated primarily by face-to-face contact. However, the relative importance of these different mechanisms has hardly ever been tested.	Small firms are generally more innovative than large firms; R&D cooperation is an essential feature of innovation, but the variety of cooperation is of little importance; and labour acquisition appears to be only of limited importance for innovation.	Knowledge flows are assumed to take place among firms or between firms and organizations, via either knowledge spillovers among individual people, or knowledge transfers via the acquisition of embodied human capital.	The data used came from secondary data which is from innovation surveys conducted by Statistics Finland in 1996 and 2000.

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88	**Philipp Koellinger**	**Why are some entrepreneurs more innovative than others?**	Entrepreneurship, Innovation, Business opportunities, Judgment, Decision making, / Entrepreneurship	To present the theoretical insights and empirical evidence on the emergence of entrepreneurial innovativeness.	The knowledge about what exactly leads to innovative rather than purely imitative business ventures is still very limited.	First, innovative and imitative forms of entrepreneurship co-exist in all countries. Second, the strong country effects revealed in the regressions suggest that entrepreneurial innovativeness cannot be fully explained by individual specific factors alone. Third, the empirical study revealed a significant influence of various individual-level characteristics identified in the empirical study, such as education, employment status, and self-confidence.	Entrepreneurs in highly developed countries are significantly more likely to engage in innovative rather than purely imitative activities.	1. The study relies on subjective measures of innovativeness. 2. Many additional factors not included in this study that could influence the innovative propensity of nascent entrepreneurs.
89	**Johan Wiklund, Holger Patzelt, Dean A. Shepherd**	**Building an integrative model of small business growth**	Growth, SME, Entrepreneurial orientation, Attitude, Environment, Resources/ Entrepreneurial orientation	To develop an integrative model of small business growth that is both broad in scope and parsimonious in nature.	Small firm growth is a research area that has attracted considerable attention in recent years. Despite substantial increase in research volume, recent reviews of the literature on small firm growth suggest that little is still known about the phenomenon, and conceptual development has been limited.	Resources only had indirect effects on growth. That is, the effects were fully mediated by the EO construct.	EO appears to be a very useful construct in understanding small business growth.	1. One limitation of the study is the potential of reverse causality. 2. The study included only a limited number of constructs in the model, and that these constructs were analysed at an aggregate level.
90	**Yu-Shan Su, Eric W. K. Tsang, Mike W. Peng**	**How do internal capabilities and external partnerships affect innovativeness**	Product innovation, Process innovation, Internal capability, External partnership, Biotechnology industry. / Strategy and innovation	to propose an integrative model arguing that both internal capabilities and external partnerships affect a firm's innovativeness, which refers to the propensity of a firm to innovate	Recently, an "open innovation" model argues that valuable ideas can come from inside or outside the firm and can go to market from inside or outside the firm as well. However, the model has rarely been empirically examined.	Only partnerships with universities and research institutes seem to add value, whereas partnerships with suppliers, customers, and competitors do not contribute to innovativeness. Further, marketing capability and customer partnerships have a positive interaction effect on product innovativeness, while manufacturing capability and supplier partnerships have a positive interaction effect on process innovativeness.	Both exploitation of internal capabilities and exploration of external partnerships would contribute to a firm's innovativeness.	1. This study cannot completely rule out its potential influence in self-report-based research. 2. Third, the cross-sectional study of this investigation remains a potential concern.

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90	**Yu-Shan Su, Eric W. K. Tsang, Mike W. Peng**	**How do internal capabilities and external partnerships affect innovativeness**	Product innovation, Process innovation, Internal capability, External partnership, Biotechnology industry. / Strategy and innovation	to propose an integrative model arguing that both internal capabilities and external partnerships affect a firm's innovativeness, which refers to the propensity of a firm to innovate	Recently, an "open innovation" model argues that valuable ideas can come from inside or outside the firm and can go to market from inside or outside the firm as well. However, the model has rarely been empirically examined.	Only partnerships with universities and research institutes seem to add value, whereas partnerships with suppliers, customers, and competitors do not contribute to innovativeness. Further, marketing capability and customer partnerships have a positive interaction effect on product innovativeness, while manufacturing capability and supplier partnerships have a positive interaction effect on process innovativeness.	Both exploitation of internal capabilities and exploration of external partnerships would contribute to a firm's innovativeness.	3. This study cannot completely rule out its potential influence in self-report-based research. 4. Third, the cross-sectional study of this investigation remains a potential concern.
91	**Ya-Hui Hsu, Wenchang Fang.**	**Intellectual capital and new product development performance: The mediating role of organizational learning capability**	Intellectual capital, Organizational learning capability, New product development performance, Partial Least Square. / Intellectual capital	To examine the relationship between intellectual capital – including human capital, structural capital, and relational capital – and organizational learning capability.	Previous studies rarely examined the relationship between intellectual capital and organizational learning capability. Moreover, most studies neglect the mediating effect of organizational learning capability in the relationship between intellectual capital and new product development performance.	Human capital and relational capital increase new product development performance through organizational learning capability. Relational capital is the greatest factor among these three types of intellectual capital in Taiwanese IC design companies, structural capital is second, and human capital is last. Comparing three types of intellectual capital of Taiwan's large enterprises with those of Taiwan's small and medium enterprises (SMEs) reveals that the relational capital of Taiwan's SMEs is marginally less than that of large enterprises.	An organization should build good relationships with its stakeholders, customers, and suppliers to improve organizational learning capability. New product benefits come more from relational capital than from investing in human or structural capital.	1. This study focuses on Intellectual Capital (IC) design companies in Taiwan. 2. This study uses the IC design industry as the research sample, concluding that structural capital marginally negatively affects new product development performance. 3. This study employs subjective measures from interviewed project managers and R&D engineers. 4. This study tested hypotheses with a questionnaire survey that provided only cross-sectional data.

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92	**Christopher Williams, Soo Hee Lee**	**Resource allocations, knowledge network characteristics and entrepreneurial orientation of multinational corporations**	Multinational corporation, Entrepreneurial orientation, Resource allocation, Knowledge network. /Entrepreneurial orientation	To propose a fresh look at entrepreneurial orientation in MNCs as a two-dimensional space rather than a continuum and suggest that organization characteristics matter to positioning in this space.	Prior MNC researchers have neglected to identify the entrepreneurial orientation continuum in the organisation.	Internal knowledge network characteristics are shown to vary by stance, with more aggressive stances linked to knowledge governance supportive of the entrepreneurship process. In linking entrepreneurial orientation to the knowledge network of the MNC, this paper identifies factors important to the strategic management and on-going renewal of MNCs.	the most salient organizational characteristics to influence MNC entrepreneurial orientation relate to internal knowledge network and firm governance underpinning the process of entrepreneurship.	1. The sample of US MNCs prevents generalization of the results to MNCs from other countries. 2. More knowledge network and governance variables could be included as explanatory variables. 3. The research design was cross-sectional and used secondary data.
93	**Semih Akcomak, Bas ter Weel**	**Social capital, innovation and growth: Evidence from Europe**	Social capital Innovation Economic growth European Union. / Intellectual capital	To investigates the interplay between social capital, innovation and per capita income growth in the European Union.	The countries with higher levels of measured trust are richer. It is however not clear how social capital improves economic outcomes.	Higher innovation performance is conducive to per capita income growth and that social capital affects this growth indirectly by fostering innovation. Our estimates suggest that there is no direct role for social capital to foster per capita income growth in our sample of European Union countries.	A higher social capital stock, which is determined by historical institutions increase the incidence of innovation. The reason for this is that investments in innovative activities are risky and capital providers want to receive commitment from researchers that their money is well spent. This is easier in an environment in which people trust each other. In turn, this increases income.	Social capital and innovation are not treated at the microeconomic level, so the exact transformation of social capital into innovation remains unclear.
94	**Francesc Xavier Molina-Morales, María Teresa Martínez-Fernández**	**Social Networks: Effects of Social Capital on Firm Innovation**	Intellectual capital	to introduce and operationalize a model based on the social capital perspective by including a set of factors such as social interactions, trust, shared vision, and the involvement of local institutions.	Previous research has sought to apply and describe the territorial agglomeration of firms with a social component, using developments from the social capital and embeddedness concept. However, attempts to determine the real potential of this approach in the field of territorial networks are scarce.	a positive association between district affiliation, social capital, and involvement of local institutions and innovation that can offer relevant prescriptions for policy makers and individual entrepreneurs.	Linkages with firms outside the district were produced mostly using “bridging” actions by an intermediary actor.	Because of the utilisation of district affiliation as a control variable, this study cautious about inferring any degree of causality among the key constructs.

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95	**Aurora A.C. Teixeira, Natércia Fortuna**	**Human capital, R&D, trade, and long-run productivity. Testing the technological absorption hypothesis for the Portuguese economy, 1960–2001**	Human capital, Innovation, Trade, Economic growth, Cointegration. / Intellectual capital	To construct empirical, testable specifications which accounted for both the direct and indirect (through technology imports) impact of human capital on the long-run total factor productivity of a country.	A better understanding of a country's real sources of growth requires examining the human capital–R&D–trade–growth nexus. One of the main problems with empirical studies in this domain is that they do not clearly test the mechanisms through which trade affects total factor productivity.	The direct effect of human capital is quite substantial and higher than that of local business R&D efforts. However, the indirect effect of local R&D effort through lagged capital goods imports emerged as even more critical for Portuguese long-run total factor productivity (TFP). Among the three trade channels considered, machinery and equipment imports have in fact had the greatest and most significant (direct and indirect) impact on TFP.	The 'openness' of the national innovation system also emerges as highly relevant in boosting innovation capability.	Since the study conducted in Portugal, the result could be different with different country.
96	**Katrin Talke, Sören Salomo, Katja Rost**	**How top management team diversity affects innovativeness and performance via the strategic choice to focus on innovation fields**	Theory of upper echelon, TMT diversity, Innovation strategy, Corporate governance, New product portfolio innovativeness. / Strategy and innovation	To investigate the influence of team diversity on innovation strategy and subsequent innovation outcomes.	Past innovation research has largely neglected potential effects of corporate governance issues on strategic choices, and thereby on innovation management outcomes. The theory of upper echelon implies that strategic choices result from idiosyncrasies of top management teams (TMT).	TMT diversity has a strong impact on the strategic choice of firms to focus on innovation fields. Such focus then drives new product portfolio innovativeness and firm performance. As corporate governance arrangements thus seem relevant in the context of innovation management.	task-oriented TMT diversity enhances firm performance by facilitating an innovation strategy that increases new product portfolio innovativeness.	1. While TMT diversity is an important prerequisite in the innovation context, the study did not compare this finding with previous explanations. 2. The analysis is restricted to one industry, i.e., manufactured goods. 3. The firms with a dominant or single-product business to secure that stock market performance reflects the firm's innovation management outcomes.
97	**Keld Laursen, Francesca Masciarelli, Andrea Prencipe.**	**Regions Matter: How Localized Social Capital Affects Innovation and External Knowledge Acquisition**	Social capital; Social interaction; External R&D Acquisition; Internal R&D; Product innovation. / Intellectual capital	to identify geographically localized social capital as a key factor in promoting firm-level innovation and providing quantitative evidence to support the claims made.	Although these contributions are very valuable, the previous studies do not model the social mechanisms that transmit knowledge in geographical locations, and they do not examine the effects of these mechanisms on firm-level outcomes, such as innovation, in general.	Being in a region characterized by a high level of social capital leads to a higher propensity to innovate. We also find that being in an area characterized by a high degree of localized social capital is complementary to firms' investments in internal research and development (R&D) and that such a location positively moderates the effectiveness of externally acquired R&D on the propensity to innovate.	Geographically localized social capital affects a firm's ability to innovate through various external channels.	1. This study focuses on the positive net effects of social capital. 2. The results of this study are based on cross-sectional data.

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98	**Yuan-Chieh Chang, Huo-Tsan Chang, Hui-Ru Chi, Ming-Huei Chen, Li-Ling Den**	**How do established firms improve radical innovation performance? The organizational capabilities view**	Organizational capabilities, Radical innovation, Innovation performance, Established firm. /Strategy and innovation	To examine organizational capabilities for improving performance, concerning radical innovation (RI), in established firms.	Most of the previous studies did not study competition at radical innovation between new entrants and incumbent firms.	A positive relationship between organisational capabilities and radical innovation performance.	The dynamic capability view can help to explain how such transfer of resources and change in capabilities can be achieved.	This paper's measurement of radical innovation performance is far from perfect. The time from incubation to the launch of radical innovation could be years or decades.
99	**Domingo Ribeiro Soriano, Gary J. Castrogiovan**	**The impact of education, experience and inner circle advisors on SME performance: insights from a study of public development centers**	Human capital, Personal networks, CEO-owner, Financial performance/ Intellectual capital	To investigate the impact of CEO knowledge, experience and advisors on productivity and profitability.	Although prior research has investigated the effects of such human capital investments in large companies, there was a limited understanding of how similar investments may influence smaller entrepreneurial firms.	Industry- specific knowledge acquired before gaining ownership of the SME and general business knowledge acquired after gaining ownership were positively related to both SME profitability and productivity.	There is a link between performance and inclusion of other CEO-owners in the founder's inner circle of advisors.	1. In this study, all CEO-owners were managers, but this study cannot distinguish between founders (entrepreneurs) and non-founders. 2. The types of performance examined, and the performance measures employed.
100	**Chamu Sundaramurthy, Kuntara Pukthuanthong, Yasemin Kor**	**Positive and Negative Synergies between the CEO's and the Corporate Board's Human And Social Capital: A Study of Biotechnology Firms**	Board of directors, Corporate governance, Initial public offering, human and social capital, biotechnology. / Intellectual capital	To examine the combinative value of human and social capital variables of the CEO and the board in serving as an effective signal and enhancing the ability of the entrepreneurs and original investors to extract more of the market value of the firm by reducing under-pricing.	Previous studies have examined the effects of these experiences at the CEO or board level; however, no other study has investigated the impact of these forms of human capital concurrently for both the CEO and the board. IPO studies have demonstrated that the human and social capital of the CEO as a pivotal executive of the firm has positive impacts.	Accumulated public company board experiences of the CEO and the board have positive synergistic effects on IPO performance whereas the current board appointments have negative effects. While scientific educational backgrounds have positive synergies, industry-specific experiences produce either positive or counterproductive effects depending on the age and profitability of the firm	The interactive effects of the CEO's and the board's human and social capital on IPO under-pricing in the biotech industry, an industry in which such capital can be significant from investors' standpoint	1. While the research unbundles the interactive effects of individual and group human and social capital, an important limitation of our study is that our measures and analysis do not isolate the effects of human and social capital. 2. The sample in this study consists only of biotechnology firms.

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101	**Francoise Bastie, Sylvie Cieply, Pascal Cussy**	**The entrepreneur's mode of entry: the effect of social and financial capital**	Entry mode, Nascent entrepreneurs, Start-up, Business takeover, Financial capital/ Intellectual capital	To analyses the entry mode chosen by individuals in France in the late nineties.	There were limited studies that investigate the direction of the effects of social capital.	Social capital and finance affect the mode of entry. They show that entrepreneurs with social capital are more likely to create new firms from scratch than to take over existing firms. This study confirms the effect of financial capital on the mode of entry.	Networks have been shown to enable the transfer of entrepreneurial values. Belonging to an entrepreneurial network could be argued to increase risk-taking and the attraction of start-ups and innovative projects. Consequently, social capital would tend to encourage the creation of a pure new firm rather than the take-over of an existing one.	1. This study does not directly control for the potential endogeneity of schooling. 2. The database in this study does not allow us to identify ''good'' instrumental variables for dealing with the problem of endogeneity.
102	**Jonas Debrulle, Johan Maes**	**Start-up absorptive capacity: Does the owner's human and social capital matter?**	business owner, environmental turbulence, human capital, organisational absorptive capacity, social capital, start-up. / Intellectual capital	to find empirical evidence of a business owner's direct contribution to their start-up's ability to acquire, assimilate and exploit new information.	Even though individual cognition is recognised as a powerful internal driver of absorptive capacity, little empirical evidence exists on the significance of the individual's knowledge base as a mainstay of organisational absorptive capacity.	A positive but decreasing effect of owner- specific human capital as a function of environmental turbulence. Furthermore, the study finds that management experience significantly stimulates start-up absorptive capacity within highly dynamic environments, whereas it hinders it within stable environments.	Enhanced absorptive capacity can alert a managerial team to atypical information that challenges the organisation's cognitive schemas. It might reduce the risk of incessantly refining existing knowledge (the familiarity trap), unilaterally aspiring to predictable outcomes (the maturity trap) and precluding the exploration of novel knowledge areas (the propinquity trap).	First, the data may have a social desirability bias, since the company questionnaire may have been completed by the interview respondent, i.e. the start-up business owner. Second, it is difficult to establish causality from a cross-sectional research design. Third, although the measure of absorptive capacity as a market-oriented construct is a step up compared to purely R&D-related measures
103	**Emilia Rovira Nordman, Daniel Tolstoy**	**The impact of opportunity connectedness on innovation in SMEs' foreign-market relationships**	Internationalization, SME Innovation, Business relationship, Connectedness, Network, Opportunity. / Strategy and innovation	To investigate how networks, depending on their location, contextualize innovation foreign market business relationships.	Networks are also particularly central for SMEs, which often lack tangible which often lack tangible resources (e. g., financial and human-capital resources) and, therefore, rely heavily on intangible resources that are accessed and employed outside the boundaries of the firm	The effect of opportunity connectedness on innovation in foreign business relationships is mediated by the level of innovative collaboration.	Weak-ties may be instrumental to extract value from resources and leverage innovative opportunities drawn from networks.	1. This study did not differentiate between radical and incremental innovation. 2. Second, this study has investigated the developmental phase of an innovation. 3. Third, the study has not specifically examined sectorial differences among SMEs

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104	**Wai Fong Boh, Roberto Evaristo, Andrew Ouderkirk.**	**Balancing breadth and depth of expertise for innovation: A 3M story**	Innovation, Expertise and knowledge, Research and development. / Strategy and innovation	To examine how inventors' breadth and depth of expertise influence innovation in 3M, a company renowned for sustained innovation for over a century.	There has, however, been limited number of studies directly examining the impact of breadth and depth of inventor expertise at the individual level, on innovation outcomes. Part of the reason for this lack of attention may be an implicit assumption that there is no question to be resolved.	Breadth of inventor expertise relates to the generation of many inventions, but not necessarily to those that are technically influential. Depth of inventor expertise enables individuals to generate technically influential inventions, as measured by patents granted. However, both breadth and depth of expertise are required for innovators to be deemed highly valuable, based on their records of effectively converting inventions into commercially successful products.	Both invention and innovation are critical for successful generation of ideas and commercialization of those ideas for development of new products and processes	First, the measurement and conceptualizations of breadth and depth of expertise focus on inventors' knowledge in technical areas. Second, we tested our third hypothesis only from a cross-sectional perspective, as we were able to obtain the organizational data on rank and awards as of a single point in time (as of 2007). Third, as we made use of patent data to measure the breadth and depth of inventors' expertise, we were able to include data only on inventors with at least 5 patents.
105	**Alessandro Arrighetti, Fabio Landini, Andrea Lasagni**	**Intangible assets and firm heterogeneity: Evidence from Italy**	Intangibles, Firms heterogeneity, Human capital, Asset accumulation, Organisational capabilities. / Intellectual capital	to investigate the factors that, in addition to industry differences, can effectively explain this heterogeneity of intangible asset.	The positive impact of intangible assets on several measures of economic performance is well documented in the literature. Less clear is what initially leads firms to invest in intangible assets.	The size, human capital and the past level of intangible capital intensity significantly increase the probability to invest in intangible assets. Concerning the proxy of organisational complexity, on the contrary, the evidence is weaker.	The heterogeneity in intangible asset investments ought to be studied by focusing on firm-specific traits, such as size, organisational structure, human capital, and the historical intangible asset base.	The firms may fail to give full account of their intangible assets in the balance sheet.
106	**Chung-Jen Chen, Tsung-Chi Liu, Mo-An Chu, Yung-Chang Hsiao**	**Intellectual capital and new product development**	Human capital, Organizational capital, Customer capital, New product performance. / Intellectual capital	To examine the relationships among various dimensions of intellectual capital, including human capital, organizational capital, and customer capital, and new product performance.	Previous studies have noted the link between intellectual capital and organizational outcomes. This association needs to be extended to product innovation.	Human capital and organizational capital are positively related to customer capital which in turn has a positive effect on new product performance. Also, customer capital can mediate the relationship among human capital and organizational capital with new product performance.	Firms may leverage the knowledge and skills embedded in the human and non-human capital to incorporate needs and desires of the customers into new products that meet customers' needs and thus increase satisfaction and repeat purchases.	Although this study posits causal relationships of three types of intellectual capital, the causality may flow in an opposite direction to the proposed causal relation, or it may flow both ways.

No	Author	Title	Keywords / Theme	The purpose of the study	Motivation of work	Key contribution/ key findings	The author's main argument/claim	Limitation (methodology, findings, conclusion, assumption)
107	**Vesna Vlaisavljevic, Carmen Cabello-Medina, Ana P´erez-Lu˜no**	**Coping with Diversity in Alliances for Innovation: The Role of Relational Social Capital and Knowledge Codifiability**	Intellectual capital	1. To discuss the controversial effect of alliance partner diversity on innovation performance. 2. To explain that this effect may be moderated by two attributes: the quality of relationships among partners; and the type of knowledge shared.	Alliances are increasingly considered a key element for innovation, especially in knowledge-intensive firms. While this is true, the mere membership to alliances does not explain innovation performance, and thus the alliance's characteristics that determine high performance must be examined.	There is an inverted U-shaped relationship between alliance partner diversity and innovation performance and confirms the positive moderating effects of relational social capital and knowledge codifiability	When alliances involve very diverse partners, the process of knowledge transfer becomes more complex, and the degree of codifiability may influence the extent to which all partners receive full information without any loss of con- tent.	1. Other variables not included here could explain the complex issue of innovation performance. 2. The Spanish sample does not guarantee that the results obtained can be generalized to other countries
108	**Yu-Shan Chen**	**The Positive Effect of Green Intellectual Capital on Competitive Advantages of Firms**	Green intellectual capital, Green human capital, Green structural capital, Green relational capital, Competitive advantage. / Intellectual capital	To explore the positive relationship between green intellectual capital and competitive advantages of firms.	No research explored intellectual capital about green innovation or environmental management.	The three types of green intellectual capital – green human capital, green structural capital, and green relational capital – had positive effects on competitive advantages of firms. Moreover, this study found that green relational capital was the most common among these three types of green intellectual capital, and the three types of green intellectual capital of Medium & Small Enterprises (SMEs) were all significantly less than those of large enterprises in the information and electronics industry in Taiwan.	The stocks of organizational capabilities, capabilities, organizational commitments, knowledge management systems, reward systems, information technology systems, databases, managerial institution, operation processes, managerial philosophies, organizational culture, company images, patents, copyrights, and trademarks, etc. about environmental protection or green innovation within a company can help companies obtain competitive advantages.	This study tested hypotheses with a questionnaire survey, only providing cross-sectional data so that this study cannot observe the dynamic change of green intellectual capital in the process of the development of the information and electronics industry in Taiwan through longitudinal data.
109	**Jaime Gómez, Pilar Vargas**	**Intangible resources and technology adoption in manufacturing firm**	Intangibles, Technology adoption, Diffusion, Complementarities. / Strategy and innovation	to analyse the determinants of the use of advanced manufacturing technologies in manufacturing firms	A part of this literature has argued that IT are strategic necessities in the sense that they must be adopted in order not to suffer from competitive disadvantages, but that they cannot produce sustainable competitive advantages	R&D investments increase the likelihood of technology use, but only offer partial support for human capital and advertising investments. Export intensity, being part of a business group and epidemic effects are also important determinants of adoption.	The complementary resources are one of the mechanisms that firms use to profit from the use of new technologies.	Although research on the diffusion of new technologies has recognized that a firm's returns cannot be assessed in isolation when arguing in favour of stock and order effects

No	Author	Title	Keywords / Theme	The purpose of the study	Motivation of work	Key contribution/ key findings	The author's main argument/claim	Limitation (methodology, findings, conclusion, assumption)
110	**César Camisón, Ana Villar-López**	**Non-technical innovation: Organizational memory and learning capabilities as antecedent factors with effects on sustained competitive advantage**	Organizational memory, Learning capabilities, Organizational innovation, Marketing innovation, Sustained competitive advantage. / Strategy and innovation	To analyse the role of organizational memory and learning capabilities as antecedents to non-technical innovation, comprising organizational and marketing innovation, and to examine their effect on sustained competitive advantage within a capabilities-based view (CBV) theoretical framework.	Non-technical innovation is playing an important role in a better understanding of innovation and its impact on the competitiveness of firms. However, the literature on non-technical innovation is diverse and scattered, and recent studies have encouraged research on the development of models and theories of non-technical innovation in organizations to extend and expand existing models and theories, which are mainly drawn from research on technical innovation	Both organizational memory and learning capabilities favour the development of organizational innovation and marketing innovation.	The competitive superiority of some firms depends on the possession of certain strategic assets that confer SCA. This is the case for non-technical innovation: its context specificity and difficult imitation make it an asset for generating SCA.	1. The conceptualization of marketing innovation used in this study is somewhat narrow. 2. Given the complexity of the proposed causal model and the number of hypotheses, we have not considered the potential mediating role that non-technical innovation can play in the relationship between knowledge-based capabilities and SCA. 3. The utilisation of cross-sectional nature of the data does not allow conclusions about the causality between constructs.
111	**Yuji Honjo, Masatoshi Kato, Hiroyuki Okamuro**	**R&D investment of start-up firms: does founders' human capital matter?**	Founder, Funding gap, Human capital, R&D, Start-up. / Intellectual capital	To examine whether founders' human capital affects not only actual investment but also required investment in research and development (R&D), using the original data of Japanese start-up firms.	The previous studies have ignored the effects of founders' human capital on R&D investment, mainly because few data sources include R&D investment and the financing of start-up firm.	The higher levels of founders' human capital, especially their education levels, increase both actual and required investment in R&D and thus do not necessarily contribute to reducing the funding gap for R&D.	Younger founders, although able to invest more in R&D, tend to seek more R&D funding. However, founders with higher education levels and prior innovation experience tend to invest more in R&D, but also tend to require more R&D funding.	1. Due to data constraints, the estimation models do not include the variable for the cost of external financing. 2. To measure the dependent variable for required R&D investment, we used a subjective measurement.

No	Author	Title	Keywords / Theme	The purpose of the study	Motivation of work	Key contribution/ key findings	The author's main argument/claim	Limitation (methodology, findings, conclusion, assumption)
112	**Philip Cooke David Wills**	**Small Firms, Social Capital and the Enhancement of Business Performance Through Innovation Programmes**	Intellectual capital	1. To study the role of social capital, in the form of SME inter-firm networks for innovation, in influencing competitiveness. 2. To determine whether they gained more benefit from collaborating domestically or globally within the public innovation support programmes in which they were engaged. 3. To evaluate the effects of all programmes, each with collaborative intent, upon firm perceptions of the value of networking whether formally or informally in future.	Although the literature on small business networking has become voluminous, little attention has been paid to the broader theoretical construct to which it relates. Social	In the programme-funded firms in Denmark, Ireland and Wales (U.K.) social capital building was associated with enhanced business, knowledge and innovation performance.	Inter-firm collaboration may prove at least as successful a growth strategy as arm's length exchange and stand-alone competition.	The role of integrity was under- deployed because of the importance of synergy.
113	**Chung-Leung Luk, Oliver HM Yau, Leo YM Sin, Alan CB Tse, Raymond PM Chow, Jenny SY Lee.**	**The effects of social capital and organizational innovativeness in different institutional contexts**	Institutional theory, Social capital theory, Organizational innovativeness, Guanxi, Mainland China, Hong Kong. / Intellectual capital	To examine how social capital and organizational innovativeness influence business performance through their separate, indirect, or interactive effects, and how these effects differ across the institutional contexts of a transition economy and a market economy.	To date, there is little research that underlying social capital and organizational innovativeness which associate with different institutional contexts, the former being more frequently adopted in transition economies, and the latter in market economies	the effects of social capital are more extensive and probably more malignant in a transition economy than in a market economy. Furthermore, different types of organizational innovativeness, as corporate culture, can be cultivated by different forms of social capital in different institutional contexts.	The institutional context of a transition economy tends to breed the more malignant form of social capital, and that of a market economy tends to breed the more benign form of social capital.	The study was undertaken for only one transition economy, and one market economy were studied.

No	Author	Title	Keywords / Theme	The purpose of the study	Motivation of work	Key contribution/ key findings	The author's main argument/claim	Limitation (methodology, findings, conclusion, assumption)
114	**Wann-Yih Wu, Man-Ling Chang, Chih-Wei Chen**	**Promoting innovation through the accumulation of intellectual capital, social capital, and entrepreneurial orientation**	**Intellectual capital**	to develop a comprehensive research model to integrate the interrelationships among social capital, entrepreneurial orientation, intellectual capital, and innovation. In	While scholars had advocated creating innovation through intellectual capital, they have seldom explored how to mould the firm's inner environment for promoting and cultivating intellectual capital and innovation.	There were the mediating role of intellectual capital and the moderating roles of entrepreneurial orientation and social capital on innovation. Specifically, firms that have higher levels of social capital and entrepreneurial orientation tend to amplify the effects of intellectual capital on innovation.	The inner environment is beneficial to the utilization and effectiveness of intangible assets.	1. Due to time constraints and data availability, longitudinal research was not viable for this study. 2. The sample firms were drawn from diverse industries in Taiwan.
115	**Paul J. A. Robson, Charles K. Akuetteh, Paul Westhead, Mike Wright**	**Innovative opportunity pursuit, human capital and business ownership experience in an emerging region: evidence from Ghana**	**Innovation process outcomes, Human capital, Habitual entrepreneurs, Ghana. / Intellectual capital**	1. To investigate to the theoretical and empirical study of innovation theory. 2. To provide new insights relating to the contributions made by habitual entrepreneurs	The relationship between the clustering of innovative firms and hard economic development measures have been explored, but there is a relative dearth of studies that focus on entrepreneurs that generate and exploit new innovative ideas.	The benefits of prior business ownership experience appear to be more readily leveraged by portfolio rather than serial entrepreneurs. The analysis failed to conclusively support the view that serial entrepreneurs were more likely than novice entrepreneurs to have exploited different types of innovation activity	Wider societal benefits can be facilitated if practitioners foster and incorporate the expertise of portfolio entrepreneurs concerning initiatives that focus on enterprise 'quality,' rather than solely the 'quantity' of new firms being established.	The study did not explore the idea generation, and resource flows between all firms owned by portfolio entrepreneurs.
116	**Andrea Lipparini, Maurizio Sobrero**	**The glue and the pieces: Entrepreneurship and innovation in small-firm networks**	**Entrepreneurship**	1. To provide insights into the relationships between manufacturers and suppliers in new product development. 2. To explore the role of the entrepreneur in managing a wide set of innovative ties.	Although incremental contributions certainly exist and are relevant, more complex relationships largely focused on joint design and development emerge as important patterns in buyer-supplier interaction.	entrepreneurs who, exploiting basic experiences, pursue new combinations among the various inter-firm ties, relying upon such linkages as a vehicle for transferring and combining their organizationally embedded learning capability.	The ability to glue external expertise and capabilities in an original and unique way is considered the key factor in pursuing innovative performance.	The notion of an entrepreneur who focuses on a specific business idea as an expert in a limited area of activity is obsolete.

No	Author	Title	Keywords / Theme	The purpose of the study	Motivation of work	Key contribution/ key findings	The author's main argument/claim	Limitation (methodology, findings, conclusion, assumption)
117	**Yasemin Y. Kor, Chamu Sundaramurthy**	**Experience-Based Human Capital and Social Capital of Outside Directors**	Board of directors, outside directors, knowledge, human capital, social capital, firm growth. / Intellectual capital	To develop theory on how relevant elements of outside directors' human and social capital can enhance directors' ability to perform advisory and governance duties.	There were few studies have empirically examined the effects of certain elements of director human and social capital on strategy and governance effectiveness.	Various types of human capital—firm and industry-specific—and internal and external social capital of outside directors influence the growth of the firm, suggesting that these varied knowledge bases, experiences, and connections can determine how effectively they question, assess, inform, and influence managerial action.	Despite holding to a strict definition of outside director independence, boards may help from focusing on the social and human capital needed to advise and monitor effectively.	Due to secondary data used, this study could not observe the processes involved in board-level decision making and dynamics.
118	**Maria de Lurdes Calisto, Soumodip Sarkar**	**Organizations as biomes of entrepreneurial life: Towards a clarification of the corporate entrepreneurship process**	Autonomous strategic behaviour, Corporate entrepreneurship, Entrepreneurial proclivity, Innovation, Intrapreneurial behaviour, Intrapreneurship. / Strategy and innovation	To study the dimension 'autonomy' could be equated to the entrepreneurial behavior of the individuals in an organizational context	The interaction between the organization's strategic orientation and the autonomous behavior of employees has never been empirically tested	Entrepreneurial Proclivity (EP) is not, in some situations, a necessary condition to instigate intrapreneurial behavior (IB) as a generalized behavior across the workforce might occur even without the strategic orientation, probably in consequence of individual predisposition and organizational factors other than EP.	High entrepreneurial proclivity is associated with diverse configurations of internal conditions.	1. The sample size and the fact that it is a convenience sample. 2. Another limitation regards the scales used, as they refer to the perception of top-management.

APPENDIX 2. ETHICS

DEPARTMENT OF DESIGN, MANUFACTURE & ENGINEERING MANAGEMENT

University of Strathclyde Engineering

Departmental Ethics Committee (DEC) Ethics Checklists

Code of Practice on Investigations on Human Beings

When implementing a staff or student project which involves 'investigation on human beings' it is important to note that the university has a code of practice governing the implementation and conduct of such investigations. This 'code of practice was developed by the 'Ethics Advisory Committee' and approved by the university court on 5th May 2000. The code governs all investigations on human beings including class teaching experiments and demonstrations, student projects and research investigations which fall within the scope of the code. The 'Departmental Research Committee' will act as the 'Departmental Ethics Committee', and can approve most routine, non-invasive investigations.

It is the responsibility of the supervisor to make the student aware of relevant guidelines and ensure that they are observed. The supervisor is also responsible for submitting details of proposed investigations for approval where necessary.

The following contains 2 checklists to aid the implementation of this practice:

(i) The first is to identify cases which require to be approved by the University Ethics Advisory Committee. If any of the boxes are marked in checklist (i) the investigation must be submitted to the university committee for approval.

(ii) The second is to ensure correct procedure is adhered to in any 'routine or non-invasive' investigation i.e. those which are readily approved by the 'Department Ethics Committee' (in essence the checklist represents a summary of Section 6 of the Code of Practice on Investigations on Human Beings.)

These checklists should not be viewed as a substitute for the original document and thus all supervisors should be familiar with the code before utilising these in staff/student research projects. The checklists are designed to ensure that the staff/students are immediately aware of the implications of the guidelines to their investigation. Furthermore, they act as departmental records of staff/student conduct in investigations on humans.

As 'Ethics Advisory Committee' approval of a protocol can take up to 4 weeks (longer for very specific requests), where research is likely to include an element of 'investigations on humans', an analysis of expected procedures should be carried out at as early a stage as possible.

In addition to the university regulations, investigations of a Physiological, Sociological and Biological nature must conform to additional 'codes of practice' set out by relevant professional bodies - in such cases the secretary of the ethics advisory board can supply copies of these statements.

SECTION B: Principles and Procedures for Obtaining Ethical Approval

1. Projects which require consideration by the UEC

Investigations governed by the Code that involve any of the following types of projects or participants must be submitted to the UEC for prior approval:

1.1. Project considerations

Studies must be considered by the UEC if they involve:

i. any significant harm or serious discomfort of a physical or psychological nature
ii. an extensive degree or duration of exercise or physical exertion beyond that to which all the participants are habitually accustomed
iii. the collection and/or use of human biological tissue and/or fluid
iv. the use of an invasive procedure
v. the isolation and profiling/typing of an individual's DNA
vi. intentional deception of participants where the true nature of the study is such that there is a possibility of causing physical or psychological harm or distress
vii. activity which can be classed as a clinical trial or any type of investigation of a pharmaceutical drug, medical procedure or medical device (see Annex 7 for the definition of 'medical device')
viii. the administration or discontinuation of pharmaceutical drugs, liquids or other substances not normally consumed by the general population
ix. a situation where highly personal, intimate or other private or confidential information of a personal nature is sought
x. the NHS, where the criteria in Section B9 (below) apply. Check that NHS approval is needed – use of NHS staff and premises may not in themselves be criteria for requirement of NHS approval.

1.2 Participant considerations

Studies must be considered by the UEC if they involve a group of participants who are in a situation of special vulnerability (e.g. women of childbearing potential where the investigation might carry any risk to pregnancy orto a foetus, or persons with addictions). This may include those who:

i. are severely ill or have a terminal illness
ii. are prisoners or young offenders, or are awaiting trial for a crime or offence that is relevant to the project
iii. are potentially subject to coercive measures by government, such as detention, restrictions on movement, deportation or repatriation
iv. live in or are connected to an institutional environment;
v. have a physical disability or a chronic physical condition relevant to the subject of the investigation and for whom participation in the investigation may pose a risk to their wellbeing
vi. are unable to consent for themselves or have significant learning difficulties and/or serious mental health issues and/or cognitive impairment of a nature and extent that would affect their ability to give informed voluntary consent (see sections 4.3.7 and 4.3.8). Not all projects where children under the age of 12 are participants need to be submitted to the UEC. Unless another of the conditions in 1.1 or 1.2 above applies, projects where children under the age of 12 are participants may be submitted to the DEC/SEC.

If you require any further advice on this please contact ethics@strath.ac.uk.

(i) Supervisor and Student Ethics Checklist

Project Title: **Innovation Capability Survey**

Participants (~~staff~~/students carrying out investigation): **Arie Restu Wardhani**

Investigation Content: **There are four sections in the survey which are: A: Learning Orientation and Strategy; B: Technological Ability. C: Innovativeness Orientation; D: External Factor.**

Does the investigation involve, any of the following (mark as appropriate):

1)	Harm, discomfort, physical or psychological risk (esp. pregnant women, elderly, the young).	yes☐	no☒
2)	Participants whose ability to give voluntary consent is limited (cognitively impaired, prisoners, persons with chronic physical or mental conditions).	yes☐	no☒
3)	Invasive techniques (DNA testing, collection of body fluids/tissue).	yes☐	no☒
4)	Extensive degree or duration of exercise or physical exertion.	yes☐	no☒
5)	Manipulation of human responses (cognitive or affective) which may involve stress or anxiety.	yes☐	no☒
6)	Administration of drugs, liquid/food additives.	yes☐	no☒
7)	Deception of the participants which might cause distress or effect their willingness to participate in the research.	yes☐	no☒
8)	The collection of highly personal, intimate, private or confidential information.	yes☐	no☒
9)	Payment to the participants (other than travel/time costs).	yes☐	no☒

If the answer to <u>any</u> of the above questions is yes you <u>must</u> submit a protocol to the 'Ethics Advisory Committee' unless previous consent has been granted for practising the 'generic' procedure involved. The protocol for such submissions to the 'Ethics Advisory Committee' can be found in Appendix A of the 'Code of Practice on Investigations of Humans Beings'.

Supervisors Signature(s)

..... Date 22/04/2016

..... Date .....

Students/Researchers Signature(s)

..... Date 08/04/2016

..... Date .....

(ii) Checklist for Department Approved Investigations

Mark all boxes when you have read, understand and, where appropriate, will adhere to the guidelines - also note the documentation required relative to your investigation:

N.B Investigators must acknowledge, understand and adhere to all of the points on this checklist.

Project Title: **Innovation Capability Survey**

Participants (~~staff~~/students carrying out investigation): **Arie Restu Wardhani**

Investigation Content: **There are four sections in the survey which are: A: Learning Orientation and Strategy; B: Technological Ability. C: Innovativeness Orientation; D: External Factor.**

It is the supervisor's responsibility to make students aware of these guidelines and the students to provide the supervisor with the required documentation from affected investigation components. Signed copies should be maintained by the supervisor and student(s) for departmental records.

☒ **Consent**. Obtain informed consent of all volunteers. A consent form must be signed by all volunteers.

☒ **Protection**. Protect all volunteers from possible harm and preserve their rights. No investigation should involve significant risks to mental or physical well-being of its participants.

☒ **Inducement**. Provide no financial inducement nor other coercion (actual or implied) to persuade people to take part in the investigation.

☒ **Withdrawal.** Volunteers must be free to withdraw at any stage, without giving reason.

☒ **Termination.** The investigation should stop immediately if volunteers report any problems (physical, mental or otherwise) during it. The problems must be reported to the appropriate ethics committee.

☒ **Recruitment.** Volunteer recruitment should wherever possible be via letter, notice (or orally - if through a group approach). However, random street or doorstep surveys are acceptable.

☒ **Staff Participation.** The motives for staff/students to participate as a volunteer in an investigation should be taken into special consideration i.e. neither declining nor agreeing to participate in an investigation should affect academic assessment in anyway.

☒ **Special Consideration**. Special consideration should be given to the young, adults with any cognitive disabilities or learning difficulties and to all persons who live in or are connected to an institutional environment (in such cases the investigator should refer to **Appendix C** of the 'code of practice on investigations on human beings').

☒ **Pregnancy.** Women of child bearing age must not be recruited for any investigation which could be harmful to fertility/pregnancy (in such cases the investigator should refer to **Appendix C** of the 'code of practice on investigations on human beings').

☒ **Selection.** Submissions based on the investigation should include details of the basis for volunteer selection i.e. questionnaires and/or other measures in the selection process.

☒ **Justification.** Investigators must justify the number/type of subjects chosen for each study.

☒ **Confidentiality.** Confidentiality and privacy must be maintained. Any waiver of confidentiality should be justified and consent must be given, in writing, by the volunteer(s). In addition, the investigator must comply with Data Protection Legislation.

☒ **Informing Volunteers.** Each volunteer must be provided with an information sheet providing full relevant details of the nature, object and duration of the proposed investigation and a contact for further queries (whom is independent of the investigation normally the secretary of the ethics advisory committee).

☒ **Deception.** There shall be no deception that might affect a person's willingness to participate in an investigation nor about the risks involved.

☒ **Unusual Symptoms.** Volunteers will be encouraged to note any unusual or unexpected symptoms arising during the investigation. These should be reported to the appropriate ethics committee

☒ **Location**. Places where investigations take place should be appropriate to the type and risk factor of study undertaken. Further, the ethics committee are entitled to carry out spot checks.

☒ **Records.** Full records of all procedures carried out should be maintained in an appropriate form. A register of all volunteers should be taken and a note of the population/sample from which they were drawn.

☒ **Queries.** Post investigation queries from a participant should be directed to an appropriate professional (supervisor, head of department etc.).

☒ **Insurance.** It is the responsibility for the applicant to seek extended insurance if the investigation scope falls out-with the University's Public Liability Policy (in such cases the investigator should refer to **Appendix B** of the original 'code of practice' document).

Additional general guidelines exist for biological, psychological and sociological investigations - in such cases refer to **Sections 6.2 and 6.3** of the original 'code of practice' document.

Supervisors Signature(s)

MURAT ACAR ..... Date 22/04/2016

..... Date .....

Students/Researchers Signature(s)

..... Date 08/04/2016

..... Date .....

APPENDIX 3. COVER LETTER

Survei Kemampuan Inovasi 2016

Kepada Yth. Bapak/Ibu Pimpinan perusahaan/Owner/Manajer perusahaan;

Kami bermaksud mengajukan permohonan kesediaan Bapak/Ibu Pimpinan perusahaan-/Owner/Manajer perusahaan, untuk berpartisipasi pada survey kemampuan berinovasi. Survei ini dilakukan oleh Arie Restu Wardhani, mahasiswa S3 pada the University of Strathclyde, Glasgow

Kami menyadari kesibukan bapak/ibu, namun studi ini sangatlah penting dalam mengetahui peran modal intelektual (kapital manusia dan kapital social) dalam mengaktifkan inovasi.

Untuk menyingkat waktu bapak dan ibu, survei ini hanya memakan waktu sekitar 30 menit.

Jaminan Kerahasiaan:
Setiap data yang diberikan oleh Anda dan perusahaan Anda akan sangat dirahasiakan, dan tidak akan sampaikan kepada siapapun di luar tim riset kami. Hanya data agregat yang akan digunakan dalam presentasi dan publikasi.

Kerjasama Bapak/Ibu sangatlah penting dan kami sangat menghargainya. Kami mengucapkan terimakasih sebesar-besarnya untuk partisipasi Bapak/Ibu.

Innovation Capability Survey 2016

Dear Sir or Madam;

We would like to invite you to participate in an Innovation Capability Survey 2016, conducted by Arie Restu Wardhani, a Ph.D. research student at the University of Strathclyde, Glasgow.

We realise that these will be busy times for you, but this makes our study all the more important. It will show the significant role of the intellectual capital which is human capital and social capital in your company in enabling innovation.
Our survey will take only 30 minutes, to shorten your time.

Pledge of Confidentiality:
Any data provided by you and your firm will be treated with strict confidentiality, and will not be identified to anyone outside of our research team. Only aggregated data will be used in any presentation and publication.

Your cooperation is highly appreciated and importance for us. We would like to thank you in advance for your participation.

Student

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Stirling

APPENDIX 4. QUESTIONNAIRE

SURVEI KAPABILITAS INOVASI
(INNOVATION CAPABILITY SURVEY)

Survei ini bertujuan untuk memahami kemampuan berinovasi pada perusahaan Teknologi Informasi dan Komunikasi. Kuesioner ini terdiri dari 4 bagian, yaitu:
(This survey is intended to understand Innovation Capabilities in ICT Companies. The survey comprises four sections, i.e.)

Bagian A : **Orientasi Pembelajaran, Budaya dan Orientasi Strategi** *(Section A: Learning Orientation, Culture and Strategy Orientation)***.**
Bagian B : **Orientasi Teknologi** *(Section B: Technology Orientation).*
Bagian C : **Orientasi Daya Inovasi** *(Section C: Innovativeness Orientation).*
Bagian D : **Kinerja dan Profil Perusahaan** *(Section D: Performance and Company Profile).*

Pada survey ini (*In this survey*):

- Istilah "perusahaan", "Anda", "Kami" atau "perusahaan Anda" akan digunakan pada survei ini (*The terms 'company', 'you', 'we' or 'your company' are used throughout this survey*).
- Istilah-istilah pada kuesioner ini mengacu pada perusahaan, divisi atau unit bisnis Anda. Jika perusahaan Anda terbagi ke dalam divisi atau terdesentralisasi, dengan masing-masing divisi atau unit bisnis memiliki pasar yang berbeda dan beroperasi secara independen, diperkenankan untuk mengganti "divisi" atau "unit bisnis" dengan istilah "perusahaan" (*These terms refer to your company, division or business unit. If your company is divisionalised or decentralised, with each division or unit serving different markets and operating fairly independently, please replace 'division' or 'business unit' for 'company*').
- Usahakan untuk menjawab seluruh pertanyaan, meskipun Anda tidak 100% yakin dengan jawaban Anda (*Please try to answer all questions, even if you may not be 100% certain of your answer*).
- Bacalah terlebih dahulu semua definisi dan penjelasan secara seksama (*Please read definitions and explanations carefully*).
- Hasil dari survei ini akan didistribusikan pada bulan Oktober 2016 (*The result will be distributed in The Autumn of 2016*).
- Semua jawaban akan **DIJAMIN KERAHASIAANNYA** (All responses will be treated with **ABSOLUTE CONFIDENTIALITY)**.
- Nama perusahan, bisnis unit, produk, nama seseorang **AKAN DIRAHASIAKAN** (*The names of companies, business units, products, and individuals **WILL NOT BE RELEASED**!*)

- Data yang akan digunakan adalah dalam bentuk agregat dan hanya digunakan untuk kebutuhan **PENELITIAN AKADEMIK** (*Data will be used in aggregate form and only for **ACADEMIC RESEARCH purposes***).
- Survei ini hanya dilakukan pada bulan Mei 2016 sampai dengan Agustus 2016 (*This survey is available for the duration of May 2016 to August 2016 only*).

Partisipasi anda sangatlah penting bagi riset kami (*Your participation is highly important to us!*)

TERIMA KASIH UNTUK KERJASAMA ANDA.
THANK YOU FOR YOUR COOPERATION!

Bagian A. Orientasi Pembelajaran, Budaya dan Orientasi Strategi
(*Section A. Learning Orientation, Culture and Strategy Orientation*).

A1. Orientasi Pembelajaran Indikasikan setuju/tidaknya Anda pada pernyataan berikut yang terkait dengan "**Orientasi Pembelajaran"** pada perusahaan anda pada skala 1 sampai 7 (*Please indicate the level of agreement/disagreement with the following statement about your company's **"Learning Orientation"** in the scale of 1 to 7*).		Sangat Tidak Setuju (*Strongly Disagree*)		Netral (*Neutral*)			Sangat Setuju (*Strongly Agree*)	
1	Para manajer setuju bahwa kemampuan perusahaan untuk belajar merupakan faktor penting dari keunggulan daya saing perusahaan. (*Managers basically agree that this company's ability to learn is the key to our competitive advantage*).	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐	6 ☐	7 ☐
2	Nilai dasar perusahaan ini meliputi pembelajaran sebagai kunci untuk kemajuan dan perkembangan. (*The basic values of this company include learning as the key to improvement*).	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐	6 ☐	7 ☐
3	Perusahaan ini menganggap pembelajaran karyawan merupakan investasi, bukanlah biaya. (*The sense around here is that employee learning is an investment, not an expense*).	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐	6 ☐	7 ☐
4	Pembelajaran dipandang sebagai faktor penting untuk menjamin kelangsungan hidup perusahaan kami. (*Learning in this company is seen as a key commodity necessary to guarantee the company's survival*).	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐	6 ☐	7 ☐
5	Budaya perusahaan kami tidak menempatkan pembelajaran karyawan sebagai prioritas utama. (*Our culture is one that does not make employee learning a top priority*).	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐	6 ☐	7 ☐
6	Pandangan umum di perusahaan ini adalah bahwa ketika seseorang berhenti balajar, maka hal itu akan membahayakan masa depan perusahaan. (*The collective wisdom in this company is that once we quit learning, we endanger our future*).	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐	6 ☐	7 ☐
7	Kami tidak takut mengkritisi asumsi bersama tentang bagaimana kami berbisnis. (*We are not afraid to reflect critically on the shared assumptions we have about the way we do business*).	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐	6 ☐	7 ☐
8	Manajer di perusahaan ini tidak menginginkan pandangan mereka diragukan. (*Managers in this company do not want their "view of the world" to be questioned*).	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐	6 ☐	7 ☐
9	Perusahaan ini menempatkan nilai yang tinggi pada keterbukaan pikiran. (*This company places a high value on open-mindedness*).	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐	6 ☐	7 ☐
10	Penekanan pada inovasi yang konstan bukanlah budaya perusahaan kami. (*An emphasis on constant innovation is not a part of our company's culture*).	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐	6 ☐	7 ☐
11	Ide-ide baru sangat dihargai di perusahaan ini. (*Original ideas are highly valued in this company*).	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐	6 ☐	7 ☐
12	Terdapat pernyataan konsep bisnis yang tepat mengenai siapa dan dimana posisi perusahaan. (*There is a well-expressed concept of who we are and where we are going as a company*).	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐	6 ☐	7 ☐
13	Terdapat kesepakatan mengenai visi perusahaan pada seluruh level, fungsi dan divisi. (*There is a total agreement on this company's vision across all levels, functions, and divisions*).	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐	6 ☐	7 ☐
14	Seluruh karyawan berkomitmen untuk mencapai tujuan perusahaan. (*All employees are committed to the goals of this company*).	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐	6 ☐	7 ☐

A1. Orientasi Pembelajaran Indikasikan setuju/tidaknya Anda pada pernyataan berikut yang terkait dengan "**Orientasi Pembelajaran"** pada perusahaan anda pada skala 1 sampai 7 (*Please indicate the level of agreement/disagreement with the following statement about your company's **"Learning Orientation"** in the scale of 1 to 7*).		Sangat Tidak Setuju (*Strongly Disagree*)		Netral (*Neutral*)			Sangat Setuju (*Strongly Agree*)	
15	Karyawan memandang diri mereka sendiri sebagai partner dalam menentukan arah perusahaan. (*Employees view themselves as partners in charting the direction of the company*).	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐	6 ☐	7 ☐
16	Pimpinan tertinggi percaya untuk membagikan visi kepada level yang lebih rendah di perusahaan. (*Top leadership believes in sharing its vision for the company with the lower levels*).	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐	6 ☐	7 ☐
17	Visi perusahaan secara menyeluruh tidak terdefinisi dengan baik. (*We do not have a well-defined vision for the entire company*).	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐	6 ☐	7 ☐

A2. Budaya (*Culture*) Indikasikan setuju/tidaknya Anda pada pernyataan berikut yang terkait dengan "**Budaya"** pada perusahaan anda pada skala 1 sampai 7 (*Please indicate your level of agreement/disagreement with the following statement about your company's **"Culture"** in the scale of 1 to 7*).		Sangat Tidak Setuju (*Strongly Disagree*)		Netral (*Neutral*)			Sangat Setuju (*Strongly Agree*)	
1	Pada perusahaan saya, orang yang mau belajar, akan dihargai. (*In my company, people are rewarded for learning*).	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐	6 ☐	7 ☐
2	Pada perusahaan saya, karyawan menghabiskan waktu untuk membangun kepercayaan, antara satu dengan yang lain. (*In my company, people spend time building trust with each other*).	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐	6 ☐	7 ☐
3	Pada perusahaan saya, tim/grup memperbaiki pemikiran mereka sebagai hasil dari diskusi atau informasi yang dikumpulkan. (*In my company, team/groups revise their thinking as a result of group discussion or information collected*).	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐	6 ☐	7 ☐
4	Perusahaan menyediakan sarana agar metode pembelajaran dapat diakses oleh seluruh karyawan. (*My company makes its lessons learned available to all employees*).	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐	6 ☐	7 ☐
5	Perusahaan saya mengakui orang-orang yang berinisiatif. (*My company recognises people for taking initiatives*).	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐	6 ☐	7 ☐
6	Perusahaan saya bekerja sama dengan masyarakat/Komunitas di luar perusahaan untuk memenuhi kebutuhan bersama. (*My company works together with the outside community to meet mutual needs*).	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐	6 ☐	7 ☐
7	Pada perusahaan saya, pemimpin terus menerus mencari peluang. *(In my company, leaders continually look for opportunities*).	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐	6 ☐	7 ☐
8	Pada perusahaan saya, orang mampu mengidentifikasi keterampilan yang dibutuhkan untuk menjawab tantangan di masa mendatang. (*In my company, people identify skills they need for future work tasks*).	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐	6 ☐	7 ☐
9	Pada perusahaan saya, orang memandang permasalah dalam pekerjaannya sebagai suatu peluang untuk belajar. (*In my company, people view problems in their work as an opportunity to learn*).	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐	6 ☐	7 ☐

A3. Orientasi Strategi (*Strategy Orientation*) Indikasikan setuju/tidaknya Anda pada pernyataan berikut yang terkait dengan "**Orientasi Strategi"** perusahaan anda pada skala 1 sampai 7. (*Please indicate the level of* agreement/disagreement *with the following statement about your company's "**Strategy Orientation**" in the scale of 1 to 7*).		Sangat Tidak Setuju (*Strongly Disagree*)		Netral (*Neutral*)			Sangat Setuju (*Strongly Agree*)	
1	Perusahaan kami seringkali yang pertama memperkenalkan produk-produk inovatif. (*We are often first to introduce innovative products*).	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐	6 ☐	7 ☐
2	Pengeluaran untuk Riset dan Pengembangan perusahaan kami lebih besar bila dibandingkan dengan pesaing kami. (*We spend more heavily on R&D than our competitors).*	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐	6 ☐	7 ☐
3	Harga produk kami adalah yang terendah di antara pesaing. (*Our prices are among the lowest in the industry*).	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐	6 ☐	7 ☐
4	Kami cenderung fokus ke kelompok pelanggan tertentu. (*We tend to focus on a narrow, specific customer group).*	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐	6 ☐	7 ☐
5	Kami yakin telah mendapat informasi yang benar tentang strategi produk baru di perusahaan kami. (*We are confident and well informed about the new product strategies in our company*).	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐	6 ☐	7 ☐
6	Kami sering berinteraksi dengan pihak lain di luar perusahaan untuk memperoleh pengetahuan baru. (*We have frequent interactions with others outside the company to acquire new knowledge*).	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐	6 ☐	7 ☐
7	Kami dapat dengan cepat mengidentifikasi peluang-peluang baru untuk memenuhi kebutuhan pelanggan (*We can quickly identify new opportunities to meet our customer needs*).	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐	6 ☐	7 ☐
8	Kami dengan cepat menyadari manfaat pengetahuan eksternal yang baru sebagai pengetahuan yang ada. (*We quickly recognise the usefulness of new external knowledge to existing knowledge*).	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐	6 ☐	7 ☐
9	Perusahaan ini secara berkala membahas dampak dari pengembangan produk baru dan proses lain atau inovasi pada organisasi. (*This company periodically meet to discuss consequences of new product development and other process or organisational innovation*).	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐	6 ☐	7 ☐
10	Perusahaan kami mengumpulkan informasi tentang kelayakan program baru. (*Our company gathers information on the feasibility of new programs*).	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐	6 ☐	7 ☐
11	Perusahaan kami mengkomunikasikan aktivitas pesaing, supplier, dll. (*Our company communicates the activities of competitors, suppliers, etc.*).	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐	6 ☐	7 ☐
12	Perusahaan kami mengevaluasi perubahan-perubahan yang terjadi di lingkungan eksternal. (*Our company assesses changes in the external environment*).	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐	6 ☐	7 ☐

Bagian B. Orientasi Teknologi (*Section B.* Technology orientation)

B1. Kemampuan teknologi (*Technological Ability*) Indikasikan tingkat setuju/tidaknya Anda pada pernyataan berikut yang terkait dengan "**Kemampuan teknologi"** pada perusahaan anda dengan skala 1 sampai 7. (*Please indicate your level of* agreement/disagreement *with the following statement about your company's "**Technological Ability**" on the scale of 1 to 7*).		Sangat Tidak Setuju (Strongly Disagree)			Netral (Neutral)			Sangat Setuju (Strongly Agree)
1	Ide teknologi baru diperlihatkan dengan cara berpikir "di luar kebiasaan". *(Looks of novel technological idea by thinking "outside the box").*	1	2	3	4	5	6	7
		☐	☐	☐	☐	☐	☐	☐
2	Kesuksesan perusahaan berdasarkan pada kemampuan untuk mengeksplorasi teknologi baru. *(Bases its success on its ability to explore new technologies).*	1	2	3	4	5	6	7
		☐	☐	☐	☐	☐	☐	☐
3	Perusahaan menciptakan produk atau jasa yang inovatif. *(Creates products or services that are innovative to the company).*	1	2	3	4	5	6	7
		☐	☐	☐	☐	☐	☐	☐
4	Perusahaan mencari cara-cara kreatif untuk memuaskan kebutuhan pelanggan. *(Looks for creative ways to satisfy its customers' needs).*	1	2	3	4	5	6	7
		☐	☐	☐	☐	☐	☐	☐
5	Perusahaan berani mengambil resiko untuk masuk ke segmen pasar baru. *(Aggressively ventures into new market segments).*	1	2	3	4	5	6	7
		☐	☐	☐	☐	☐	☐	☐
6	Perusahaan memperkuat keterampilan inovasi di bidang yang belum memiliki pengalaman. *(Strengthened innovation skills in areas where it had no prior experience).*	1	2	3	4	5	6	7
		☐	☐	☐	☐	☐	☐	☐
7	Perusahaan berkomitmen untuk senantiasa meningkatkan kualitas dan menurunkan biaya. *(Commits to improve quality and lower cost).*	1	2	3	4	5	6	7
		☐	☐	☐	☐	☐	☐	☐
8	Perusahaan secara terus menerus meningkatkan keandalan produk dan layanannya. *(Continuously improves the reliability of its products and services).*	1	2	3	4	5	6	7
		☐	☐	☐	☐	☐	☐	☐
9	Perusahaan meningkatkan otomatisasi dalam kegiatan operasionalnya. *(Increases the levels of automation in its operations).*	1	2	3	4	5	6	7
		☐	☐	☐	☐	☐	☐	☐
10	Perusahaan senantiasa melakukan survei kepuasan pelanggan. *(Constantly surveys existing customers' satisfaction).*	1	2	3	4	5	6	7
		☐	☐	☐	☐	☐	☐	☐
11	Perusahaan senantiasa menyesuaikan diri agar pelanggan saat ini terpuaskan. *(Fine-tunes what it offers to keep its current customers satisfied).*	1	2	3	4	5	6	7
		☐	☐	☐	☐	☐	☐	☐
12	Perusahaan meningkatkan keterampilan proses pengembangan produk di mana perusahaan sudah memiliki pengalaman yang signifikan. *(Upgraded skills in product development processes in which the company already possesses significant experience).*	1	2	3	4	5	6	7
		☐	☐	☐	☐	☐	☐	☐

B2. Peluang teknologi (*Technological Opportunities*) Evaluasikan industri utama perusahaan Anda berkaitan dengan "**Peluang Teknologi"** yang muncul selama tiga tahun terakhir. (*Please evaluate your company's major industry with regards to "**Technological Opportunities"** that have emerged over the past three years*).		Sangat Rendah (Very low)		Sedang (*Moderate*)			Sangat Tinggi (Very high)	
1	Peluang untuk melakukan inovasi produk di perusahaan Anda. (*Opportunities for product innovation in your company*).	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐	6 ☐	7 ☐
2	Peluang untuk inovasi teknologi di perusahaan Anda. (*Opportunities for technological innovation in your company*).	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐	6 ☐	7 ☐
3	Peluang untuk mematenkan produk baru di perusahaan Anda. (*Opportunities for patenting new products in your company*).	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐	6 ☐	7 ☐
4	Peluang untuk mematenkan teknologi proses (produksi) baru di perusahaan Anda. (*Opportunities for patenting new process (production) technologies in your company*).	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐	6 ☐	7 ☐
5	Pembelanjaan riset dan pengembangan di industry sejenis secara keseluruhan. (*Industry-wide research and development spending*).	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐	6 ☐	7 ☐

B3. Selama tiga tahun terakhir, sampai sejauh mana perusahaan Anda telah mengadopsi pernyataan berikut? (*Over the last three years, to what extent has your company adopted the following statement?*)		Sangat Rendah (Very low)		Sedang (*Moderate*)			Sangat Tinggi (Very high)	
1	Menerapkan teknologi manufaktur dan keterampilan yang sama sekali baru. *(Acquired manufacturing technologies and skills entirely new to the company).*	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐	6 ☐	7 ☐
2	Mempelajari keterampilan pengembangan produk dan proses yang sama sekali baru. *(Learned product development skills and processes which were entirely new to the company).*	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐	6 ☐	7 ☐
3	Memperoleh keterampilan manajerial dan organisasional yang sama sekali baru dan penting untuk inovasi. *(Acquired entirely new managerial and organisational skills that are important for innovation).*	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐	6 ☐	7 ☐
4	Mempelajari keterampilan yang sama sekali baru mengenai pendanaan teknologi baru dan pelatihan tenaga riset dan pengembangan. *(Learned entirely new skills in funding new technology and training R&D personnel).*	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐	6 ☐	7 ☐

B4. Portofolio Paten Teknologi (Technological patent portfolio) Indikasikan tingkat setuju/tidaknya Anda pada pernyataan berikut yang terkait dengan "**Portofolio Paten Teknologi"** pada perusahaan anda dengan skala 1 sampai 7. (*Please indicate your level of* agreement/disagreement *with the following statement about your company's "***Technological Patent Portfolio***" on the scale of 1 to 7*).		Sangat Tidak Setuju (Strongly Disagree)		Netral (Neutral)			Sangat Setuju (Strongly Agree)	
1	Pengukuran kinerja inovasi adalah berdasarkan jumlah paten. (The innovation performance is measured based on the number of patents).	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐	6 ☐	7 ☐
2	Kami memiliki paten dan hak cipta produk atau proses kami. (We have our own product or process patent and copyright).	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐	6 ☐	7 ☐
3	Pengelompokkan paten sangat penting untuk melindungi keunggulan bersaing. (Creation of patent clusters is important for systematic protection for competitive advantages).	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐	6 ☐	7 ☐
4	Perusahaan kami mengeksplorasi potensi aplikasi dan konseptual paten secara umum. (Our company explore the potential for application of broad and conceptual patents).	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐	6 ☐	7 ☐
5	Kami mempertimbangkan data paten sebagai asset teknologi yang paling bernilai. (We consider patent data as the company's most valuable technology asset).	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐	6 ☐	7 ☐

B5. Turbulensi Teknologi (*Technological Turbulence*) Indikasikan tingkat setuju/tidaknya Anda pada pernyataan berikut yang terkait dengan "**Turbulensi Teknologi"** pada perusahaan anda dengan skala 1 sampai 7. (*Please indicate your level of* agreement/disagreement *with the following statement about your company's "**Technological Turbulence**" on the scale of 1 to 7*).		Sangat Tidak Setuju (Strongly Disagree)		Netral (Neutral)			Sangat Setuju (Strongly Agree)	
1	Teknologi di perusahaan kami berubah dengan sangat cepat. *(The technology in our company is changing rapidly).*	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐	6 ☐	7 ☐
2	Perubahan teknologi memberikan peluang besar di perusahaan kami. *(Technological changes provide big opportunities in our company).*	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐	6 ☐	7 ☐
3	Sangat sulit untuk meramalkan di mana posisi teknologi di perusahaan kami dalam 2 sampai 3 tahun ke depan. *(It is challenging to forecast where the technology in our company will be in the next 2 to 3 years).*	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐	6 ☐	7 ☐
4	Sejumlah besar ide-ide produk baru telah diwujudkan melalui terobosan teknologi di perusahaan kami. *(A large number of new product ideas have been made possible through technological breakthroughs in our company).*	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐	6 ☐	7 ☐
5	Perkembangan teknologi di perusahaan kami tidak banyak. *(Technological developments in our company are rather minor).*	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐	6 ☐	7 ☐

B6. Intensitas Persaingan (*Competitive Intensity*) Indikasikan tingkat setuju/tidaknya Anda pada pernyataan berikut yang terkait dengan "**Intensitas Persaingan"** pada perusahaan anda dengan skala 1 sampai 7. (*Please indicate your level of* agreement/disagreement *with the following statement about your company's "**Competitive Intensity**" on the scale of 1 to 7*).		Sangat Tidak Setuju (Strongly Disagree)			Netral (Neutral)			Sangat Setuju (Strongly Agree)
1	Persaingan antara perusahaan kami dan perusahaan yang lain sangatlah ketat. *(Competition between our company and others is cutthroat).*	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐	6 ☐	7 ☐
2	Ada banyak "persaingan dalam hal promosi" di perusahaan kami. *(There are many "promotion wars" in our company).*	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐	6 ☐	7 ☐
3	Apa pun yang ditawarkan pesaing, yang lain senantiasa siap menandinginya. *(Anything that one competitor can offer, others can match readily).*	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐	6 ☐	7 ☐
4	Persaingan harga adalah ciri khas dari perusahaan kami. *(Price competition is a hallmark of our company).*	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐	6 ☐	7 ☐
5	Selalu mendengar langkah baru pesaing hampir setiap hari. *(One hears of a new competitive move almost every day).*	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐	6 ☐	7 ☐
6	Pesaing kami relatif lemah. *(Our competitors are relatively weak).*	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐	6 ☐	7 ☐

Bagian C. Orientasi daya inovasi (*Section C. Innovativeness Orientation*).

Indikasikan tingkat setuju/tidaknya Anda pada pernyataan berikut yang terkait dengan "**Orientasi daya inovasi"** di perusahaan Anda pada skala 1-7. (*Please indicate your level of agreement/disagreement with the following statement about your company's "**Innovativeness Orientation**" on the scale of 1 to 7)* .		Sangat Tidak Setuju (Strongly Disagree)			Netral (Neutral)			Sangat Setuju (Strongly Agree)
1	Perusahaan ini selalu menuju ke arah pengembangan solusi-solusi baru. *(This company is always moving toward the development of new answers).*	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐	6 ☐	7 ☐
2	Perusahaan ini terbuka dan responsif pada perubahan. *(This company is open and responsive to changes).*	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐	6 ☐	7 ☐
3	Manajer perusahaan ini selalu mencari cara-cara baru dalam menjawab permasalahan. *(This company's manager is always searching for fresh, new ways of looking at problems).*	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐	6 ☐	7 ☐
4	Manajer selalu mencari peluang baru bagi perusahaan. *(Managers are constantly seeking new opportunities for the company).*	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐	6 ☐	7 ☐
5	Manajer berinisiatif untuk membentuk lingkungan yang bermanfaat untuk perusahaan. *(Managers take the initiative to shape the environment to the company's advantage).*	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐	6 ☐	7 ☐
6	Manager seringkali menjadi yang pertama memperkenalkan layanan baru. *(Managers are often the first to introduce new services).*	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐	6 ☐	7 ☐
7	Manajer biasanya mengambil inisiatif dengan memperkenalkan teknik administrasi baru. *(Managers usually take the initiative by introducing new administrative techniques).*	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐	6 ☐	7 ☐
9	Perusahaan ini menetapkan tujuan masa depan yang realistis. *(This company establishes a realistic set of future goals for itself).*	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐	6 ☐	7 ☐
10	Perusahaan ini memiliki visi yang realistis untuk semua departemen dan karyawan. *(This company has a realistic vision of the future for all departments and employees).*	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐	6 ☐	7 ☐
11	Pada perusahaan ini, kreativitas sangatlah didukung. *(In this company, creativity is encouraged).*	1 ☐ ☐	2 ☐ ☐	3 ☐ ☐	4 ☐ ☐	5 ☐ ☐	6 ☐ ☐	7 ☐ ☐
12	Pada perusahaan ini, manajer diharapkan memiliki banyak pemikiran untuk memecahkan masalah. *(In this company, managers are expected to be resourceful problem solvers).*	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐	6 ☐	7 ☐
13	Perusahaan ini secara terus menerus mengembangkan dan menawarkan layanan baru atau perbaikan layanan. *(In this company, we are constantly looking to develop and offer new or improved services).*	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐	6 ☐	7 ☐
14	Pada perusahaan ini, manajer didorong untuk menggunakan pendekatan orisinil untuk memecahkan masalah di tempat kerja. *(In this company, managers are encouraged to use original approaches when dealing with problems in the workplace).*	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐	6 ☐	7 ☐
15	Perusahaan ini meyakini bahwa semakin tinggi resiko, maka pendapatan akan semakin tinggi. (*This company believes that higher risks are worth taking for high payoffs*).	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐	6 ☐	7 ☐
16	Perusahaan ini mendorong strategi inovatif, mengetahui dengan baik kemungkinan beberapa strategi tersebut akan gagal. (*This company encourages innovative strategies, knowing well that some will fail*).	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐	6 ☐	7 ☐
17	Perusahaan ini tidak "takut mengambil resiko". (*This company does not like to "play it safe"*).	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐	6 ☐	7 ☐
18	Perusahaan ini menyukai tatangan yang lebih besar. (*This company likes to take big risks*).	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐	6 ☐	7 ☐

Bagian D. Kinerja dan Profil Perusahaan *(Section D: Performance and Company Profile).*

D1. Kinerja (Performance)

a. Perkirakan prosentase output dari aktivitas pengembangan produk baru perusahaan anda. (*Please estimate the percentage of your company's output from new product development activities for each of the following three types of products*).

%	A. Terobosan radikal pada produk dan proses inti. (*Radical breakthroughs in core products and processes*).
%	B. Generasi produk dan proses inti selanjutnya. (Next generation of core product and/or process).
%	C. Fitur tambahan, hibrid, dan turunan dari produk inti dan atau proses. (*Enhancements, hybrids, and derivatives of core product and or process*).
100 %	

b. Distribusikan prosentase pada total penjualan untuk tiga tahun terakhir berdasarkan tipe produk berikut ini (dengan total 100%).

(*Please distribute the percentages of your total sales for the last three years from the following types of products (The total sums up to 100%*)).

%	Terobosan produk baru. (*Breakthrough new products*).
%	Generasi produk baru selanjutnya. (*Next generation new products*).
%	Tambahan untuk produk family dan/atau turunan/fitur tambahan. (*Addition to Product Family and/or Derivatives/Enhancements*).
%	Produk yang tidak dimodifikasi. (*Non-modified products*).
100 %	

c. Silakan mengevaluasi kinerja perusahaan Anda selama 3 tahun terakhir **relatif terhadap pesaing Anda**. (Please evaluate your *company's performance* over the last 3 years **relative to your competitors).**

		Sangat Rendah (Very low)			Sedang (*Moderate*)			Sangat Tinggi (Very high)
		1	2	3	4	5	6	7
1	Keuntungan *(Profitability*)	☐	☐	☐	☐	☐	☐	☐
		1	2	3	4	5	6	7
2	Pertumbuhan penjualan (*Sales growth*)	☐	☐	☐	☐	☐	☐	☐
		1	2	3	4	5	6	7
3	Pangsa pasar (*Market share*)	☐	☐	☐	☐	☐	☐	☐
		1	2	3	4	5	6	7
4	Pengembalian investasi (*Return on investment*)	☐	☐	☐	☐	☐	☐	☐
		1	2	3	4	5	6	7
5	Pengembalian penjualan (*Return on sales*)	☐	☐	☐	☐	☐	☐	☐
		1	2	3	4	5	6	7
6	Pengembalian Aset (*Return on assets*)	☐	☐	☐	☐	☐	☐	☐

D2. Profil Perusahaan (*Company Profile*)

a. Apakah jabatan Anda diperusahaan? (Contoh. CEO, wakil direktur, manajer tingkat menengah) (*What does best describe your position? (e.g., CEO, VP, mid-level manager*))_____

b. Berapa lama Anda bekerja di perusahaan Anda sekarang? (*How long have you been working for your company?*)_____(thn/bln (yrs/months)).

c. Berapa jumlah tenaga kerja fulltime secara keseluruhan? (*What is the total number of employees in full time equivalent?*) _____

d. Berapa jumlah tenaga kerja fulltime di bagian riset dan pengembangan? (*What is the total number of the R&D employees in full time equivalent*?) _____

e. Berapa total penjualan tahunan? (What are total annual sales?) _____ (Milyar Dolar)

f. Tahun berapa perusahaan Anda didirikan? (*What is the calendar year when your company was established*?)_____(yyyy)

g. Silakan beri tanda centang kode industri yang paling menggambarkan kegiatan perusahaan Anda
(*Please tick the industry code that does best describe the activities of your company*):

- ☐ 58 - Penerbitan buku, software, koran, jurnal, dan email (*Book, software, newspaper, journal, mailing list publishing activities*)
- ☐ 59 – Gambar bergerak, video, program televise, rekaman suara dan music (*Motion picture, video and television programme production, sound recording and music publishing activities*).
- ☐ 60 – Penyiaran radio, program televisi, dan kegiatan penyiaran lainnya (*Radio broadcasting, television programming, and other broadcasting activities*).
- ☐ 61 - Telekomunikasi (*Telecommunication*).
- ☐ 62 - Pemrograman computer, konsultasi dan aktivitas terkait lainnya (*Computer programming, consultancy, and related activities*).
- ☐ 63 – Kegiatan pelayanan informasi (*Information service activities*).
- ☐ Lainnya (*Others*): _____

h. Mempertimbangkan posisi Anda di perusahaan ini, seberapa yakin Anda bahwa strategi produk baru diinformasikan dengan baik di perusahaan Anda? (*Given your position in this company, how confident are you that you are well informed about the new product strategies in your company?*)

- ☐ Sama Sekali tidak yakin (*Not Confident At All*).
- ☐ Tidak seberapa yakin (Not Too Confident).
- ☐ Agak yakin (*Somewhat Confident*).
- ☐ Antara yakin dan tidak yakin (*Neither Confident and Not Confident*).
- ☐ Yakin (*Confident*).
- ☐ Sangat Yakin (*Very Confident*).
- ☐ Teramat sangat yakin (*Extremely Confident*).

TERIMA KASIH BANYAK ATAS PARTISIPASI ANDA.

(*THANK YOU FOR YOUR PARTICIPATION!*)

APPENDIX 5. DESCRIPTIVE STATISTICS

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
HC1	310	1	7	5.19	1.315	-.989	.138	1.300	.276
HC2	310	2	7	4.92	1.174	-.464	.138	.082	.276
HC3	310	1	7	4.70	1.425	-.622	.138	.146	.276
HC4	310	1	7	4.63	1.462	-.538	.138	-.374	.276
HC5	310	1	7	4.46	1.542	-.632	.138	-.355	.276
HC6	310	1	7	4.95	1.364	-.737	.138	.300	.276
OP1	310	1	7	4.77	1.314	-.547	.138	-.053	.276
OP2	310	1	7	4.54	1.502	-.427	.138	-.458	.276
OP3	310	1	7	4.79	1.335	-.512	.138	-.008	.276
OP4	310	1	7	4.63	1.508	-.662	.138	-.130	.276
OP5	310	1	7	5.02	1.381	-.675	.138	.338	.276
SC1	310	1	7	5.01	1.312	-.474	.138	-.067	.276
SC2	310	1	7	4.96	1.250	-.583	.138	.198	.276
SC3	310	1	7	4.97	1.230	-.549	.138	.273	.276
SC4	310	1	7	4.88	1.297	-.634	.138	.227	.276
SC5	310	1	7	4.82	1.379	-.767	.138	.194	.276
SC6	310	1	7	4.58	1.487	-.989	.138	.158	.276
HC7	310	1	7	5.29	1.204	-1.022	.138	2.087	.276
HC8	310	1	7	4.83	1.131	-.436	.138	.123	.276
SC7	310	1	7	4.77	1.325	-.856	.138	.322	.276
OC1	310	1	7	4.73	1.390	-.677	.138	.010	.276
OC2	310	1	7	4.92	1.326	-.908	.138	.615	.276
OC3	310	1	7	5.13	1.296	-.682	.138	.228	.276
OC4	310	1	7	5.14	1.139	-.632	.138	.504	.276
HC9	310	1	7	4.94	1.237	-.725	.138	.512	.276
HC10	310	1	7	5.02	1.186	-.805	.138	.734	.276
RI1	310	1	7	5.14	1.106	-.660	.138	1.512	.276
RI2	310	1	7	4.95	1.048	-.011	.138	.251	.276
RI3	310	1	7	4.83	1.186	-.280	.138	-.005	.276
RI4	310	2	7	4.85	1.163	-.323	.138	.061	.276
RI5	310	1	7	4.81	1.241	-.340	.138	-.252	.276
RI6	310	1	7	4.72	1.355	-.810	.138	.520	.276
II1	310	1	7	5.00	1.182	-.426	.138	.212	.276
II2	310	1	7	4.98	1.125	-.408	.138	.424	.276
II3	310	1	7	4.91	1.202	-.709	.138	.623	.276
II4	310	1	7	4.86	1.227	-.453	.138	.308	.276
II5	310	1	7	4.96	1.198	-.573	.138	.349	.276
II6	310	1	7	4.98	1.197	-.914	.138	1.543	.276
RI7	310	1	7	5.07	1.125	-.764	.138	1.834	.276
RI8	310	1	7	4.81	.978	-.842	.138	1.631	.276
RI9	310	1	7	4.73	1.179	-.717	.138	.461	.276
RI10	310	1	7	4.67	1.205	-.899	.138	.800	.276
OP6	310	1	7	5.23	1.002	-.718	.138	1.956	.276
OP7	310	2	7	4.94	1.011	-.047	.138	-.053	.276
OP8	310	1	7	4.75	1.290	-.531	.138	.085	.276
PR1	310	1	7	4.80	1.263	-.681	.138	.639	.276
PR2	310	1	7	4.77	1.415	-.803	.138	.223	.276
PR3	310	1	7	4.68	1.413	-.957	.138	.551	.276
PR4	310	1	7	5.07	1.173	-.544	.138	.609	.276
RT1	310	1	7	5.06	1.162	-.874	.138	1.435	.276
RT2	310	1	7	4.96	1.217	-.804	.138	1.397	.276
RT3	310	1	7	5.04	1.141	-.963	.138	1.648	.276
RT4	310	1	7	5.04	1.178	-1.050	.138	1.616	.276
Valid N (listwise)	310								

APPENDIX 6. MAHALANOBIS DISTANCE TEST

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	ID	MAH_3	Probability	Outlier
1	63	221.25046	.00111	.00
2	19	219.19933	.00202	.00
3	82	218.23339	.00202	.00
4	154	191.67528	.00206	.00
5	12	183.76263	.00657	.00
6	30	183.07337	.00723	.00
7	9	181.32653	.00919	.00
8	35	178.18294	.01395	.00
9	50	167.80896	.04841	.00
10	14	165.54424	.06177	.00
11	10	163.05577	.07979	.00
12	61	161.50047	.09303	.00
13	70	159.44456	.11309	.00
14	34	158.15242	.12728	.00
15	84	157.54951	.13433	.00
16	72	155.21848	.16431	.00
17	27	154.51355	.17424	.00
18	71	151.80420	.21615	.00
19	28	150.94759	.23064	.00
20	74	150.17194	.24427	.00
21	68	145.92962	.32681	.00
22	110	145.74136	.33077	.00
23	49	145.15213	.34328	.00
24	76	144.55333	.35621	.00
25	79	143.76612	.37352	.00
26	85	143.40151	.38165	.00
27	47	139.93989	.46167	.00
28	83	139.52716	.47148	.00
29	89	138.70458	.49111	.00
30	45	137.00095	.53205	.00
31	73	135.70236	.56328	.00
32	48	135.21658	.57492	.00
33	75	134.99808	.58015	.00
34	56	134.32069	.59629	.00
35	4	132.27421	.64428	.00
36	156	130.90959	.67537	.00
37	88	130.53013	.68385	.00
38	53	129.68654	.70241	.00
39	78	129.55243	.70532	.00

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	ID	MAH_3	Probability	Outlier
40	67	128.16923	.73467	.00
41	69	124.47142	.80603	.00
42	153	123.34302	.82547	.00
43	86	123.16170	.82849	.00
44	31	120.89219	.86361	.00
45	114	118.80613	.89155	.00
46	60	118.73769	.89240	.00
47	77	118.68436	.89306	.00
48	3	118.55374	.89465	.00
49	25	116.69589	.91563	.00
50	44	116.61660	.91645	.00
51	81	115.23042	.92996	.00
52	11	114.68686	.93480	.00
53	26	114.34749	.93769	.00
54	87	113.94272	.94102	.00
55	178	112.52694	.95162	.00
56	59	110.80879	.96248	.00
57	108	110.15923	.96605	.00
58	43	110.13255	.96619	.00
59	55	110.10306	.96634	.00
60	57	108.77943	.97275	.00
61	2	107.96728	.97617	.00
62	80	107.08936	.97947	.00
63	99	105.09249	.98561	.00
64	29	105.09211	.98561	.00
65	64	103.95017	.98838	.00
66	66	103.51119	.98932	.00
67	115	103.48555	.98937	.00
68	33	102.47556	.99129	.00
69	92	100.67461	.99398	.00
70	23	100.58450	.99410	.00
71	20	99.72217	.99509	.00
72	21	99.03874	.99578	.00
73	143	98.04867	.99662	.00
74	169	96.20986	.99781	.00
75	97	96.11624	.99786	.00
76	16	95.87004	.99798	.00
77	100	95.56557	.99813	.00
78	166	94.35027	.99862	.00

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	ID	MAH_3	Probability	Outlier
79	145	93.84402	.99879	.00
80	162	93.76996	.99881	.00
81	113	93.34307	.99894	.00
82	170	93.25120	.99896	.00
83	32	92.10074	.99924	.00
84	13	91.64775	.99933	.00
85	175	91.45805	.99936	.00
86	171	91.06466	.99943	.00
87	197	91.01897	.99944	.00
88	151	90.44416	.99952	.00
89	196	90.34506	.99953	.00
90	144	89.91913	.99959	.00
91	65	89.62515	.99962	.00
92	179	88.57255	.99972	.00
93	163	88.42387	.99974	.00
94	182	87.78293	.99978	.00
95	187	87.66698	.99979	.00
96	198	87.64834	.99979	.00
97	173	86.43225	.99986	.00
98	24	86.38845	.99986	.00
99	22	86.09884	.99987	.00
100	201	86.00782	.99988	.00
101	116	85.54742	.99989	.00
102	147	85.51190	.99989	.00
103	219	85.42029	.99990	.00
104	51	85.39384	.99990	.00
105	167	85.25810	.99990	.00
106	203	84.97867	.99991	.00
107	194	84.92596	.99991	.00
108	107	84.32658	.99993	.00
109	17	84.30444	.99993	.00
110	158	82.90842	.99996	.00
111	98	82.34257	.99996	.00
112	165	82.32644	.99996	.00
113	200	82.04756	.99997	.00
114	96	81.84210	.99997	.00
115	146	81.72964	.99997	.00
116	195	81.19581	.99998	.00
117	150	81.13557	.99998	.00

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	ID	MAH_3	Probability	Outlier
118	106	80.32059	.99998	.00
119	52	80.30996	.99998	.00
120	190	80.30637	.99998	.00
121	208	80.22130	.99998	.00
122	149	79.71126	.99999	.00
123	192	79.70199	.99999	.00
124	160	79.67437	.99999	.00
125	58	79.38059	.99999	.00
126	140	78.87450	.99999	.00
127	191	78.87363	.99999	.00
128	54	78.52992	.99999	.00
129	62	77.58097	.99999	.00
130	172	77.05132	1.00000	.00
131	176	76.49894	1.00000	.00
132	155	75.61189	1.00000	.00
133	193	75.24215	1.00000	.00
134	206	75.00627	1.00000	.00
135	141	73.16888	1.00000	.00
136	189	73.15084	1.00000	.00
137	168	72.88503	1.00000	.00
138	109	72.82958	1.00000	.00
139	216	72.74406	1.00000	.00
140	181	72.39445	1.00000	.00
141	204	72.33647	1.00000	.00
142	15	72.12111	1.00000	.00
143	104	71.89242	1.00000	.00
144	105	71.79399	1.00000	.00
145	112	71.49183	1.00000	.00
146	223	71.36045	1.00000	.00
147	111	71.22786	1.00000	.00
148	225	70.75097	1.00000	.00
149	137	70.68332	1.00000	.00
150	148	70.17374	1.00000	.00
151	202	70.03967	1.00000	.00
152	199	69.98406	1.00000	.00
153	174	69.96823	1.00000	.00
154	224	69.50754	1.00000	.00
155	135	68.96577	1.00000	.00
156	133	68.71477	1.00000	.00

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	ID	MAH_3	Probability	Outlier
157	183	68.10078	1.00000	.00
158	5	67.54564	1.00000	.00
159	184	66.83144	1.00000	.00
160	220	66.60949	1.00000	.00
161	205	66.46694	1.00000	.00
162	180	66.44356	1.00000	.00
163	207	66.44026	1.00000	.00
164	221	66.40354	1.00000	.00
165	233	65.62296	1.00000	.00
166	95	65.33282	1.00000	.00
167	211	64.63225	1.00000	.00
168	94	64.59147	1.00000	.00
169	139	64.45385	1.00000	.00
170	164	64.35927	1.00000	.00
171	8	64.02979	1.00000	.00
172	228	63.89220	1.00000	.00
173	7	63.46274	1.00000	.00
174	103	62.56931	1.00000	.00
175	188	62.48659	1.00000	.00
176	46	62.32626	1.00000	.00
177	222	62.23450	1.00000	.00
178	131	62.06762	1.00000	.00
179	217	62.05712	1.00000	.00
180	152	61.50136	1.00000	.00
181	286	60.92722	1.00000	.00
182	91	60.58814	1.00000	.00
183	186	60.00802	1.00000	.00
184	215	59.98552	1.00000	.00
185	210	59.92612	1.00000	.00
186	159	59.73937	1.00000	.00
187	42	59.61231	1.00000	.00
188	90	59.40874	1.00000	.00
189	93	58.87958	1.00000	.00
190	130	58.60504	1.00000	.00
191	136	58.12853	1.00000	.00
192	257	58.06130	1.00000	.00
193	138	58.03764	1.00000	.00
194	231	57.74971	1.00000	.00
195	128	57.66675	1.00000	.00

Untitled3.sav

	ID	MAH_3	Probability	Outlier
196	41	57.12698	1.00000	.00
197	213	56.70051	1.00000	.00
198	226	56.63694	1.00000	.00
199	157	56.58783	1.00000	.00
200	39	56.08099	1.00000	.00
201	132	55.80165	1.00000	.00
202	263	55.63349	1.00000	.00
203	161	55.41694	1.00000	.00
204	177	55.33449	1.00000	.00
205	125	54.87920	1.00000	.00
206	234	54.25655	1.00000	.00
207	142	53.89868	1.00000	.00
208	185	53.03660	1.00000	.00
209	134	52.89213	1.00000	.00
210	262	52.60775	1.00000	.00
211	38	51.70476	1.00000	.00
212	246	51.26922	1.00000	.00
213	209	50.77872	1.00000	.00
214	214	50.69468	1.00000	.00
215	245	50.66331	1.00000	.00
216	122	50.60452	1.00000	.00
217	218	50.39748	1.00000	.00
218	6	50.39085	1.00000	.00
219	241	50.24750	1.00000	.00
220	230	49.55062	1.00000	.00
221	251	49.16279	1.00000	.00
222	102	49.05449	1.00000	.00
223	281	48.71117	1.00000	.00
224	240	48.12803	1.00000	.00
225	36	47.94896	1.00000	.00
226	236	47.77913	1.00000	.00
227	256	47.34502	1.00000	.00
228	238	47.17349	1.00000	.00
229	127	46.41585	1.00000	.00
230	232	46.37303	1.00000	.00
231	296	46.13895	1.00000	.00
232	291	45.93138	1.00000	.00
233	278	45.79643	1.00000	.00
234	101	45.03613	1.00000	.00

Untitled3.sav

	ID	MAH_3	Probability	Outlier
235	40	44.84973	1.00000	.00
236	244	44.67002	1.00000	.00
237	284	44.20717	1.00000	.00
238	117	43.39428	1.00000	.00
239	248	43.23009	1.00000	.00
240	274	43.12622	1.00000	.00
241	118	43.10169	1.00000	.00
242	249	43.02611	1.00000	.00
243	229	42.53806	1.00000	.00
244	293	42.50491	1.00000	.00
245	285	42.27373	1.00000	.00
246	258	41.82404	1.00000	.00
247	252	41.62599	1.00000	.00
248	227	41.57254	1.00000	.00
249	254	41.36271	1.00000	.00
250	273	41.05629	1.00000	.00
251	279	41.03126	1.00000	.00
252	212	41.00821	1.00000	.00
253	297	41.00458	1.00000	.00
254	37	40.05770	1.00000	.00
255	289	39.53097	1.00000	.00
256	124	39.25347	1.00000	.00
257	282	39.10008	1.00000	.00
258	276	38.98127	1.00000	.00
259	267	38.92616	1.00000	.00
260	271	38.42343	1.00000	.00
261	288	38.18707	1.00000	.00
262	235	37.96914	1.00000	.00
263	264	37.84770	1.00000	.00
264	239	37.80347	1.00000	.00
265	266	37.53339	1.00000	.00
266	283	37.53262	1.00000	.00
267	129	36.96029	1.00000	.00
268	255	36.53767	1.00000	.00
269	250	36.44238	1.00000	.00
270	265	36.37705	1.00000	.00
271	270	35.94482	1.00000	.00
272	294	35.87605	1.00000	.00
273	123	35.75618	1.00000	.00

Untitled3.sav

	ID	MAH_3	Probability	Outlier
274	287	35.71163	1.00000	.00
275	253	35.56214	1.00000	.00
276	237	35.42017	1.00000	.00
277	295	34.94796	1.00000	.00
278	277	34.62389	1.00000	.00
279	272	33.92350	1.00000	.00
280	290	33.73406	1.00000	.00
281	121	33.53717	1.00000	.00
282	275	33.26246	1.00000	.00
283	120	33.16843	1.00000	.00
284	126	33.10707	1.00000	.00
285	268	33.06628	1.00000	.00
286	243	32.81822	1.00000	.00
287	247	32.24668	1.00000	.00
288	280	31.10433	1.00000	.00
289	292	30.50959	1.00000	.00
290	119	30.48062	1.00000	.00
291	242	30.30435	1.00000	.00
292	269	29.67711	1.00000	.00
293	259	29.27953	1.00000	.00
294	261	28.28229	1.00000	.00
295	260	26.06747	1.00000	.00
296	18	17.96723	1.00000	.00
297	1	8.62929	1.00000	.00

APPENDIX 7. MISSING VALUE AND UNENGAGED VARIABLE

ID	Missing	Unengaged	ID	Missing	Unengaged
1	0	0.103136162	50	0	1.390052698
2	0	1.532852177	51	0	1.34361282
3	0	1.305378116	52	0	1.288977794
4	0	1.624972762	53	0	1.445266893
5	0	1.120655045	54	0	1.317017762
6	0	0.800335229	55	0	1.501608187
7	0	1.025628352	56	0	1.537672005
8	0	1.469385428	57	0	1.634903717
9	1	1.772239193	58	0	1.57665358
10	0	2.044481644	59	0	1.507371949
11	0	1.377435723	60	0	1.579071706
12	0	1.470250721	61	0	1.436198525
13	0	1.579291352	62	0	0.945625414
14	0	1.746575527	63	0	1.81341464
15	0	1.955452546	64	0	1.627887386
16	0	1.519214431	65	0	1.761997836
17	0	0.90143191	66	0	1.15058788
18	0	1.481297441	67	0	1.697426861
19	0	0.865173879	68	0	1.769005121
20	0	0.954024646	69	0	1.922958275
21	0	0.79424453	70	0	1.699605145
22	0	0.767594335	71	0	1.243598477
23	0	1.142014456	72	0	1.286373886
24	0	0	73	0	1.143936444
25	0	0	74	0	1.452926526
26	0	1.1676449	75	0	1.251106575
27	0	1.528622361	76	0	0.781477089
28	0	0	77	0	1.336278399
29	0	0	78	0	1.623620309
30	0	1.434265118	79	0	1.562288256
31	0	0.742324972	80	0	1.436440018
32	0	1.14140684	81	0	1.439013421
33	0	0.964151044	82	0	2.324869442
34	0	1.031361618	83	0	1.077417209
35	0	1.092020057	84	0	1.494894383
36	0	1.237727358	85	0	1.619770328
37	0	1.223351626	86	0	1.526578798
38	0	1.398759009	87	0	1.635398681
39	0	1.376680067	88	0	1.527487386
40	0	1.076665759	89	0	1.722109395
41	0	1.223351626	90	0	1.560659252
42	0	1.088945282	91	0	1.474961566
43	0	1.621339942	92	0	1.578778797
44	0	1.526578798	93	0	1.53383243
45	0	1.65898333	94	0	1.392462739
46	0	1.640481079	95	0	1.431279332
47	0	1.808754293	96	0	1.470093433
48	0	1.296223068	97	0	1.502531875
49	0	1.280608596	98	0	1.470093433

ID	Missing	Unengaged	ID	Missing	Unengaged
99	0	2.18165657	150	0	0.67047128
100	0	1.768874399	151	0	0.887862166
101	0	1.369691584	152	0	0.923480024
102	0	1.671065994	153	0	0.938383838
103	0	1.369607168	154	0	0.913282467
104	0	1.230137604	155	0	0.903353806
105	0	1.143936444	156	0	0.847077092
106	0	1.301652764	157	0	0.98315092
107	0	1.274182206	158	0	0.910111999
108	0	1.501300165	159	0	0.931334265
109	0	1.160194624	160	0	1.095930521
110	0	1.077095223	161	0	0.772997882
111	0	0.957291241	162	0	1.331684725
112	0	0.66388598	163	0	1.857820573
113	0	0.687499672	164	0	0.953054615
114	0	0.732920137	165	0	1.393458778
115	0	1.008920783	166	0	0.738577409
116	0	0.922728514	167	0	0.899505909
117	0	1.083836832	168	0	0.754835646
118	0	0.982091934	169	0	0.973103428
119	0	0.9426864	170	0	0.847077092
120	0	0.740453561	171	0	0.968458516
121	0	0.732920137	172	0	0.85034662
122	0	0.822563075	173	0	0.716164551
123	0	0.861558091	174	0	0.831371259
124	0	0.805088454	175	0	0.866909435
125	0	1.030015485	176	0	0.821297052
126	0	1.155901475	177	0	0.839674108
127	0	1.738214531	178	0	0.873949496
128	0	1.92079251	179	0	0.723872373
129	0	1.323847632	180	0	0.852383707
130	0	1.908231071	181	0	0.834702309
131	0	1.920250687	182	0	0.661792798
132	0	1.646531161	183	0	0.965708736
133	0	0.878830828	184	0	0.934308989
134	0	0.681927312	185	0	0.835532997
135	0	0.595586341	186	0	0.813659545
136	0	0.541918416	187	0	0.879619842
137	0	0.551435759	188	0	0.701978441
138	0	0.572220847	189	0	0.77687707
139	0	0.650159848	190	0	0.627168455
140	0	0.563875725	191	0	0.72817217
141	0	0.563875725	192	0	0.948677204
142	0	0.665451546	193	0	0.697019736
143	0	0.458725355	194	0	0.841324845
144	0	0.732920137	195	0	0.905527022
145	0	0.746982986	196	0	0.762455824
146	0	0.765331598	197	0	0.816213321
147	0	0.701978441	198	0	0.818617906
148	0	0.77479069	199	0	0.82326558
149	0	0.727536767	200	0	0.784135684

ID	Missing	Unengaged	ID	Missing	Unengaged
200	0	0.784135684	250	0	0.607122332
201	0	0.915558407	251	0	0.553737341
202	0	0.828864187	252	0	0.603109835
203	0	0.90143191	253	0	0.534615178
204	0	0.859677251	254	0	0.629927678
205	0	0.848168335	255	0	0.572422867
206	0	0.760785933	256	0	0.49927685
207	0	0.850754428	257	0	0.487797687
208	0	0.815788247	258	0	0.555821419
209	0	0.891760306	259	0	0.588948987
210	0	0.691858406	260	0	0.544472641
211	0	0.80981378	261	0	0.492750075
212	0	0.810099277	262	0	0.593836614
213	0	0.957291241	263	0	0.536773504
214	0	0.972152435	264	0	0.554988727
215	0	0.736539518	265	0	0.620682567
216	0	0.860886834	266	0	0.558312042
217	0	0.811810154	267	0	0.463738896
218	0	0.677334011	268	0	0.515680809
219	0	0.611675813	269	0	0.528306172
220	0	0.708209626	270	0	0.596749975
221	0	0.678357432	271	0	0.645877738
222	0	0.745588638	272	0	0.551435759
223	0	0.653353012	273	0	0.429838626
224	0	0.679889676	274	0	0.460235152
225	0	0.718903856	275	0	0.431449519
226	0	0.553110587	276	0	0.643186943
227	0	0.801922767	277	0	0.674254426
228	0	0.614880794	278	0	0.540636778
229	0	0.663363304	279	0	0.568572218
230	0	0.811525259	280	0	0.53331599
231	0	0.749763905	281	0	0.54764867
232	0	0.65811371	282	0	0.514783192
233	0	0.80623653	283	0	0.478706006
234	0	0.765180511	284	0	0.495090943
235	0	0.756212945	285	0	0.515007743
236	0	0.627168455	286	0	0.462490606
237	0	0.769850422	287	0	0.53526359
238	0	0.788546758	288	0	0.497653181
239	0	0.767594335	289	0	0.541277976
240	0	0.699999174	290	0	0.536773504
241	0	0.515007743	291	0	0.517694758
242	0	0.680909256	292	0	0.607122332
243	0	0.618443176	293	0	0.510950726
244	0	0.571007228	294	0	0.536773504
245	0	0.614504605	295	0	0.638858098
246	0	0.52103404	289	0	0.541277976
247	0	0.727218857	290	0	0.536773504
248	0	0.626246012	291	0	0.517694758

ID	Missing	Unengaged	ID	Missing	Unengaged
291	0	0.517694758	301	0	0.57039945
292	0	0.607122332	302	0	0.540636778
293	0	0.510950726	303	0	0.5612038
294	0	0.536773504	304	0	0.533965979
295	0	0.638858098	305	0	0.59713735
296	0	0.5612038	306	0	0.536773504
297	0	0.541918416	307	0	0.566943068
298	0	0.600804948	308	0	0.54170502
299	0	0.59713735	309	0	0.518364335
300	0	0.635592116	310	0	0.489926269

APPENDIX 8. NON-RESPOND BIAS, INDEPENDENT T-TEST

T-Test

Notes

Output Created		01-DEC-2017 21:54:20
Comments		
Input	Data	H:\Kuesioner\02122017.sav
	Active Dataset	DataSet1
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	275
Missing Value Handling	Definition of Missing	User defined missing values are treated as missing.
	Cases Used	Statistics for each analysis are based on the cases with no missing or out-of-range data for any variable in the analysis.
Syntax		T-TEST GROUPS=VAR00001(0 1) /MISSING=ANALYSIS /VARIABLES=HC1 HC2 HC3 HC4 HC5 HC6 OP1 OP2 OP3 OP4 OP5 SC1 SC2 SC3 SC4 SC5 SC6 HC7 HC8 SC7 HC9 HC10 RI1 RI2 RI3 RI4 RI5 RI6 II1 II2 II3 II4 II5 II6 RI7 RI8 RI9 RI10 OP6 OP7 OP8 PR1 PR2 PR3 PR4 RT1 RT2 RT3 RT4 /CRITERIA=CI(.95).
Resources	Processor Time	00:00:00.03
	Elapsed Time	00:00:00.10

Group Statistics

	VAR00001	N	Mean	Std. Deviation	Std. Error Mean
HC1	0	7	6.29	1.113	.421
	1	268	5.14	1.175	.072
HC2	0	7	5.57	.976	.369
	1	268	4.95	1.095	.067
HC3	0	7	6.00	1.155	.436
	1	268	4.76	1.308	.080
HC4	0	7	5.86	1.069	.404
	1	268	4.69	1.326	.081
HC5	0	7	2.43	.976	.369
	1	268	4.62	1.394	.085
HC6	0	7	5.14	1.069	.404
	1	268	4.96	1.271	.078
OP1	0	7	5.57	.787	.297
	1	268	4.85	1.218	.074
OP2	0	7	3.14	1.464	.553
	1	268	4.73	1.356	.083
OP3	0	7	5.71	1.254	.474
	1	268	4.85	1.238	.076
OP4	0	7	3.57	1.718	.649
	1	268	4.71	1.426	.087
OP5	0	7	5.57	1.272	.481
	1	268	5.09	1.230	.075
SC1	0	7	5.43	1.134	.429
	1	268	5.06	1.198	.073
SC2	0	7	5.43	.976	.369
	1	268	5.02	1.164	.071
SC3	0	7	5.57	.787	.297
	1	268	5.00	1.168	.071
SC4	0	7	5.43	.787	.297
	1	268	4.95	1.226	.075
SC5	0	7	5.71	.756	.286
	1	268	4.91	1.216	.074
SC6	0	7	3.14	1.464	.553
	1	268	4.73	1.389	.085
HC7	0	7	5.71	.951	.360
	1	268	5.29	1.019	.062
HC8	0	7	5.14	.900	.340
	1	268	4.90	1.012	.062
SC7	0	7	5.57	.787	.297
	1	268	4.90	1.179	.072
HC9	0	7	4.71	1.380	.522
	1	268	5.07	1.082	.066
HC10	0	7	5.71	.951	.360
	1	268	5.10	1.023	.062
RI1	0	7	5.14	.900	.340
	1	268	5.10	.968	.059
RI2	0	7	5.29	1.113	.421
	1	268	4.97	.979	.060
RI3	0	7	5.57	.787	.297
	1	268	4.87	1.125	.069
RI4	0	7	5.71	.951	.360
	1	268	4.85	1.095	.067
RI5	0	7	5.29	.756	.286

	1	268	4.83	1.179	.072
RI6	0	7	4.86	1.464	.553
	1	268	4.82	1.189	.073
II1	0	7	5.29	.951	.360
	1	268	5.04	1.080	.066
II2	0	7	5.71	.951	.360
	1	268	5.01	1.060	.065
II3	0	7	5.57	.976	.369
	1	268	5.01	1.105	.067
II4	0	7	4.86	1.464	.553
	1	268	4.93	1.131	.069
II5	0	7	4.86	1.464	.553
	1	268	5.03	1.120	.068
II6	0	7	5.43	.787	.297
	1	268	5.10	1.008	.062
RI7	0	7	4.86	1.345	.508
	1	268	5.06	.964	.059
RI8	0	7	5.00	.577	.218
	1	268	4.90	.875	.053
RI9	0	7	5.14	.690	.261
	1	268	4.84	1.036	.063
RI10	0	7	4.29	1.254	.474
	1	268	4.81	1.048	.064
OP6	0	7	5.29	.756	.286
	1	268	5.18	.904	.055
OP7	0	7	5.71	1.113	.421
	1	268	4.94	.958	.059
OP8	0	7	5.57	1.272	.481
	1	268	4.86	1.161	.071
PR1	0	7	5.86	1.215	.459
	1	268	4.89	1.126	.069
PR2	0	7	5.43	1.134	.429
	1	268	4.89	1.257	.077
PR3	0	7	5.43	.787	.297
	1	268	4.79	1.255	.077
PR4	0	7	5.14	.900	.340
	1	268	5.07	1.111	.068
RT1	0	7	5.57	1.272	.481
	1	268	5.17	.986	.060
RT2	0	7	5.29	1.113	.421
	1	268	5.09	1.065	.065
RT3	0	7	5.29	1.380	.522
	1	268	5.18	.954	.058
RT4	0	7	5.71	.951	.360
	1	268	5.16	.991	.061

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
HC1	Equal variances assumed	.004	.951	2.546	273	.011	1.144	.449	.259	2.029
	Equal variances not assumed			2.681	6.354	.035	1.144	.427	.114	2.174
HC2	Equal variances assumed	.004	.950	1.482	273	.140	.620	.418	-.204	1.444
	Equal variances not assumed			1.654	6.401	.146	.620	.375	-.284	1.523
HC3	Equal variances assumed	.212	.645	2.480	273	.014	1.239	.500	.255	2.222
	Equal variances not assumed			2.792	6.409	.029	1.239	.444	.170	2.308
HC4	Equal variances assumed	.851	.357	2.308	273	.022	1.167	.506	.171	2.162
	Equal variances not assumed			2.831	6.491	.027	1.167	.412	.177	2.157
HC5	Equal variances assumed	1.091	.297	-4.127	273	.000	-2.191	.531	-3.236	-1.146
	Equal variances not assumed			-5.787	6.657	.001	-2.191	.379	-3.095	-1.286
HC6	Equal variances assumed	.006	.939	.371	273	.711	.180	.485	-.775	1.135
	Equal variances not assumed			.438	6.451	.676	.180	.411	-.810	1.170
OP1	Equal variances assumed	1.253	.264	1.556	273	.121	.721	.463	-.191	1.633
	Equal variances not assumed			2.351	6.774	.052	.721	.307	-.009	1.450
OP2	Equal variances assumed	.354	.552	-3.046	273	.003	-1.585	.520	-2.609	-.561
	Equal variances not assumed			-2.833	6.272	.028	-1.585	.559	-2.939	-.230
OP3	Equal variances assumed	.010	.920	1.813	273	.071	.860	.474	-.074	1.793
	Equal variances not assumed			1.792	6.310	.121	.860	.480	-.300	2.020
OP4	Equal variances assumed	.461	.498	-2.073	273	.039	-1.138	.549	-2.218	-.057
	Equal variances not assumed			-1.736	6.218	.132	-1.138	.655	-2.727	.452
OP5	Equal variances assumed	.223	.637	1.023	273	.307	.482	.471	-.446	1.410
	Equal variances not assumed			.990	6.296	.359	.482	.487	-.696	1.659
SC1	Equal variances assumed	.000	.983	.805	273	.421	.369	.458	-.533	1.271
	Equal variances not assumed			.848	6.355	.427	.369	.435	-.681	1.418
SC2	Equal variances assumed	.060	.807	.914	273	.361	.406	.444	-.468	1.281
	Equal variances not assumed			1.081	6.454	.318	.406	.376	-.498	1.310
SC3	Equal variances assumed	.523	.470	1.286	273	.200	.571	.444	-.303	1.446
	Equal variances not assumed			1.869	6.710	.106	.571	.306	-.158	1.301
SC4	Equal variances assumed	.676	.412	1.031	273	.303	.481	.466	-.437	1.399
	Equal variances not assumed			1.568	6.784	.162	.481	.307	-.249	1.211
SC5	Equal variances assumed	1.637	.202	1.730	273	.085	.800	.463	-.111	1.711
	Equal variances not assumed			2.710	6.838	.031	.800	.295	.099	1.502

SC6	Equal variances assumed	.623	.431	-2.976	273	.003	-1.585	.532	-2.633	-.537
	Equal variances not assumed			-2.831	6.285	.028	-1.585	.560	-2.939	-.230
HC7	Equal variances assumed	.193	.661	1.086	273	.278	.423	.390	-.344	1.190
	Equal variances not assumed			1.160	6.365	.288	.423	.365	-.457	1.304
HC8	Equal variances assumed	.025	.875	.620	273	.535	.240	.387	-.521	1.001
	Equal variances not assumed			.694	6.403	.512	.240	.346	-.593	1.073
SC7	Equal variances assumed	.713	.399	1.507	273	.133	.676	.449	-.207	1.559
	Equal variances not assumed			2.209	6.724	.064	.676	.306	-.054	1.405
HC9	Equal variances assumed	.452	.502	-.846	273	.398	-.353	.417	-1.174	.469
	Equal variances not assumed			-.671	6.194	.526	-.353	.526	-1.630	.924
HC10	Equal variances assumed	.026	.873	1.578	273	.116	.617	.391	-.153	1.387
	Equal variances not assumed			1.692	6.368	.139	.617	.365	-.263	1.498
RI1	Equal variances assumed	.027	.871	.114	273	.910	.042	.370	-.687	.771
	Equal variances not assumed			.122	6.368	.907	.042	.345	-.791	.875
RI2	Equal variances assumed	.499	.481	.839	273	.402	.316	.376	-.425	1.056
	Equal variances not assumed			.743	6.245	.485	.316	.425	-.714	1.345
RI3	Equal variances assumed	.873	.351	1.631	273	.104	.698	.428	-.145	1.541
	Equal variances not assumed			2.288	6.657	.058	.698	.305	-.031	1.428
RI4	Equal variances assumed	.288	.592	2.066	273	.040	.864	.418	.041	1.687
	Equal variances not assumed			2.361	6.422	.053	.864	.366	-.017	1.744
RI5	Equal variances assumed	1.365	.244	1.011	273	.313	.454	.449	-.430	1.337
	Equal variances not assumed			1.539	6.787	.169	.454	.295	-.248	1.155
RI6	Equal variances assumed	.283	.595	.079	273	.937	.036	.458	-.865	.937
	Equal variances not assumed			.065	6.208	.950	.036	.558	-1.318	1.391
II1	Equal variances assumed	.001	.973	.602	273	.548	.248	.413	-.564	1.061
	Equal variances not assumed			.680	6.411	.521	.248	.366	-.632	1.129
II2	Equal variances assumed	.079	.779	1.745	273	.082	.707	.405	-.090	1.504
	Equal variances not assumed			1.935	6.395	.098	.707	.365	-.174	1.587
II3	Equal variances assumed	.001	.972	1.336	273	.183	.564	.422	-.267	1.395
	Equal variances not assumed			1.504	6.408	.180	.564	.375	-.340	1.468
II4	Equal variances assumed	.571	.450	-.165	273	.869	-.072	.436	-.931	.787
	Equal variances not assumed			-.129	6.189	.901	-.072	.558	-1.426	1.282
II5	Equal variances assumed	.652	.420	-.408	273	.683	-.176	.432	-1.027	.674
	Equal variances not assumed			-.316	6.185	.762	-.176	.557	-1.531	1.178
II6	Equal variances assumed	.101	.751	.844	273	.400	.324	.384	-.432	1.080
	Equal variances not assumed			1.067	6.525	.324	.324	.304	-.405	1.053
RI7	Equal variances assumed	2.027	.156	-.553	273	.580	-.206	.373	-.940	.528

	Equal variances not assumed			-.403	6.162	.701	-.206	.512	-1.451	1.038
RI8	Equal variances assumed	1.888	.171	.303	273	.762	.101	.333	-.554	.756
	Equal variances not assumed			.448	6.740	.668	.101	.225	-.435	.636
RI9	Equal variances assumed	.957	.329	.779	273	.437	.307	.394	-.469	1.083
	Equal variances not assumed			1.144	6.727	.292	.307	.268	-.333	.947
RI10	Equal variances assumed	.339	.561	-1.300	273	.195	-.524	.403	-1.318	.270
	Equal variances not assumed			-1.096	6.221	.314	-.524	.478	-1.684	.636
OP6	Equal variances assumed	.054	.816	.298	273	.766	.103	.345	-.576	.782
	Equal variances not assumed			.354	6.456	.735	.103	.291	-.597	.803
OP7	Equal variances assumed	.564	.453	2.102	273	.036	.774	.368	.049	1.499
	Equal variances not assumed			1.823	6.235	.116	.774	.425	-.256	1.804
OP8	Equal variances assumed	.332	.565	1.593	273	.112	.709	.445	-.168	1.587
	Equal variances not assumed			1.459	6.264	.193	.709	.486	-.468	1.887
PR1	Equal variances assumed	.458	.499	2.243	273	.026	.969	.432	.119	1.819
	Equal variances not assumed			2.087	6.272	.080	.969	.464	-.155	2.093
PR2	Equal variances assumed	.002	.967	1.118	273	.265	.537	.480	-.409	1.482
	Equal variances not assumed			1.233	6.391	.261	.537	.435	-.513	1.587
PR3	Equal variances assumed	.965	.327	1.336	273	.183	.638	.477	-.302	1.577
	Equal variances not assumed			2.076	6.823	.078	.638	.307	-.092	1.368
PR4	Equal variances assumed	.059	.808	.170	273	.865	.072	.424	-.762	.906
	Equal variances not assumed			.208	6.487	.842	.072	.347	-.761	.905
RT1	Equal variances assumed	1.636	.202	1.061	273	.289	.404	.380	-.345	1.152
	Equal variances not assumed			.833	6.190	.436	.404	.485	-.774	1.581
RT2	Equal variances assumed	.297	.586	.472	273	.638	.192	.408	-.611	.996
	Equal variances not assumed			.452	6.290	.666	.192	.426	-.837	1.222
RT3	Equal variances assumed	2.676	.103	.299	273	.765	.110	.369	-.617	.838
	Equal variances not assumed			.210	6.151	.840	.110	.525	-1.166	1.387
RT4	Equal variances assumed	.009	.925	1.461	273	.145	.554	.379	-.192	1.300
	Equal variances not assumed			1.519	6.345	.177	.554	.365	-.327	1.434

APPENDIX 9. MULTICOLINEARITY

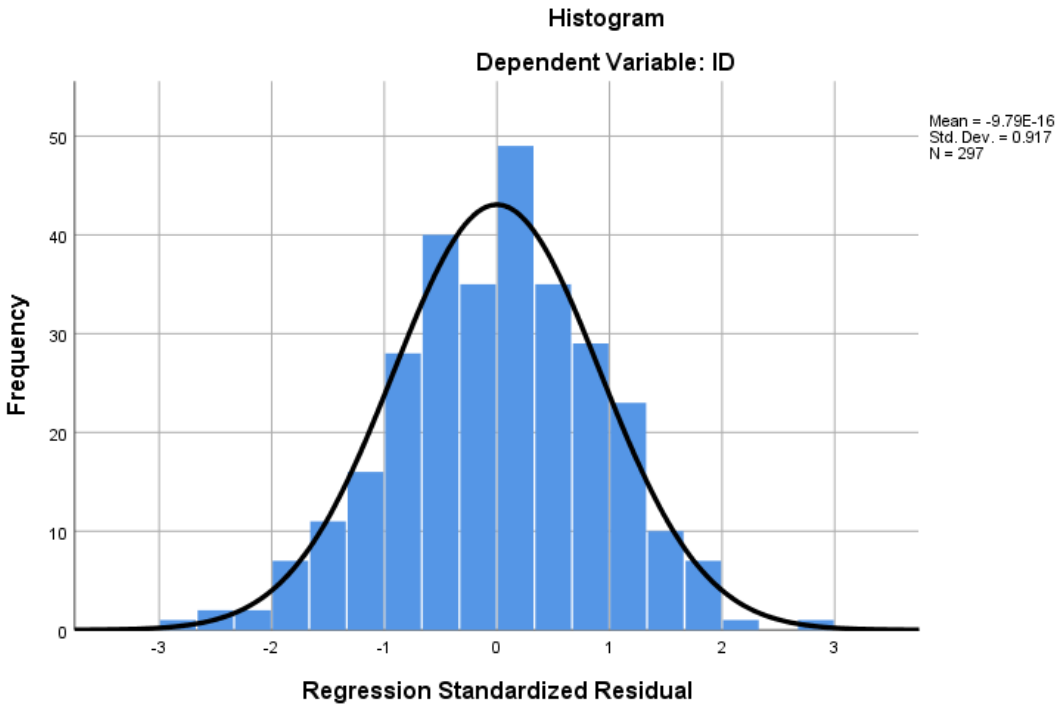
Coefficients[a]

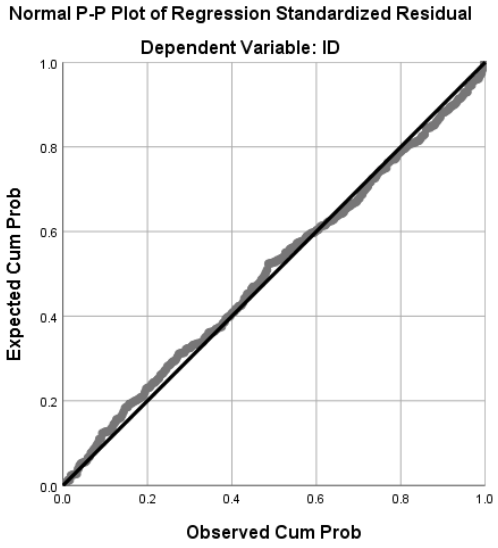
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	-.501	.415		-1.209	.228		
	HC1	-.123	.061	-.137	-2.010	.045	.277	3.606
	HC2	-.039	.055	-.042	-.698	.486	.362	2.765
	HC3	.113	.052	.139	2.165	.031	.311	3.210
	HC4	-.020	.047	-.025	-.419	.675	.372	2.686
	HC5	.006	.032	.008	.172	.863	.649	1.541
	HC6	.016	.042	.019	.381	.704	.514	1.946
	OP4	-.021	.047	-.024	-.444	.658	.441	2.267
	OP5	-.004	.035	-.006	-.120	.905	.580	1.724
	OP6	-.059	.038	-.074	-1.576	.116	.589	1.698
	OP7	.036	.031	.049	1.162	.246	.729	1.372
	OP8	-.006	.043	-.008	-.147	.884	.463	2.159
	SC1	.015	.043	.017	.342	.733	.524	1.908
	SC2	.074	.045	.081	1.624	.106	.514	1.947
	SC3	-.032	.046	-.036	-.701	.484	.480	2.085
	SC4	.058	.045	.066	1.287	.199	.498	2.008
	SC5	.001	.045	.001	.020	.984	.420	2.384
	HC7	.016	.058	.015	.274	.784	.410	2.440
	HC8	-.021	.052	-.021	-.406	.685	.493	2.027
	SC7	.035	.054	.042	.650	.516	.312	3.201
	HC10	.051	.060	.055	.849	.397	.312	3.208
	RI1	-.174	.058	-.170	-3.021	.003	.407	2.457
	RI2	-.023	.060	-.022	-.387	.699	.395	2.534
	RI3	.233	.053	.241	4.393	.000	.429	2.333
	RI4	-.066	.055	-.068	-1.200	.231	.402	2.486
	RI5	-.025	.047	-.026	-.522	.602	.525	1.906
	RI6	.038	.046	.044	.840	.402	.477	2.096
	II1	-.004	.051	-.004	-.078	.938	.465	2.151
	II2	.096	.055	.094	1.768	.078	.454	2.204
	II3	-.045	.048	-.048	-.935	.351	.482	2.073

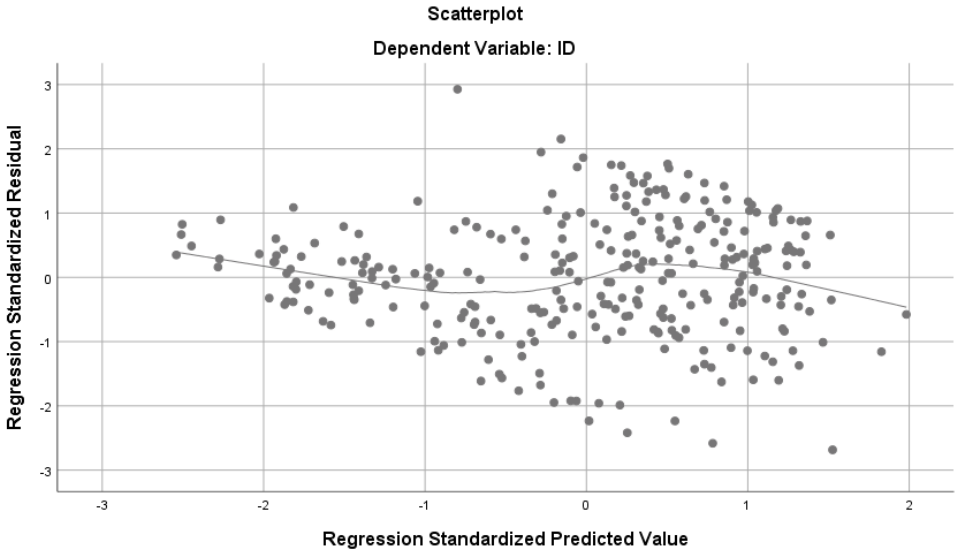
II4	-.036	.049	-.034	-.734	.464	.618	1.618
II5	.046	.054	.049	.851	.395	.390	2.562
II6	.118	.054	.123	2.211	.028	.420	2.382
RI7	.187	.053	.175	3.505	.001	.520	1.923
RI8	.105	.057	.091	1.829	.069	.522	1.916
RI10	.089	.051	.094	1.755	.080	.448	2.232
OP1	.058	.065	.052	.882	.379	.367	2.728
OP2	9.782E-5	.059	.000	.002	.999	.468	2.136
OP3	.015	.053	.016	.282	.778	.403	2.484
PR1	.146	.054	.154	2.705	.007	.398	2.515
PR2	.070	.049	.083	1.417	.158	.376	2.660
PR3	.040	.042	.046	.957	.339	.569	1.759
PR4	.058	.047	.059	1.237	.217	.568	1.762
RT1	-.042	.050	-.043	-.829	.408	.475	2.104
RT2	.096	.050	.095	1.931	.055	.536	1.865
RT3	-.125	.055	-.119	-2.260	.025	.469	2.133
RT4	.129	.054	.131	2.379	.018	.426	2.349

a. Dependent Variable: RI9

Charts


Histogram
Dependent Variable: ID
Mean = -9.79E-16
Std. Dev. = 0.917
N = 297
Frequency
50
40
30
20
10
0
-3
-2
-1
0
1
2
3
Regression Standardized Residual


Normal P-P Plot of Regression Standardized Residual
Dependent Variable: ID
Expected Cum Prob
1.0
0.8
0.6
0.4
0.2
0.0
0.0
0.2
0.4
0.6
0.8
1.0
Observed Cum Prob


Scatterplot
Dependent Variable: ID
Regression Standardized Residual
Regression Standardized Predicted Value
3
2
1
0
-1
-2
-3
-3
-2
-1
0
1
2

APPENDIX 10. The Communalities

Communalities[a]

	Initial	Extraction
HC9	.567	.585
HC10	.532	.861
SC2	.531	.558
SC3	.594	.712
SC4	.560	.544
RT2	.449	.430
RT3	.506	.581
RT4	.557	.748
PR1	.517	.543
PR2	.551	.501
PR3	.561	.593
PR4	.547	.555
OP5	.490	.628
OP6	.589	.522
OP7	.536	.507
RI9	.540	.516
RI10	.507	.708
II4	.515	.526
II5	.504	.637
II6	.502	.583

Extraction Method: Maximum Likelihood.

a. One or more communalitiy estimates greater than 1 were encountered during iterations. The resulting solution should be interpreted with caution.

APPENDIX 11. FACTOR ANALYSIS

Notes

Output Created		03-FEB-2017 16:00:00
Comments		
Input	Data	H:\Kuesioner\22012017\22012017.sav
	Active Dataset	DataSet1
	Filter	PROB_MD > 0.001 (FILTER)
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	241
Missing Value Handling	Definition of Missing	MISSING=EXCLUDE: User-defined missing values are treated as missing.
	Cases Used	LISTWISE: Statistics are based on cases with no missing values for any variable used.
Syntax		FACTOR /VARIABLES A2.8 A2.9 A1.13 A1.14 A1.15 C16 C17 C18 C4 C5 C6 C7 A1.7 A1.8 A1.9 B3.2 B3.3 B1.10 B1.11 B1.12 /MISSING LISTWISE /ANALYSIS A2.8 A2.9 A1.13 A1.14 A1.15 C16 C17 C18 C4 C5 C6 C7 A1.7 A1.8 A1.9 B3.2 B3.3 B1.10 B1.11 B1.12 /PRINT INITIAL KMO REPR EXTRACTION ROTATION /FORMAT SORT BLANK(0.3) /CRITERIA FACTORS(7) ITERATE(25) /EXTRACTION ML /CRITERIA ITERATE(25) /ROTATION PROMAX(4).
Resources	Processor Time	00:00:00.06
	Elapsed Time	00:00:00.10
	Maximum Memory Required	48768 (47.625K) bytes

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.905
Bartlett's Test of Sphericity	Approx. Chi-Square	1959.276
	df	190
	Sig.	.000

Communalities[a]

	Initial	Extraction
HC9	.567	.585
HC10	.532	.861
SC2	.431	.458
SC3	.494	.712
SC4	.460	.544
RT2	.449	.430
RT3	.506	.581
RT4	.557	.748
PR1	.417	.443
PR2	.451	.501
PR3	.361	.393
PR4	.447	.455
OP4	.490	.628
OP5	.289	.422
OP6	.336	.407
RI8	.440	.516
RI9	.507	.708
II4	.315	.426
II5	.504	.637
II6	.502	.583

Extraction Method: Maximum Likelihood.

a. One or more communalitiy estimates greater than 1 were encountered during iterations. The resulting solution should be interpreted with caution.

Total Variance Explained

Factor	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings[a]
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total
1	7.417	37.086	37.086	6.880	34.402	34.402	5.838
2	1.762	8.809	45.895	1.312	6.561	40.963	5.232
3	1.291	6.456	52.351	.628	3.141	44.104	3.586
4	1.037	5.186	57.537	.823	4.114	48.218	4.108
5	.982	4.908	62.446	.559	2.793	51.012	3.468
6	.823	4.117	66.563	.483	2.414	53.425	3.620
7	.714	3.570	70.134	.351	1.757	55.182	4.575
8	.704	3.522	73.655				
9	.684	3.422	77.077				
10	.638	3.192	80.269				
11	.579	2.893	83.162				
12	.493	2.467	85.630				
13	.473	2.363	87.993				
14	.412	2.061	90.054				
15	.404	2.019	92.073				
16	.365	1.824	93.896				
17	.335	1.674	95.571				
18	.312	1.562	97.133				
19	.295	1.475	98.608				
20	.278	1.392	100.000				

Extraction Method: Maximum Likelihood.

a. When factors are correlated, sums of squared loadings cannot be added to obtain a total variance.

Factor Matrix[a]

	Factor						
	1	2	3	4	5	6	7
HC10	.785		-.479				
HC9	.734						
RT4	.704			-.359			
RI9	.660						
PR2	.642						
RT3	.624		.303				
RT2	.623						
PR1	.614						
II6	.608	-.340					
PR4	.603						
II5	.598	-.380					
OP4	.591			.382			
RI8	.569						
PR3	.525						
SC2	.523	.375					
OP6	.385			.358			
II4	.378						
SC3	.523	.583					
SC4	.500	.520					
OP5	.315			.315			

Extraction Method: Maximum Likelihood.

a. Attempted to extract 7 factors. More than 25 iterations required. (Convergence=.001). Extraction was terminated.

Reproduced Correlations

		HC9	HC10	SC2	SC3	SC4	RT2	RT3	RT4	PR1	PR2	PR3	PR4	OP4	OP5	OP6	RI8	RI9	II4	II5	II6
Reproduced Correlation	HC9	.585[a]	.640	.357	.357	.359	.426	.406	.466	.449	.465	.388	.439	.480	.251	.330	.343	.408	.313	.440	.465
	HC10	.640	.861[a]	.363	.353	.368	.433	.355	.497	.460	.432	.377	.414	.394	.160	.215	.333	.442	.274	.420	.439
	SC2	.357	.363	.458[a]	.555	.463	.326	.357	.367	.314	.323	.255	.291	.294	.221	.210	.256	.277	.109	.210	.210
	SC3	.357	.353	.555	.712[a]	.579	.310	.346	.323	.320	.318	.259	.292	.298	.258	.227	.209	.224	.086	.169	.167
	SC4	.359	.368	.463	.579	.544[a]	.277	.255	.278	.305	.279	.257	.278	.375	.334	.273	.240	.271	.082	.123	.128
	RT2	.426	.433	.326	.310	.277	.430[a]	.468	.530	.362	.408	.299	.358	.335	.175	.217	.406	.443	.224	.389	.388
	RT3	.406	.355	.357	.346	.255	.468	.581[a]	.615	.359	.454	.290	.356	.319	.136	.229	.408	.401	.205	.403	.413
	RT4	.466	.497	.367	.323	.278	.530	.615	.748[a]	.358	.446	.267	.332	.346	.166	.225	.479	.476	.183	.385	.397
	PR1	.449	.460	.314	.320	.305	.362	.359	.358	.443[a]	.452	.409	.440	.385	.161	.241	.362	.438	.203	.364	.382
	PR2	.465	.432	.323	.318	.279	.408	.454	.446	.452	.501[a]	.413	.452	.413	.157	.281	.381	.425	.216	.397	.428
	PR3	.388	.377	.255	.259	.257	.299	.290	.267	.409	.413	.393[a]	.412	.362	.144	.230	.318	.392	.171	.312	.335
	PR4	.439	.414	.291	.292	.278	.358	.356	.332	.440	.452	.412	.455[a]	.388	.173	.251	.367	.449	.257	.414	.422
	OP4	.480	.394	.294	.298	.375	.335	.319	.346	.385	.413	.362	.388	.628[a]	.428	.485	.328	.343	.225	.263	.316
	OP5	.251	.160	.221	.258	.334	.175	.136	.166	.161	.157	.144	.173	.428	.422[a]	.352	.193	.190	.154	.100	.108
	OP6	.330	.215	.210	.227	.273	.217	.229	.225	.241	.281	.230	.251	.485	.352	.407[a]	.179	.157	.178	.171	.218
	RI8	.343	.333	.256	.209	.240	.406	.408	.479	.362	.381	.318	.367	.328	.193	.179	.516[a]	.585	.164	.339	.322
	RI9	.408	.442	.277	.224	.271	.443	.401	.476	.438	.425	.392	.449	.343	.190	.157	.585	.708[a]	.223	.427	.392
	II4	.313	.274	.109	.086	.082	.224	.205	.183	.203	.216	.171	.257	.225	.154	.178	.164	.223	.426[a]	.473	.435
	II5	.440	.420	.210	.169	.123	.389	.403	.385	.364	.397	.312	.414	.263	.100	.171	.339	.427	.473	.637[a]	.597
	II6	.465	.439	.210	.167	.128	.388	.413	.397	.382	.428	.335	.422	.316	.108	.218	.322	.392	.435	.597	.583[a]
Residual[b]	HC9		-5.434E-5	.035	-.012	.003	-.003	-.008	.008	-.053	-.014	.017	.065	-.016	-.001	.011	.001	-.001	.016	-.036	.027
	HC10	-5.434E-5		-.002	-.002	.002	.007	.003	-.002	.006	-.002	.001	-.004	.001	.001	-.003	.001	-.002	-.002	.004	-.004
	SC2	.035	-.002		-.001	.007	-.043	.039	-.012	-.009	-.050	-.060	.047	.019	-.033	.007	-.003	.013	-.037	.010	.004
	SC3	-.012	-.002	-.001		.000	.026	-.021	.008	.022	.005	.017	-.017	.003	.010	-.020	8.296E-6	-.009	.012	-.006	.007
	SC4	.003	.002	.007	.000		-.055	.009	.000	-.023	.036	-.010	-.015	-.017	-.004	.037	-.006	.017	.006	.001	-.005
	RT2	-.003	.007	-.043	.026	-.055		.034	-.004	.019	-.034	-.023	.073	-.020	.038	.034	-.024	.008	-.014	.020	-.053
	RT3	-.008	.003	.039	-.021	.009	.034		-.008	-.045	-.006	.039	.015	-.015	.018	.010	.009	-.012	-.029	.011	.005
	RT4	.008	-.002	-.012	.008	.000	-.004	-.008		.010	.018	-.005	-.033	.009	-.007	-.014	.009	.000	.008	-.002	.002
	PR1	-.053	.006	-.009	.022	-.023	.019	-.045	.010		.046	-.009	-.036	.014	-.023	.035	-.002	.006	.009	.020	-.013
	PR2	-.014	-.002	-.050	.005	.036	-.034	-.006	.018	.046		.009	-.029	-.009	-.022	.020	-.010	.006	.033	-.011	.008
	PR3	.017	.001	-.060	.017	-.010	-.023	.039	-.005	-.009	.009		.023	.023	.038	-.087	.003	-.009	.013	.001	-.026
	PR4	.065	-.004	.047	-.017	-.015	.073	.015	-.033	-.036	-.029	.023		-.031	.010	.021	.050	-.020	-.031	.000	-.005
	OP4	-.016	.001	.019	.003	-.017	-.020	-.015	.009	.014	-.009	.023	-.031		.023	.007	-.018	.007	-.037	.015	.024
	OP5	-.001	.001	-.033	.010	-.004	.038	.018	-.007	-.023	-.022	.038	.010	.023		-.042	.008	-.012	.012	.005	-.022
	OP6	.011	-.003	.007	-.020	.037	.034	.010	-.014	.035	.020	-.087	.021	.007	-.042		.006	-.002	.033	-.012	-.021
	RI8	.001	.001	-.003	8.296E-6	-.006	-.024	.009	.009	-.002	-.010	.003	.050	-.018	.008	.006		-.001	.038	-.029	-.004
	RI9	-.001	-.002	.013	-.009	.017	.008	-.012	.000	.006	.006	-.009	-.020	.007	-.012	-.002	-.001		-.013	.005	.014
	II4	.016	-.002	-.037	.012	.006	-.014	-.029	.008	.009	.033	.013	-.031	-.037	.012	.033	.038	-.013		.004	.002
	II5	-.036	.004	.010	-.006	.001	.020	.011	-.002	.020	-.011	.001	.000	.015	.005	-.012	-.029	.005	.004		.000
	II6	.027	-.004	.004	.007	-.005	-.053	.005	.002	-.013	.008	-.026	-.005	.024	-.022	-.021	-.004	.014	.002	.000	

Extraction Method: Maximum Likelihood.

a. Reproduced communalities

b. Residuals are computed between observed and reproduced correlations. There are 8 (4.0%) nonredundant residuals with absolute values greater than 0.05.

EXPLORATORY FACTOR ANALYSIS

Pattern Matrix[a]

	Factor						
	1	2	3	4	5	6	7
PR3	.694						
PR2	.596						
PR4	.579						
PR1	.577						
RT4		.922					
RT3		.742					
RT2		.418					
SC3			.865				
SC4			.608				
SC2			.579				
II4				.762			
II5				.715			
II6				.557			
OP5					.657		
OP4					.652		
OP6					.612		
RI9						.707	
RI8						.541	
HC10							.945
HC9							.408

Extraction Method: Maximum Likelihood.

Rotation Method: Promax with Kaiser Normalization.[a]

a. Rotation converged in 7 iterations.

Structure Matrix

	Factor						
	1	2	3	4	5	6	7
PR2	.693	.588	.368	.456	.384	.404	.470
PR4	.661	.457	.350	.488	.369	.445	.452
PR1	.653	.472	.385	.418	.361	.435	.499
PR3	.613	.375	.311	.358	.337	.384	.412
RT4	.517	.843	.390	.421	.339	.520	.542
RT3	.552	.750	.393	.452		.406	.384
RT2	.526	.628	.376	.446	.333	.473	.472
SC3	.415	.404	.837		.379		.388
SC4	.381	.319	.711		.492	.319	.422
SC2	.419	.443	.659		.347		.399
II5	.572	.525		.789		.406	.444
II6	.611	.543		.739		.350	.468
II4	.330			.626			.302
OP4	.580	.433	.384	.348	.761	.355	.475
OP6	.384				.616		
OP5			.350		.613		
RI9	.601	.550	.314	.463	.313	.821	.484
RI8	.507	.551		.362	.322	.683	.372
HC10	.623	.554	.443	.505	.373	.432	.924
HC9	.656	.569	.435	.544	.507	.390	.703

Extraction Method: Maximum Likelihood.

Rotation Method: Promax with Kaiser Normalization.

Factor Correlation Matrix

Factor	1	2	3	4	5	6	7
1	1.000	.714	.483	.667	.531	.563	.676
2	.714	1.000	.468	.588	.406	.566	.600
3	.483	.468	1.000	.216	.499	.356	.494
4	.667	.588	.216	1.000	.322	.423	.540
5	.531	.406	.499	.322	1.000	.352	.479
6	.563	.566	.356	.423	.352	1.000	.481
7	.676	.600	.494	.540	.479	.481	1.000

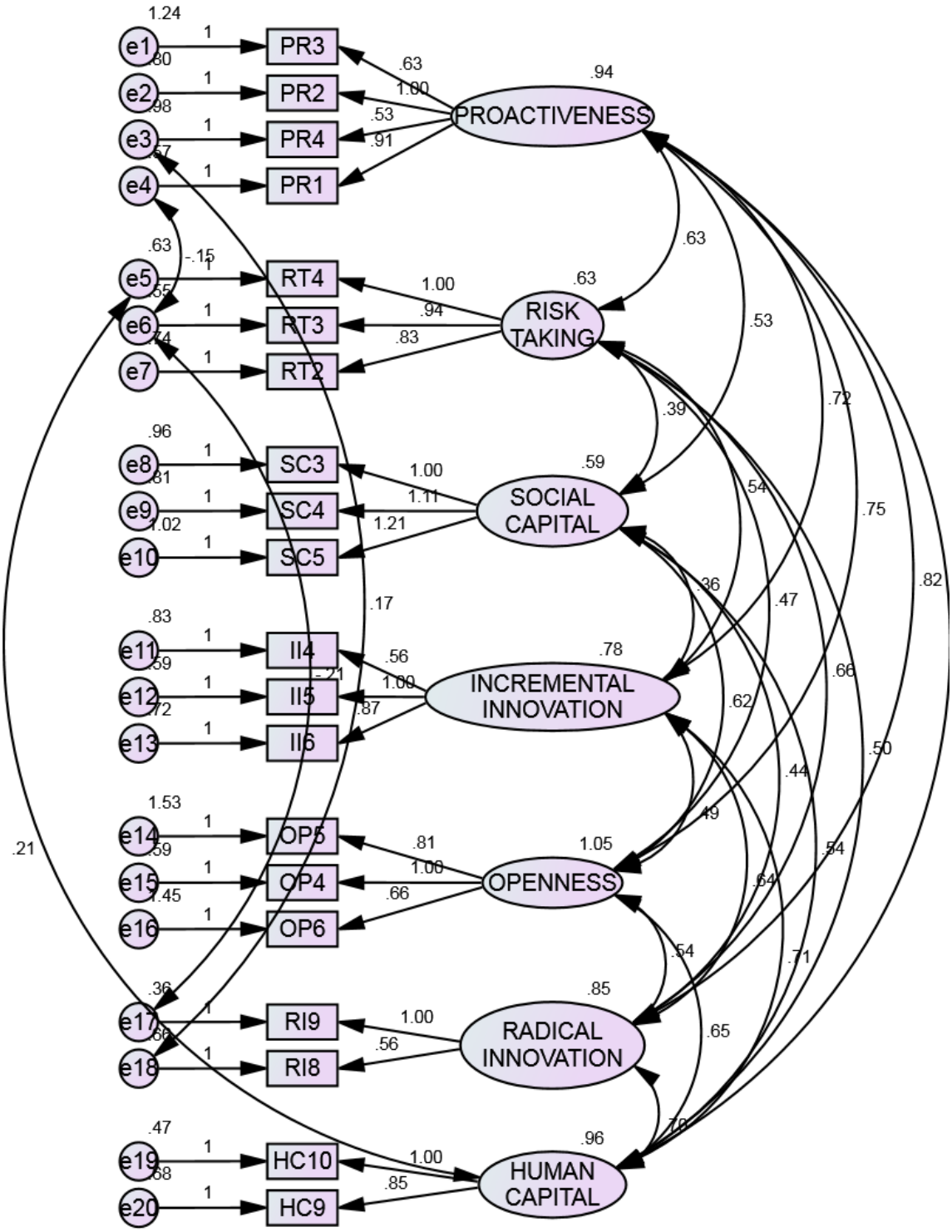
Extraction Method: Maximum Likelihood.

Rotation Method: Promax with Kaiser Normalization.

APPENDIX 12. AVE AND CR

Scale Items		Standard Loading	square	1-square	Count	SUM SL	Sum Square	1-square	AVE	CR
HC9	In my company, people identify skills they need for future work tasks.	0.889	0.790321	0.209679	2	1.778	3.161284	0.419358	0.889	0.882882
HC10	In my company, people view problems in their work as an opportunity to learn.	0.889	0.790321	0.209679						
SC2	There is a total agreement on this company's vision across all levels, functions, and divisions.	0.784	0.614656	0.385344	3	2.39	5.7121	1.095438	0.796666667	0.839085
SC3	All employees are committed to the goals of this company.	0.815	0.664225	0.335775						
SC4	Employees view themselves as partners in charting the direction of the company.	0.791	0.625681	0.374319						
RT2	This company encourages innovative strategies, knowing well that some will fail.	0.779	0.606841	0.393159	3	2.395	5.736025	1.086549	0.798333333	0.840742
RT3	This company does not like to "play it safe".	0.829	0.687241	0.312759						
RT4	This company likes to take big risks.	0.787	0.619369	0.380631						
PR1	Managers are constantly seeking new opportunities for the company.	0.816	0.665856	0.334144	4	2.865	8.208225	1.909799	0.71625	0.811248
PR2	Managers take the initiative to shape the environment to the company's advantage.	0.81	0.6561	0.3439						
PR3	Managers are often the first to introduce new services	0.638	0.407044	0.592956						
PR4	Managers usually take the initiative by introducing new administrative techniques.	0.601	0.361201	0.638799						
OP4	This company is always moving toward the development of new answers.	0.82	0.6724	0.3276	3	2.283	5.212089	1.255555	0.761	0.805871
OP5	This company is open and responsive to changes	0.762	0.580644	0.419356						
OP6	This company's, manager is always searching for fresh, new ways of looking at problems	0.701	0.491401	0.508599						
RI8	Learned product development skills and processes entirely new to the company.	0.851	0.724201	0.275799	2	1.702	2.896804	0.551598	0.851	0.840042
RI9	Acquired entirely new managerial and organizational skills that are important for innovation	0.851	0.724201	0.275799						
II4	Constantly surveys existing customers' satisfaction	0.734	0.538756	0.461244	3	2.334	5.447556	1.179322	0.778	0.82204
II5	Fine-tunes what it offers to keep its current customers satisfied	0.831	0.690561	0.309439						
II6	Upgraded skills in product development processes in which the company already possesses significant experience	0.769	0.591361	0.408639						

APPENDIX 13. CONFIRMATORY FACTOR ANALYSIS (CFA)



Model Fit Summary

CMIN

Model	NPAR	CMIN	DF	P	CMIN/DF
Default model	65	282.874	145	.000	1.951
Saturated model	210	.000	0		
Independence model	20	2354.334	190	.000	12.391

RMR, GFI

Model	RMR	GFI	AGFI	PGFI
Default model	.067	.914	.876	.631
Saturated model	.000	1.000		
Independence model	.468	.309	.236	.279

Baseline Comparisons

Model	NFI Delta1	RFI rho1	IFI Delta2	TLI rho2	CFI
Default model	.880	.843	.938	.917	.936
Saturated model	1.000		1.000		1.000
Independence model	.000	.000	.000	.000	.000

Parsimony-Adjusted Measures

Model	PRATIO	PNFI	PCFI
Default model	.763	.671	.715
Saturated model	.000	.000	.000
Independence model	1.000	.000	.000

NCP

Model	NCP	LO 90	HI 90
Default model	137.874	94.011	189.534
Saturated model	.000	.000	.000
Independence model	2164.334	2011.602	2324.442

FMIN

Model	FMIN	F0	LO 90	HI 90
Default model	.956	.466	.318	.640
Saturated model	.000	.000	.000	.000
Independence model	7.954	7.312	6.796	7.853

RMSEA

Model	RMSEA	LO 90	HI 90	PCLOSE
Default model	.057	.047	.066	.129
Independence model	.196	.189	.203	.000

AIC

Model	AIC	BCC	BIC	CAIC
Default model	412.874	422.801	652.967	717.967
Saturated model	420.000	452.073	1195.684	1405.684
Independence model	2394.334	2397.388	2468.208	2488.208

ECVI

Model	ECVI	LO 90	HI 90	MECVI
Default model	1.395	1.247	1.569	1.428
Saturated model	1.419	1.419	1.419	1.527
Independence model	8.089	7.573	8.630	8.099

HOELTER

Model	HOELTER .05	HOELTER .01
Default model	183	197
Independence model	29	30

Estimates (Group number 1 - Default model)
Scalar Estimates (Group number 1 - Default model)
Maximum Likelihood Estimates
Regression Weights: (Group number 1 - Default model)

			Estimate	S.E.	C.R.	P	Label
C6	<---	PROACTIVENESS	.628	.079	7.964	***	
C5	<---	PROACTIVENESS	1.000				
C7	<---	PROACTIVENESS	.528	.069	7.615	***	
C4	<---	PROACTIVENESS	.906	.071	12.679	***	
C18	<---	RISK_TAKING	1.000				
C17	<---	RISK_TAKING	.937	.091	10.341	***	
C16	<---	RISK_TAKING	.831	.087	9.592	***	
A1.14	<---	SOCIAL_CAPITAL	1.000				
A1.15	<---	SOCIAL_CAPITAL	1.114	.128	8.721	***	
A1.16	<---	SOCIAL_CAPITAL	1.208	.140	8.638	***	
B1.10	<---	INCREMENTAL_INNOVATION	.564	.075	7.511	***	
B1.11	<---	INCREMENTAL_INNOVATION	1.000				
B1.12	<---	INCREMENTAL_INNOVATION	.874	.084	10.469	***	
A1.8	<---	OPENNESS	.806	.097	8.290	***	
A1.7	<---	OPENNESS	1.000				
A1.9	<---	OPENNESS	.663	.089	7.406	***	
B3.3	<---	RADICAL_INNOVATION	1.000				
B3.2	<---	RADICAL_INNOVATION	.562	.062	8.991	***	
A2.9	<---	HUMAN_CAPITAL	1.000				
A2.8	<---	HUMAN_CAPITAL	.847	.069	12.293	***	

Standardized Regression Weights: (Group number 1 - Default model)

			Estimate
C6	<---	PROACTIVENESS	.480
C5	<---	PROACTIVENESS	.736
C7	<---	PROACTIVENESS	.459
C4	<---	PROACTIVENESS	.759
C18	<---	RISK_TAKING	.709
C17	<---	RISK_TAKING	.709
C16	<---	RISK_TAKING	.608
A1.14	<---	SOCIAL_CAPITAL	.617
A1.15	<---	SOCIAL_CAPITAL	.688
A1.16	<---	SOCIAL_CAPITAL	.677
B1.10	<---	INCREMENTAL_INNOVATION	.480
B1.11	<---	INCREMENTAL_INNOVATION	.755
B1.12	<---	INCREMENTAL_INNOVATION	.674
A1.8	<---	OPENNESS	.555
A1.7	<---	OPENNESS	.800
A1.9	<---	OPENNESS	.491
B3.3	<---	RADICAL_INNOVATION	.837
B3.2	<---	RADICAL_INNOVATION	.536
A2.9	<---	HUMAN_CAPITAL	.820
A2.8	<---	HUMAN_CAPITAL	.708

Covariances: (Group number 1 - Default model)

			Estimate	S.E.	C.R.	P	Label
PROACTIVENESS	<-->	RISK_TAKING	.631	.083	7.580	***	
PROACTIVENESS	<-->	SOCIAL_CAPITAL	.526	.081	6.481	***	
PROACTIVENESS	<-->	INCREMENTAL_INNOVATION	.718	.091	7.910	***	
PROACTIVENESS	<-->	OPENNESS	.751	.099	7.617	***	
PROACTIVENESS	<-->	RADICAL_INNOVATION	.821	.093	8.831	***	
PROACTIVENESS	<-->	HUMAN_CAPITAL	.810	.096	8.409	***	
RISK_TAKING	<-->	SOCIAL_CAPITAL	.386	.065	5.939	***	
RISK_TAKING	<-->	INCREMENTAL_INNOVATION	.538	.074	7.271	***	
RISK_TAKING	<-->	OPENNESS	.468	.076	6.115	***	
RISK_TAKING	<-->	RADICAL_INNOVATION	.661	.079	8.357	***	
RISK_TAKING	<-->	HUMAN_CAPITAL	.500	.080	6.238	***	
SOCIAL_CAPITAL	<-->	INCREMENTAL_INNOVATION	.359	.067	5.354	***	
SOCIAL_CAPITAL	<-->	OPENNESS	.615	.089	6.909	***	
SOCIAL_CAPITAL	<-->	RADICAL_INNOVATION	.436	.071	6.173	***	
SOCIAL_CAPITAL	<-->	HUMAN_CAPITAL	.537	.080	6.749	***	
INCREMENTAL_INNOVATION	<-->	OPENNESS	.492	.083	5.934	***	
INCREMENTAL_INNOVATION	<-->	RADICAL_INNOVATION	.635	.080	7.968	***	
INCREMENTAL_INNOVATION	<-->	HUMAN_CAPITAL	.706	.086	8.160	***	
OPENNESS	<-->	RADICAL_INNOVATION	.543	.083	6.522	***	
OPENNESS	<-->	HUMAN_CAPITAL	.654	.091	7.197	***	
RADICAL_INNOVATION	<-->	HUMAN_CAPITAL	.702	.084	8.382	***	
e5	<-->	HUMAN_CAPITAL	.212	.047	4.545	***	
e6	<-->	e17	-.209	.042	-4.945	***	
e3	<-->	e18	.173	.050	3.446	***	
e4	<-->	e6	-.155	.042	-3.670	***	

Correlations: (Group number 1 - Default model)

			Estimate
PROACTIVENESS	<-->	RISK_TAKING	.817
PROACTIVENESS	<-->	SOCIAL_CAPITAL	.707
PROACTIVENESS	<-->	INCREMENTAL_INNOVATION	.837
PROACTIVENESS	<-->	OPENNESS	.755
PROACTIVENESS	<-->	RADICAL_INNOVATION	.918
PROACTIVENESS	<-->	HUMAN_CAPITAL	.854
RISK_TAKING	<-->	SOCIAL_CAPITAL	.632
RISK_TAKING	<-->	INCREMENTAL_INNOVATION	.765
RISK_TAKING	<-->	OPENNESS	.573
RISK_TAKING	<-->	RADICAL_INNOVATION	.901
RISK_TAKING	<-->	HUMAN_CAPITAL	.643
SOCIAL_CAPITAL	<-->	INCREMENTAL_INNOVATION	.529
SOCIAL_CAPITAL	<-->	OPENNESS	.783
SOCIAL_CAPITAL	<-->	RADICAL_INNOVATION	.617
SOCIAL_CAPITAL	<-->	HUMAN_CAPITAL	.716
INCREMENTAL_INNOVATION	<-->	OPENNESS	.543
INCREMENTAL_INNOVATION	<-->	RADICAL_INNOVATION	.781
INCREMENTAL_INNOVATION	<-->	HUMAN_CAPITAL	.817
OPENNESS	<-->	RADICAL_INNOVATION	.576
OPENNESS	<-->	HUMAN_CAPITAL	.653
RADICAL_INNOVATION	<-->	HUMAN_CAPITAL	.780
e5	<-->	HUMAN_CAPITAL	.274
e6	<-->	e17	-.467
e3	<-->	e18	.214
e4	<-->	e6	-.277

Variances: (Group number 1 - Default model)

	Estimate	S.E.	C.R.	P	Label
PROACTIVENESS	.942	.134	7.025	***	
RISK_TAKING	.634	.098	6.442	***	
SOCIAL_CAPITAL	.589	.113	5.230	***	
INCREMENTAL_INNOVATION	.781	.115	6.802	***	
OPENNESS	1.049	.153	6.848	***	
RADICAL_INNOVATION	.848	.117	7.258	***	
HUMAN_CAPITAL	.955	.123	7.778	***	
e1	1.240	.105	11.760	***	
e2	.797	.078	10.179	***	
e3	.984	.083	11.805	***	
e4	.569	.059	9.586	***	
e5	.627	.065	9.615	***	
e6	.551	.061	9.078	***	
e7	.744	.068	10.910	***	
e8	.957	.094	10.143	***	
e9	.813	.089	9.145	***	
e10	1.016	.109	9.332	***	
e11	.829	.073	11.374	***	
e12	.589	.072	8.178	***	
e13	.716	.073	9.828	***	
e14	1.535	.143	10.721	***	
e15	.591	.100	5.906	***	
e16	1.448	.130	11.145	***	
e17	.363	.075	4.874	***	
e18	.662	.057	11.539	***	
e19	.466	.067	7.004	***	
e20	.683	.068	9.986	***	

Matrices (Group number 1 - Default model)

Total Effects (Group number 1 - Default model)

	HUMAN CAPITAL	RADICAL INNOVATION	OPENNESS	INCREMENTAL INNOVATION	SOCIAL CAPITAL	RISK TAKING	PROACTIVENESS
A2.8	.847	.000	.000	.000	.000	.000	.000
A2.9	1.000	.000	.000	.000	.000	.000	.000
B3.2	.000	.562	.000	.000	.000	.000	.000
B3.3	.000	1.000	.000	.000	.000	.000	.000
A1.9	.000	.000	.663	.000	.000	.000	.000
A1.7	.000	.000	1.000	.000	.000	.000	.000
A1.8	.000	.000	.806	.000	.000	.000	.000
B1.12	.000	.000	.000	.874	.000	.000	.000
B1.11	.000	.000	.000	1.000	.000	.000	.000
B1.10	.000	.000	.000	.564	.000	.000	.000
A1.16	.000	.000	.000	.000	1.208	.000	.000
A1.15	.000	.000	.000	.000	1.114	.000	.000
A1.14	.000	.000	.000	.000	1.000	.000	.000
C16	.000	.000	.000	.000	.000	.831	.000
C17	.000	.000	.000	.000	.000	.937	.000
C18	.000	.000	.000	.000	.000	1.000	.000
C4	.000	.000	.000	.000	.000	.000	.906
C7	.000	.000	.000	.000	.000	.000	.528
C5	.000	.000	.000	.000	.000	.000	1.000
C6	.000	.000	.000	.000	.000	.000	.628

Standardized Total Effects (Group number 1 - Default model)

	HUMAN CAPITAL	RADICAL INNOVATION	OPENNESS	INCREMENTAL INNOVATION	SOCIAL CAPITAL	RISK TAKING	PROACTIVENESS
A2.8	.708	.000	.000	.000	.000	.000	.000
A2.9	.820	.000	.000	.000	.000	.000	.000
B3.2	.000	.536	.000	.000	.000	.000	.000
B3.3	.000	.837	.000	.000	.000	.000	.000
A1.9	.000	.000	.491	.000	.000	.000	.000
A1.7	.000	.000	.800	.000	.000	.000	.000
A1.8	.000	.000	.555	.000	.000	.000	.000
B1.12	.000	.000	.000	.674	.000	.000	.000
B1.11	.000	.000	.000	.755	.000	.000	.000
B1.10	.000	.000	.000	.480	.000	.000	.000
A1.16	.000	.000	.000	.000	.677	.000	.000
A1.15	.000	.000	.000	.000	.688	.000	.000
A1.14	.000	.000	.000	.000	.617	.000	.000
C16	.000	.000	.000	.000	.000	.608	.000
C17	.000	.000	.000	.000	.000	.709	.000
C18	.000	.000	.000	.000	.000	.709	.000
C4	.000	.000	.000	.000	.000	.000	.759
C7	.000	.000	.000	.000	.000	.000	.459
C5	.000	.000	.000	.000	.000	.000	.736
C6	.000	.000	.000	.000	.000	.000	.480

Direct Effects (Group number 1 - Default model)

	HUMAN CAPITAL	RADICAL INNOVATION	OPENNESS	INCREMENTAL INNOVATION	SOCIAL CAPITAL	RISK TAKING	PROACTIVENESS
A2.8	.847	.000	.000	.000	.000	.000	.000
A2.9	1.000	.000	.000	.000	.000	.000	.000
B3.2	.000	.562	.000	.000	.000	.000	.000
B3.3	.000	1.000	.000	.000	.000	.000	.000
A1.9	.000	.000	.663	.000	.000	.000	.000
A1.7	.000	.000	1.000	.000	.000	.000	.000
A1.8	.000	.000	.806	.000	.000	.000	.000
B1.12	.000	.000	.000	.874	.000	.000	.000
B1.11	.000	.000	.000	1.000	.000	.000	.000
B1.10	.000	.000	.000	.564	.000	.000	.000
A1.16	.000	.000	.000	.000	1.208	.000	.000
A1.15	.000	.000	.000	.000	1.114	.000	.000
A1.14	.000	.000	.000	.000	1.000	.000	.000
C16	.000	.000	.000	.000	.000	.831	.000
C17	.000	.000	.000	.000	.000	.937	.000
C18	.000	.000	.000	.000	.000	1.000	.000
C4	.000	.000	.000	.000	.000	.000	.906
C7	.000	.000	.000	.000	.000	.000	.528
C5	.000	.000	.000	.000	.000	.000	1.000
C6	.000	.000	.000	.000	.000	.000	.628

Standardized Direct Effects (Group number 1 - Default model)

	HUMAN CAPITAL	RADICAL INNOVATION	OPENNESS	INCREMENTAL INNOVATION	SOCIAL CAPITAL	RISK TAKING	PROACTIVENESS
A2.8	.708	.000	.000	.000	.000	.000	.000
A2.9	.820	.000	.000	.000	.000	.000	.000
B3.2	.000	.536	.000	.000	.000	.000	.000
B3.3	.000	.837	.000	.000	.000	.000	.000
A1.9	.000	.000	.491	.000	.000	.000	.000
A1.7	.000	.000	.800	.000	.000	.000	.000
A1.8	.000	.000	.555	.000	.000	.000	.000
B1.12	.000	.000	.000	.674	.000	.000	.000
B1.11	.000	.000	.000	.755	.000	.000	.000
B1.10	.000	.000	.000	.480	.000	.000	.000
A1.16	.000	.000	.000	.000	.677	.000	.000
A1.15	.000	.000	.000	.000	.688	.000	.000
A1.14	.000	.000	.000	.000	.617	.000	.000
C16	.000	.000	.000	.000	.000	.608	.000
C17	.000	.000	.000	.000	.000	.709	.000
C18	.000	.000	.000	.000	.000	.709	.000
C4	.000	.000	.000	.000	.000	.000	.759
C7	.000	.000	.000	.000	.000	.000	.459
C5	.000	.000	.000	.000	.000	.000	.736
C6	.000	.000	.000	.000	.000	.000	.480

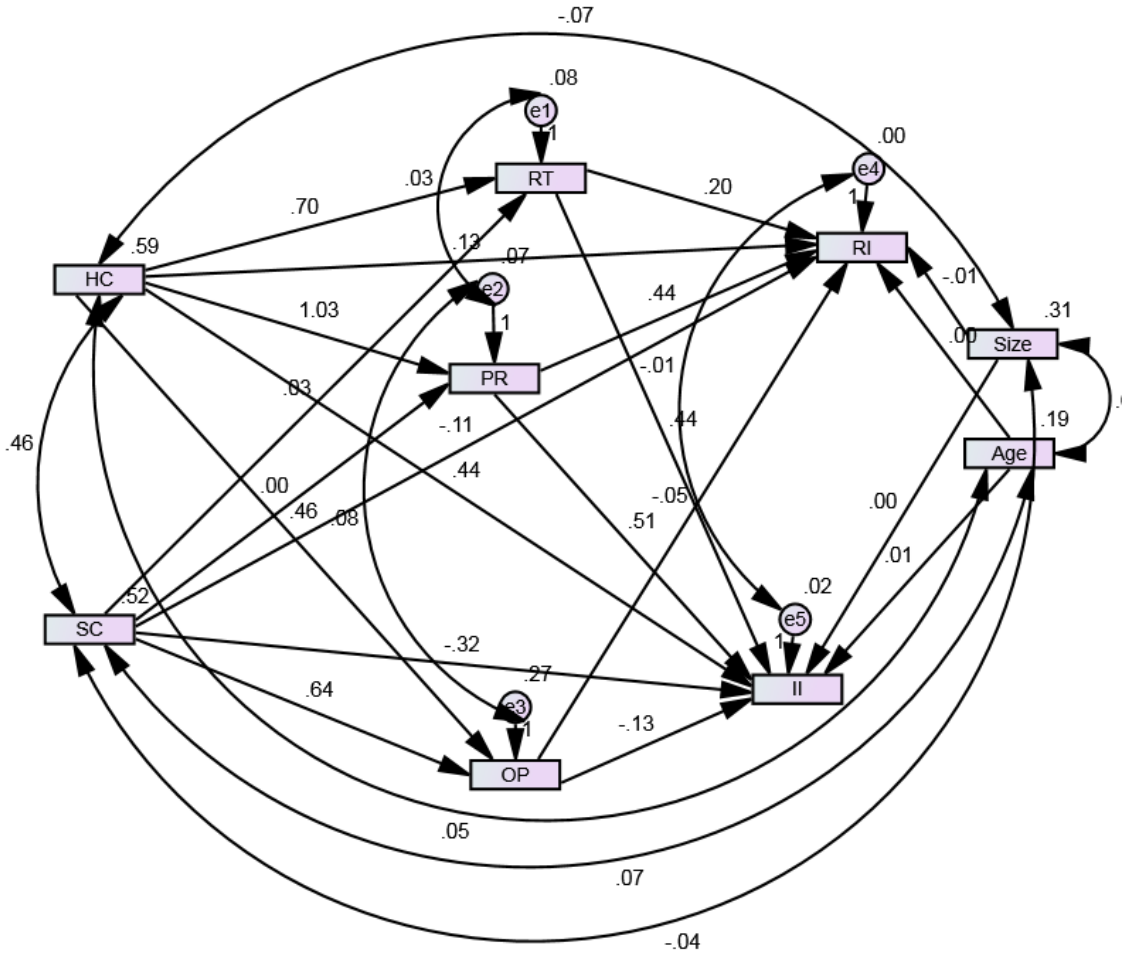
Indirect Effects (Group number 1 - Default model)

	HUMAN CAPITAL	RADICAL INNOVATION	OPENNESS	INCREMENTAL INNOVATION	SOCIAL CAPITAL	RISK TAKING	PROACTIVENESS
A2.8	.000	.000	.000	.000	.000	.000	.000
A2.9	.000	.000	.000	.000	.000	.000	.000
B3.2	.000	.000	.000	.000	.000	.000	.000
B3.3	.000	.000	.000	.000	.000	.000	.000
A1.9	.000	.000	.000	.000	.000	.000	.000
A1.7	.000	.000	.000	.000	.000	.000	.000
A1.8	.000	.000	.000	.000	.000	.000	.000
B1.12	.000	.000	.000	.000	.000	.000	.000
B1.11	.000	.000	.000	.000	.000	.000	.000
B1.10	.000	.000	.000	.000	.000	.000	.000
A1.16	.000	.000	.000	.000	.000	.000	.000
A1.15	.000	.000	.000	.000	.000	.000	.000
A1.14	.000	.000	.000	.000	.000	.000	.000
C16	.000	.000	.000	.000	.000	.000	.000
C17	.000	.000	.000	.000	.000	.000	.000
C18	.000	.000	.000	.000	.000	.000	.000
C4	.000	.000	.000	.000	.000	.000	.000
C7	.000	.000	.000	.000	.000	.000	.000
C5	.000	.000	.000	.000	.000	.000	.000
C6	.000	.000	.000	.000	.000	.000	.000

Standardized Indirect Effects (Group number 1 - Default model)

	HUMAN CAPITAL	RADICAL INNOVATION	OPENNESS	INCREMENTAL INNOVATION	SOCIAL CAPITAL	RISK TAKING	PROACTIVENESS
A2.8	.000	.000	.000	.000	.000	.000	.000
A2.9	.000	.000	.000	.000	.000	.000	.000
B3.2	.000	.000	.000	.000	.000	.000	.000
B3.3	.000	.000	.000	.000	.000	.000	.000
A1.9	.000	.000	.000	.000	.000	.000	.000
A1.7	.000	.000	.000	.000	.000	.000	.000
A1.8	.000	.000	.000	.000	.000	.000	.000
B1.12	.000	.000	.000	.000	.000	.000	.000
B1.11	.000	.000	.000	.000	.000	.000	.000
B1.10	.000	.000	.000	.000	.000	.000	.000
A1.16	.000	.000	.000	.000	.000	.000	.000
A1.15	.000	.000	.000	.000	.000	.000	.000
A1.14	.000	.000	.000	.000	.000	.000	.000
C16	.000	.000	.000	.000	.000	.000	.000
C17	.000	.000	.000	.000	.000	.000	.000
C18	.000	.000	.000	.000	.000	.000	.000
C4	.000	.000	.000	.000	.000	.000	.000
C7	.000	.000	.000	.000	.000	.000	.000
C5	.000	.000	.000	.000	.000	.000	.000
C6	.000	.000	.000	.000	.000	.000	.000

APPENDIX 14. STRUCTURAL EQUATION MODELING (SEM)



Model Fit Summary

CMIN

Model	NPAR	CMIN	DF	P	CMIN/DF
Default model	38	14.220	7	.047	2.031
Saturated model	45	.000	0		
Independence model	9	4410.203	36	.000	122.506

RMR, GFI

Model	RMR	GFI	AGFI	PGFI
Default model	.008	.989	.931	.154
Saturated model	.000	1.000		
Independence model	.315	.227	.034	.181

Baseline Comparisons

Model	NFI Delta1	RFI rho1	IFI Delta2	TLI rho2	CFI
Default model	.997	.983	.998	.992	.998
Saturated model	1.000		1.000		1.000
Independence model	.000	.000	.000	.000	.000

Parsimony-Adjusted Measures

Model	PRATIO	PNFI	PCFI
Default model	.194	.194	.194
Saturated model	.000	.000	.000
Independence model	1.000	.000	.000

NCP

Model	NCP	LO 90	HI 90
Default model	7.220	.076	22.065
Saturated model	.000	.000	.000
Independence model	4374.203	4159.710	4595.934

FMIN

Model	FMIN	F0	LO 90	HI 90
Default model	.048	.024	.000	.075
Saturated model	.000	.000	.000	.000
Independence model	14.899	14.778	14.053	15.527

RMSEA

Model	RMSEA	LO 90	HI 90	PCLOSE
Default model	.059	.006	.103	.318
Independence model	.641	.625	.657	.000

AIC

Model	AIC	BCC	BIC	CAIC
Default model	90.220	92.878	230.582	268.582
Saturated model	90.000	93.147	256.218	301.218
Independence model	4428.203	4428.833	4461.447	4470.447

ECVI

Model	ECVI	LO 90	HI 90	MECVI
Default model	.305	.281	.355	.314
Saturated model	.304	.304	.304	.315
Independence model	14.960	14.236	15.709	14.962

HOELTER

Model	HOELTER .05	HOELTER .01
Default model	293	385
Independence model	4	4

Estimates (Group number 1 - Default model)

Scalar Estimates (Group number 1 - Default model)

Maximum Likelihood Estimates

Regression Weights: (Group number 1 - Default model)

			Estimate	S.E.	C.R.	P	Label
RT	<---	HC	.699	.038	18.193	***	par_2
PR	<---	HC	1.033	.036	28.854	***	par_3
OP	<---	HC	.464	.070	6.592	***	par_4
RT	<---	SC	.029	.041	.708	.479	par_5
PR	<---	SC	.004	.038	.093	.926	par_6
OP	<---	SC	.635	.075	8.451	***	par_7
II	<---	RT	.439	.029	15.285	***	par_8
RI	<---	RT	.204	.015	13.275	***	par_9
RI	<---	PR	.442	.020	22.189	***	par_10
II	<---	PR	.507	.037	13.597	***	par_11
RI	<---	OP	-.054	.010	-5.655	***	par_12
II	<---	OP	-.130	.018	-7.339	***	par_13
RI	<---	Size	-.010	.007	-1.415	.157	par_14
RI	<---	Age	-.002	.009	-.190	.849	par_15
II	<---	Size	.003	.014	.217	.828	par_16
II	<---	Age	.005	.018	.289	.773	par_17
RI	<---	HC	.127	.019	6.589	***	par_23
II	<---	HC	.444	.036	12.281	***	par_24
RI	<---	SC	-.109	.012	-9.304	***	par_25
II	<---	SC	-.320	.022	-14.622	***	par_26

Standardized Regression Weights: (Group number 1 - Default model)

			Estimate
RT	<---	HC	.861
PR	<---	HC	.946
OP	<---	HC	.380
RT	<---	SC	.034
PR	<---	SC	.003
OP	<---	SC	.487
II	<---	RT	.362
RI	<---	RT	.261
RI	<---	PR	.760
II	<---	PR	.561
RI	<---	OP	-.103
II	<---	OP	-.161
RI	<---	Size	-.012
RI	<---	Age	-.002
II	<---	Size	.002
II	<---	Age	.003
RI	<---	HC	.201
II	<---	HC	.450
RI	<---	SC	-.160
II	<---	SC	-.303

Covariances: (Group number 1 - Default model)

			Estimate	S.E.	C.R.	P	Label
HC	<-->	SC	.456	.042	10.958	***	par_1
SC	<-->	Age	.069	.019	3.664	***	par_18
HC	<-->	Size	-.066	.025	-2.600	.009	par_19
Size	<-->	Age	.015	.014	1.023	.306	par_20
SC	<-->	Size	-.038	.023	-1.614	.107	par_21
HC	<-->	Age	.055	.020	2.757	.006	par_22
e2	<-->	e3	.078	.009	8.831	***	par_28
e1	<-->	e2	.027	.004	6.682	***	par_29
e4	<-->	e5	-.006	.001	-9.395	***	par_27

Correlations: (Group number 1 - Default model)

			Estimate
HC	<-->	SC	.826
SC	<-->	Age	.218
HC	<-->	Size	-.153
Size	<-->	Age	.060
SC	<-->	Size	-.094
HC	<-->	Age	.162
e2	<-->	e3	.560
e1	<-->	e2	.349
e4	<-->	e5	-.652

Variances: (Group number 1 - Default model)

	Estimate	S.E.	C.R.	P	Label
HC	.590	.048	12.166	***	par_30
SC	.516	.042	12.166	***	par_31
Size	.312	.026	12.166	***	par_32
Age	.192	.016	12.166	***	par_33
e1	.082	.007	12.166	***	par_34
e2	.071	.006	12.660	***	par_35
e3	.274	.023	12.166	***	par_36
e4	.005	.000	12.166	***	par_37
e5	.016	.001	12.166	***	par_38

Squared Multiple Correlations: (Group number 1 - Default model)

	Estimate
OP	.688
PR	.899
RT	.790
RI	.980
II	.971

Matrices (Group number 1 - Default model)

Total Effects (Group number 1 - Default model)

	Age	Size	SC	HC	OP	PR	RT
OP	.000	.000	.635	.464	.000	.000	.000
PR	.000	.000	.004	1.033	.000	.000	.000
RT	.000	.000	.029	.699	.000	.000	.000
RI	-.002	-.010	-.136	.702	-.054	.442	.204
II	.005	.003	-.388	1.215	-.130	.507	.439

Standardized Total Effects (Group number 1 - Default model)

	Age	Size	SC	HC	OP	PR	RT
OP	.000	.000	.487	.380	.000	.000	.000
PR	.000	.000	.003	.946	.000	.000	.000
RT	.000	.000	.034	.861	.000	.000	.000
RI	-.002	-.012	-.200	1.105	-.103	.760	.261
II	.003	.002	-.368	1.231	-.161	.561	.362

Direct Effects (Group number 1 - Default model)

	Age	Size	SC	HC	OP	PR	RT
OP	.000	.000	.635	.464	.000	.000	.000
PR	.000	.000	.004	1.033	.000	.000	.000
RT	.000	.000	.029	.699	.000	.000	.000
RI	-.002	-.010	-.109	.127	-.054	.442	.204
II	.005	.003	-.320	.444	-.130	.507	.439

Standardized Direct Effects (Group number 1 - Default model)

	Age	Size	SC	HC	OP	PR	RT
OP	.000	.000	.487	.380	.000	.000	.000
PR	.000	.000	.003	.946	.000	.000	.000
RT	.000	.000	.034	.861	.000	.000	.000
RI	-.002	-.012	-.160	.201	-.103	.760	.261
II	.003	.002	-.303	.450	-.161	.561	.362

Indirect Effects (Group number 1 - Default model)

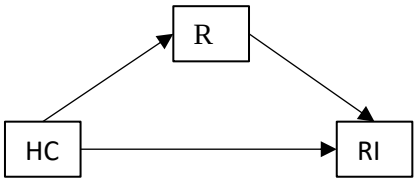
	Age	Size	SC	HC	OP	PR	RT
OP	.000	.000	.000	.000	.000	.000	.000
PR	.000	.000	.000	.000	.000	.000	.000
RT	.000	.000	.000	.000	.000	.000	.000
RI	.000	.000	-.027	.574	.000	.000	.000
II	.000	.000	-.068	.770	.000	.000	.000

Standardized Indirect Effects (Group number 1 - Default model)

	Age	Size	SC	HC	OP	PR	RT
OP	.000	.000	.000	.000	.000	.000	.000
PR	.000	.000	.000	.000	.000	.000	.000
RT	.000	.000	.000	.000	.000	.000	.000
RI	.000	.000	-.039	.904	.000	.000	.000
II	.000	.000	-.065	.780	.000	.000	.000

Appendix 15. Sobel Estimand

HC-RT-RI



User-defined estimands: (Group number 1 - Default model) standardized

A x B	.143

User-defined estimands: (Group number 1 - Default model)

Parameter	SE	SE-SE	Mean	Bias	SE-Bias
A x B	.019	.000	.143	.001	.000

User-defined estimands: (Group number 1 - Default model)

Parameter	Estimate	Lower	Upper	P
A x B	.143	.112	.175	.001

SPSS

Run MATRIX procedure:

********** PROCESS Procedure for SPSS Release 2.16.3 **********

Written by Andrew F. Hayes, Ph.D. www.afhayes.com
Documentation available in Hayes (2013). www.guilford.com/p/hayes3

****
Model = 1
Y = RI
X = HC
M = RT

Sample size
297

****
Outcome: RI

Model Summary

R	R-sq	MSE	F	df1	df2	p
.9635	.9283	.0173	1017.9318	3.0000	293.0000	.0000

Model

	coeff	se	t	p	LLCI	ULCI
constant	3.0087	.0095	317.7589	.0000	2.9901	3.0274
RT	.3474	.0427	8.1350	.0000	.2633	.4314
HC	.3367	.0354	9.5123	.0000	.2671	.4064
int_1	-.0310	.0154	-2.0173	.0446	-.0613	-.0008

Product terms key:

int_1	HC	X	RT

R-square increase due to interaction(s):

	R2-chng	F	df1	df2	p
int_1	.0016	4.0695	1.0000	293.0000	.0446

****

Conditional effect of X on Y at values of the moderator(s):

RT	Effect	se	t	p	LLCI	ULCI
-.6250	.3561	.0383	9.2877	.0000	.2807	.4316
.0000	.3367	.0354	9.5123	.0000	.2671	.4064
.6250	.3173	.0349	9.0818	.0000	.2486	.3861

Values for quantitative moderators are the mean and plus/minus one SD from mean.
Values for dichotomous moderators are the two values of the moderator.

********** JOHNSON-NEYMAN TECHNIQUE **********

There are no statistical significance transition points within the observed
range of the moderator.

****

Data for visualizing conditional effect of X on Y
Paste text below into a SPSS syntax window and execute to produce plot.

```
DATA LIST FREE/HC RT RI.
BEGIN DATA.

   -.7693    -.6250    2.5177
    .0000    -.6250    2.7916
    .7693    -.6250    3.0656
   -.7693     .0000    2.7497
    .0000     .0000    3.0087
    .7693     .0000    3.2678
   -.7693     .6250    2.9818
    .0000     .6250    3.2259
    .7693     .6250    3.4700

END DATA.
GRAPH/SCATTERPLOT=HC WITH RI BY RT.
```

********** ANALYSIS NOTES AND WARNINGS **********

Level of confidence for all confidence intervals in output:
  95.00

NOTE: The following variables were mean centered prior to analysis:
 HC RT

NOTE: All standard errors for continuous outcome models are based on the HC3 estimator

------ END MATRIX -----

Run MATRIX procedure:

********** PROCESS Procedure for SPSS Release 2.16.3 **********

Written by Andrew F. Hayes, Ph.D. www.afhayes.com
Documentation available in Hayes (2013). www.guilford.com/p/hayes3

****
Model = 4
Y = RI
X = HC
M = RT

Sample size
297

****

Outcome: RT

Model Summary

R	R-sq	MSE	F	df1	df2	p
.8884	.7893	.0826	1105.1449	1.0000	295.0000	.0000

Model

	coeff	se	t	p	LLCI	ULCI
constant	.7564	.1019	7.4201	.0000	.5558	.9571
HC	.7218	.0217	33.2437	.0000	.6791	.7645

****
Outcome: RI

Model Summary

R	R-sq	MSE	F	df1	df2	p
.9626	.9267	.0176	1857.4637	2.0000	294.0000	.0000

Model

	coeff	se	t	p	LLCI	ULCI
constant	-.0364	.0513	-.7087	.4791	-.1374	.0647
RT	.3462	.0269	12.8622	.0000	.2932	.3992
HC	.3481	.0219	15.9198	.0000	.3051	.3912

************************** TOTAL EFFECT MODEL ****************************

Outcome: RI

Model Summary

R	R-sq	MSE	F	df1	df2	p
.9410	.8854	.0275	2279.1046	1.0000	295.0000	.0000

Model

	coeff	se	t	p	LLCI	ULCI
constant	.2255	.0588	3.8340	.0002	.1097	.3413
HC	.5980	.0125	47.7400	.0000	.5734	.6227

********** TOTAL, DIRECT, AND INDIRECT EFFECTS **********

Total effect of X on Y

Effect	SE	t	p	LLCI	ULCI
.5980	.0125	47.7400	.0000	.5734	.6227

Direct effect of X on Y

Effect	SE	t	p	LLCI	ULCI
.3481	.0219	15.9198	.0000	.3051	.3912

Indirect effect of X on Y

	Effect	Boot SE	BootLLCI	BootULCI
RT	.2499	.0324	.1857	.3112

Partially standardized indirect effect of X on Y

	Effect	Boot SE	BootLLCI	BootULCI
RT	.5111	.0683	.3771	.6442

Completely standardized indirect effect of X on Y

	Effect	Boot SE	BootLLCI	BootULCI
RT	.3932	.0493	.2950	.4858

Ratio of indirect to total effect of X on Y

	Effect	Boot SE	BootLLCI	BootULCI
RT	.4179	.0538	.3112	.5196

Ratio of indirect to direct effect of X on Y

	Effect	Boot SE	BootLLCI	BootULCI
RT	.7178	.1679	.4518	1.0815

R-squared mediation effect size (R-sq_med)

	Effect	Boot SE	BootLLCI	BootULCI
RT	.8222	.0222	.7718	.8593

Normal theory tests for indirect effect

Effect	se	Z	p
.2499	.0208	11.9909	.0000

********** ANALYSIS NOTES AND WARNINGS **********

Number of bootstrap samples for bias corrected bootstrap confidence intervals:
5000

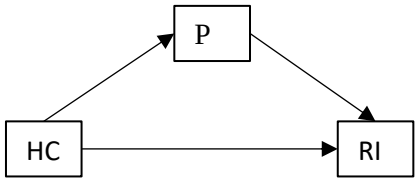
Level of confidence for all confidence intervals in output:
95.00

NOTE: The Johnson-Neyman method is available only for Models 1 and 3

NOTE: Kappa-squared is disabled from output as of version 2.16.

------ END MATRIX -----

HC-PR-RI



User-defined estimands: (Group number 1 - Default model)

A x B	.457

User-defined estimands: (Group number 1 - Default model)

Parameter	SE	SE-SE	Mean	Bias	SE-Bias
A x B	.033	.001	.456	-.001	.001

User-defined estimands: (Group number 1 - Default model)

Parameter	Estimate	Lower	Upper	P
A x B	.457	.406	.517	.001

SPSS

Run MATRIX procedure:

********** PROCESS Procedure for SPSS Release 2.16.3 **********

Written by Andrew F. Hayes, Ph.D. www.afhayes.com
Documentation available in Hayes (2013). www.guilford.com/p/hayes3

****
Model = 4
Y = RI
X = HC
M = PR

Sample size
297

****
Outcome: PR

Model Summary

R	R-sq	MSE	F	df1	df2	p
.9470	.8968	.0734	2562.6998	1.0000	295.0000	.0000

Model

	coeff	se	t	p	LLCI	ULCI
constant	.3837	.0961	3.9924	.0001	.1946	.5728
HC	1.0362	.0205	50.6231	.0000	.9959	1.0765

****
Outcome: RI

Model Summary

R	R-sq	MSE	F	df1	df2	p
.9749	.9504	.0119	2816.1973	2.0000	294.0000	.0000

Model

	coeff	se	t	p	LLCI	ULCI
constant	.0487	.0398	1.2229	.2223	-.0297	.1270
PR	.4609	.0235	19.6261	.0000	.4147	.5071
HC	.1205	.0257	4.6883	.0000	.0699	.1710

********** TOTAL EFFECT MODEL **********
Outcome: RI

Model Summary

R	R-sq	MSE	F	df1	df2	p
.9410	.8854	.0275	2279.1046	1.0000	295.0000	.0000

Model

	coeff	se	t	p	LLCI	ULCI
constant	.2255	.0588	3.8340	.0002	.1097	.3413
HC	.5980	.0125	47.7400	.0000	.5734	.6227

********** TOTAL, DIRECT, AND INDIRECT EFFECTS **********

Total effect of X on Y

Effect	SE	t	p	LLCI	ULCI
.5980	.0125	47.7400	.0000	.5734	.6227

Direct effect of X on Y

Effect	SE	t	p	LLCI	ULCI
.1205	.0257	4.6883	.0000	.0699	.1710

Indirect effect of X on Y

	Effect	Boot SE	BootLLCI	BootULCI
PR	.4776	.0296	.4204	.5374

Partially standardized indirect effect of X on Y

	Effect	Boot SE	BootLLCI	BootULCI
PR	.9768	.0694	.8428	1.1129

Completely standardized indirect effect of X on Y

	Effect	Boot SE	BootLLCI	BootULCI
PR	.7514	.0465	.6651	.8475

Ratio of indirect to total effect of X on Y

Effect	Boot SE	BootLLCI	BootULCI

PR .7986 .0530 .6990 .9075

Ratio of indirect to direct effect of X on Y
Effect Boot SE BootLLCI BootULCI
PR 3.9642 2.7306 2.3223 9.7298

R-squared mediation effect size (R-sq_med)
Effect Boot SE BootLLCI BootULCI
PR .8817 .0143 .8510 .9069

Normal theory tests for indirect effect
Effect se Z p
.4776 .0261 18.2959 .0000

********** ANALYSIS NOTES AND WARNINGS **********

Number of bootstrap samples for bias corrected bootstrap confidence intervals:
5000

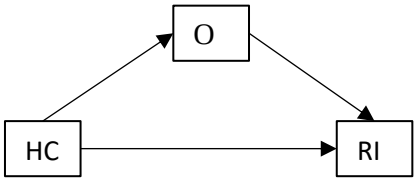
Level of confidence for all confidence intervals in output:
95.00

NOTE: The Johnson-Neyman method is available only for Models 1 and 3

NOTE: Kappa-squared is disabled from output as of version 2.16.

------ END MATRIX -----

HC-OP-RI



User-defined estimands: (Group number 1 - Default model)

A x B	-.025

User-defined estimands: (Group number 1 - Default model)

Parameter	SE	SE-SE	Mean	Bias	SE-Bias
A x B	.007	.000	-.025	.000	.000

User-defined estimands: (Group number 1 - Default model)

Parameter	Estimate	Lower	Upper	P
A x B	-.025	-.038	-.015	.001

OP mediate HC and RI

Run MATRIX procedure:

********** PROCESS Procedure for SPSS Release 2.16.3 **********

Written by Andrew F. Hayes, Ph.D. www.afhayes.com
Documentation available in Hayes (2013). www.guilford.com/p/hayes3

****
Model = 4
Y = RI
X = HC
M = OP

Sample size
297

****
Outcome: OP

Model Summary

R	R-sq	MSE	F	df1	df2	p
.7825	.6124	.3427	466.0057	1.0000	295.0000	.0000

Model

	coeff	se	t	p	LLCI	ULCI
constant	.5996	.2077	2.8873	.0042	.1909	1.0083
HC	.9548	.0442	21.5872	.0000	.8678	1.0419

****
Outcome: RI

Model Summary

R	R-sq	MSE	F	df1	df2	p
.9414	.8863	.0274	1146.0473	2.0000	294.0000	.0000

Model

	coeff	se	t	p	LLCI	ULCI
constant	.2103	.0595	3.5343	.0005	.0932	.3274
OP	.0253	.0165	1.5408	.1244	-.0070	.0577
HC	.5738	.0201	28.5869	.0000	.5343	.6133

************************** TOTAL EFFECT MODEL ****************************
Outcome: RI

Model Summary

R	R-sq	MSE	F	df1	df2	p
.9410	.8854	.0275	2279.1046	1.0000	295.0000	.0000

Model

	coeff	se	t	p	LLCI	ULCI
constant	.2255	.0588	3.8340	.0002	.1097	.3413
HC	.5980	.0125	47.7400	.0000	.5734	.6227

***************** TOTAL, DIRECT, AND INDIRECT EFFECTS ********************

Total effect of X on Y

Effect	SE	t	p	LLCI	ULCI
.5980	.0125	47.7400	.0000	.5734	.6227

Direct effect of X on Y

Effect	SE	t	p	LLCI	ULCI
.5738	.0201	28.5869	.0000	.5343	.6133

Indirect effect of X on Y

	Effect	Boot SE	BootLLCI	BootULCI
OP	.0242	.0214	-.0183	.0652

Partially standardized indirect effect of X on Y

	Effect	Boot SE	BootLLCI	BootULCI
OP	.0495	.0441	-.0366	.1346

Completely standardized indirect effect of X on Y

	Effect	Boot SE	BootLLCI	BootULCI
OP	.0381	.0335	-.0286	.1021

Ratio of indirect to total effect of X on Y

	Effect	Boot SE	BootLLCI	BootULCI
OP	.0405	.0357	-.0305	.1088

Ratio of indirect to direct effect of X on Y

	Effect	Boot SE	BootLLCI	BootULCI
OP	.0422	.0389	-.0296	.1220

R-squared mediation effect size (R-sq_med)

	Effect	Boot SE	BootLLCI	BootULCI
OP	.5694	.0415	.4835	.6464

Normal theory tests for indirect effect

Effect	se	Z	p
.0242	.0158	1.5353	.1247

********** ANALYSIS NOTES AND WARNINGS **********

Number of bootstrap samples for bias corrected bootstrap confidence intervals:
5000

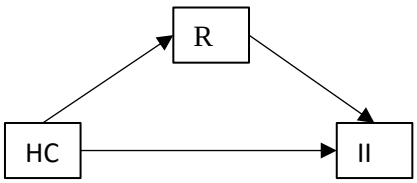
Level of confidence for all confidence intervals in output:
95.00

NOTE: The Johnson-Neyman method is available only for Models 1 and 3

NOTE: Kappa-squared is disabled from output as of version 2.16.

------ END MATRIX -----

HC-RT-II



User-defined estimands: (Group number 1 - Default model)

A x B	.307

User-defined estimands: (Group number 1 - Default model)

Parameter	SE	SE-SE	Mean	Bias	SE-Bias
A x B	.032	.001	.308	.001	.001

User-defined estimands: (Group number 1 - Default model)

Parameter	Estimate	Lower	Upper	P
A x B	.307	.258	.364	.001

SPSS

Run MATRIX procedure:

********** PROCESS Procedure for SPSS Release 2.16.3 **********

Written by Andrew F. Hayes, Ph.D. www.afhayes.com
Documentation available in Hayes (2013). www.guilford.com/p/hayes3

****
Model = 4
Y = II
X = HC
M = RT

Sample size
297

****
Outcome: RT

Model Summary

R	R-sq	MSE	F	df1	df2	p
.8884	.7893	.0826	1105.1449	1.0000	295.0000	.0000

Model

	coeff	se	t	p	LLCI	ULCI
constant	.7564	.1019	7.4201	.0000	.5558	.9571
HC	.7218	.0217	33.2437	.0000	.6791	.7645

****
Outcome: II

Model Summary

R	R-sq	MSE	F	df1	df2	p
.9521	.9065	.0543	1425.9420	2.0000	294.0000	.0000

Model

	coeff	se	t	p	LLCI	ULCI
constant	-.0913	.0900	-1.0141	.3114	-.2685	.0859
RT	.5835	.0472	12.3622	.0000	.4906	.6764
HC	.4933	.0383	12.8639	.0000	.4178	.5688

********** TOTAL EFFECT MODEL **********
Outcome: II

Model Summary

R	R-sq	MSE	F	df1	df2	p
.9263	.8580	.0822	1781.9591	1.0000	295.0000	.0000

Model

	coeff	se	t	p	LLCI	ULCI
constant	.3501	.1017	3.4419	.0007	.1499	.5502
HC	.9144	.0217	42.2133	.0000	.8718	.9571

********** TOTAL, DIRECT, AND INDIRECT EFFECTS **********

Total effect of X on Y

Effect	SE	t	p	LLCI	ULCI
.9144	.0217	42.2133	.0000	.8718	.9571

Direct effect of X on Y

Effect	SE	t	p	LLCI	ULCI
.4933	.0383	12.8639	.0000	.4178	.5688

Indirect effect of X on Y

	Effect	Boot SE	BootLLCI	BootULCI
RT	.4212	.0529	.3254	.5305

Partially standardized indirect effect of X on Y

	Effect	Boot SE	BootLLCI	BootULCI
RT	.5546	.0693	.4335	.6956

Completely standardized indirect effect of X on Y

	Effect	Boot SE	BootLLCI	BootULCI
RT	.4266	.0503	.3359	.5295

Ratio of indirect to total effect of X on Y

	Effect	Boot SE	BootLLCI	BootULCI
RT	.4606	.0557	.3614	.5751

Ratio of indirect to direct effect of X on Y

	Effect	Boot SE	BootLLCI	BootULCI
RT	.8538	.2105	.5658	1.3534

R-squared mediation effect size (R-sq_med)

	Effect	Boot SE	BootLLCI	BootULCI

RT .8054 .0224 .7542 .8428

Normal theory tests for indirect effect

Effect	se	Z	p
.4212	.0364	11.5824	.0000

********** ANALYSIS NOTES AND WARNINGS **********

Number of bootstrap samples for bias corrected bootstrap confidence intervals:
5000

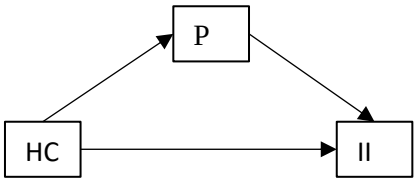
Level of confidence for all confidence intervals in output:
95.00

NOTE: The Johnson-Neyman method is available only for Models 1 and 3

NOTE: Kappa-squared is disabled from output as of version 2.16.

------ END MATRIX -----

HC-PR-II



User-defined estimands: (Group number 1 - Default model)

A x B	.523

User-defined estimands: (Group number 1 - Default model)

Parameter	SE	SE-SE	Mean	Bias	SE-Bias
A x B	.046	.001	.523	-.001	.001

User-defined estimands: (Group number 1 - Default model)

Parameter	Estimate	Lower	Upper	P
A x B	.523	.449	.599	.001

Run MATRIX procedure:

********** PROCESS Procedure for SPSS Release 2.16.3 **********

Written by Andrew F. Hayes, Ph.D. www.afhayes.com
Documentation available in Hayes (2013). www.guilford.com/p/hayes3

****
Model = 4
Y = II
X = HC
M = PR

Sample size
297

****
Outcome: PR

Model Summary

R	R-sq	MSE	F	df1	df2	p
.9470	.8968	.0734	2562.6998	1.0000	295.0000	.0000

Model

	coeff	se	t	p	LLCI	ULCI
constant	.3837	.0961	3.9924	.0001	.1946	.5728
HC	1.0362	.0205	50.6231	.0000	.9959	1.0765

****
Outcome: II

Model Summary

R	R-sq	MSE	F	df1	df2	p
.9458	.8945	.0613	1246.2890	2.0000	294.0000	.0000

Model

	coeff	se	t	p	LLCI	ULCI
constant	.1441	.0902	1.5990	.1109	-.0333	.3216
PR	.5367	.0532	10.0891	.0000	.4320	.6414
HC	.3583	.0582	6.1557	.0000	.2438	.4729

************************** TOTAL EFFECT MODEL ****************************
Outcome: II

Model Summary

R	R-sq	MSE	F	df1	df2	p
.9263	.8580	.0822	1781.9591	1.0000	295.0000	.0000

Model

	coeff	se	t	p	LLCI	ULCI
constant	.3501	.1017	3.4419	.0007	.1499	.5502
HC	.9144	.0217	42.2133	.0000	.8718	.9571

****************** TOTAL, DIRECT, AND INDIRECT EFFECTS ********************

Total effect of X on Y

Effect	SE	t	p	LLCI	ULCI
.9144	.0217	42.2133	.0000	.8718	.9571

Direct effect of X on Y

Effect	SE	t	p	LLCI	ULCI
.3583	.0582	6.1557	.0000	.2438	.4729

Indirect effect of X on Y

	Effect	Boot SE	BootLLCI	BootULCI
PR	.5561	.0574	.4427	.6680

Partially standardized indirect effect of X on Y

	Effect	Boot SE	BootLLCI	BootULCI
PR	.7323	.0776	.5807	.8857

Completely standardized indirect effect of X on Y

	Effect	Boot SE	BootLLCI	BootULCI
PR	.5633	.0574	.4494	.6763

Ratio of indirect to total effect of X on Y

	Effect	Boot SE	BootLLCI	BootULCI
PR	.6082	.0641	.4835	.7370

Ratio of indirect to direct effect of X on Y

	Effect	Boot SE	BootLLCI	BootULCI
PR	1.5521	.4851	.9362	2.8029

R-squared mediation effect size (R-sq_med)

	Effect	Boot SE	BootLLCI	BootULCI
PR	.8444	.0163	.8087	.8738

Normal theory tests for indirect effect

Effect	se	Z	p
.5561	.0562	9.8927	.0000

********** ANALYSIS NOTES AND WARNINGS **********

Number of bootstrap samples for bias corrected bootstrap confidence intervals:
5000

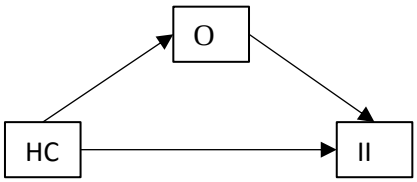
Level of confidence for all confidence intervals in output:
95.00

NOTE: The Johnson-Neyman method is available only for Models 1 and 3

NOTE: Kappa-squared is disabled from output as of version 2.16.

------ END MATRIX -----

HC-OP-II



User-defined estimands: (Group number 1 - Default model)

A x B	-.060

User-defined estimands: (Group number 1 - Default model)

Parameter	SE	SE-SE	Mean	Bias	SE-Bias
A x B	.014	.000	-.061	.000	.000

User-defined estimands: (Group number 1 - Default model)

Parameter	Estimate	Lower	Upper	P
A x B	-.060	-.087	-.040	.001

Run MATRIX procedure:

********** PROCESS Procedure for SPSS Release 2.16.3 **********

Written by Andrew F. Hayes, Ph.D. www.afhayes.com
Documentation available in Hayes (2013). www.guilford.com/p/hayes3

****
Model = 4
Y = II
X = HC
M = OP

Sample size
297

****
Outcome: OP

Model Summary

R	R-sq	MSE	F	df1	df2	p
.7825	.6124	.3427	466.0057	1.0000	295.0000	.0000

Model

	coeff	se	t	p	LLCI	ULCI
constant	.5996	.2077	2.8873	.0042	.1909	1.0083
HC	.9548	.0442	21.5872	.0000	.8678	1.0419

****
Outcome: II

Model Summary

R	R-sq	MSE	F	df1	df2	p
.9288	.8627	.0797	923.6750	2.0000	294.0000	.0000

Model

	coeff	se	t	p	LLCI	ULCI
constant	.4037	.1016	3.9745	.0001	.2038	.6036
OP	-.0895	.0281	-3.1852	.0016	-.1447	-.0342
HC	.9999	.0343	29.1793	.0000	.9324	1.0673

************************** TOTAL EFFECT MODEL ****************************
Outcome: II

Model Summary

R	R-sq	MSE	F	df1	df2	p
.9263	.8580	.0822	1781.9591	1.0000	295.0000	.0000

Model

	coeff	se	t	p	LLCI	ULCI
constant	.3501	.1017	3.4419	.0007	.1499	.5502
HC	.9144	.0217	42.2133	.0000	.8718	.9571

***************** TOTAL, DIRECT, AND INDIRECT EFFECTS ********************

Total effect of X on Y

Effect	SE	t	p	LLCI	ULCI
.9144	.0217	42.2133	.0000	.8718	.9571

Direct effect of X on Y

Effect	SE	t	p	LLCI	ULCI
.9999	.0343	29.1793	.0000	.9324	1.0673

Indirect effect of X on Y

	Effect	Boot SE	BootLLCI	BootULCI
OP	-.0854	.0351	-.1550	-.0176

Partially standardized indirect effect of X on Y

	Effect	Boot SE	BootLLCI	BootULCI
OP	-.1125	.0462	-.2053	-.0240

Completely standardized indirect effect of X on Y

	Effect	Boot SE	BootLLCI	BootULCI
OP	-.0865	.0355	-.1574	-.0181

Ratio of indirect to total effect of X on Y

	Effect	Boot SE	BootLLCI	BootULCI
OP	-.0934	.0386	-.1710	-.0198

Ratio of indirect to direct effect of X on Y

	Effect	Boot SE	BootLLCI	BootULCI
OP	-.0854	.0324	-.1460	-.0194

R-squared mediation effect size (R-sq_med)

	Effect	Boot SE	BootLLCI	BootULCI
OP	.4604	.0503	.3612	.5557

Normal theory tests for indirect effect

Effect	se	Z	p
-.0854	.0271	-3.1478	.0016

********** ANALYSIS NOTES AND WARNINGS **********

Number of bootstrap samples for bias corrected bootstrap confidence intervals:
5000

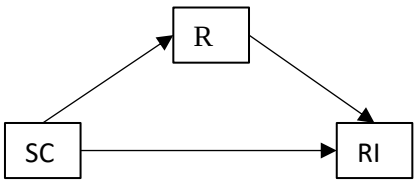
Level of confidence for all confidence intervals in output:
95.00

NOTE: The Johnson-Neyman method is available only for Models 1 and 3

NOTE: Kappa-squared is disabled from output as of version 2.16.

------ END MATRIX -----

SC-RT-RI



User-defined estimands: (Group number 1 - Default model)

A x B	.006

User-defined estimands: (Group number 1 - Default model)

Parameter	SE	SE-SE	Mean	Bias	SE-Bias
A x B	.009	.000	.006	.000	.000

User-defined estimands: (Group number 1 - Default model)

Parameter	Estimate	Lower	Upper	P
A x B	.006	-.010	.020	.572

Run MATRIX procedure:

********** PROCESS Procedure for SPSS Release 2.16.3 **********

Written by Andrew F. Hayes, Ph.D. www.afhayes.com
Documentation available in Hayes (2013). www.guilford.com/p/hayes3

****
Model = 4
Y = RI
X = SC
M = RT

Sample size
297

****
Outcome: RT

Model Summary

R	R-sq	MSE	F	df1	df2	p
.7446	.5545	.1746	367.1452	1.0000	295.0000	.0000

Model

	coeff	se	t	p	LLCI	ULCI
constant	1.3944	.1433	9.7337	.0000	1.1125	1.6764
SC	.6467	.0337	19.1610	.0000	.5802	.7131

****
Outcome: RI

Model Summary

R	R-sq	MSE	F	df1	df2	p
.9298	.8645	.0326	937.8242	2.0000	294.0000	.0000

Model

	coeff	se	t	p	LLCI	ULCI
constant	-.0066	.0712	-.0932	.9258	-.1467	.1334
RT	.6986	.0252	27.7665	.0000	.6491	.7481
SC	.0330	.0219	1.5087	.1325	-.0100	.0760

********** TOTAL EFFECT MODEL **********
Outcome: RI

Model Summary

R	R-sq	MSE	F	df1	df2	p
.7135	.5091	.1177	305.9934	1.0000	295.0000	.0000

Model

	coeff	se	t	p	LLCI	ULCI
constant	.9676	.1176	8.2255	.0000	.7361	1.1991
SC	.4847	.0277	17.4927	.0000	.4302	.5393

********** TOTAL, DIRECT, AND INDIRECT EFFECTS **********

Total effect of X on Y

Effect	SE	t	p	LLCI	ULCI
.4847	.0277	17.4927	.0000	.4302	.5393

Direct effect of X on Y

Effect	SE	t	p	LLCI	ULCI
.0330	.0219	1.5087	.1325	-.0100	.0760

Indirect effect of X on Y

	Effect	Boot SE	BootLLCI	BootULCI
RT	.4518	.0335	.3875	.5191

Partially standardized indirect effect of X on Y

	Effect	Boot SE	BootLLCI	BootULCI
RT	.9240	.0557	.8186	1.0373

Completely standardized indirect effect of X on Y

	Effect	Boot SE	BootLLCI	BootULCI
RT	.6650	.0418	.5807	.7450

Ratio of indirect to total effect of X on Y

	Effect	Boot SE	BootLLCI	BootULCI
RT	.9320	.0644	.8104	1.0629

Ratio of indirect to direct effect of X on Y

	Effect	Boot SE	BootLLCI	BootULCI
RT	13.7049	4433.5579	-15.6496	1254.7160

R-squared mediation effect size (R-sq_med)

Effect	Boot SE	BootLLCI	BootULCI

RT .5081 .0483 .4155 .6017

Normal theory tests for indirect effect

Effect	se	Z	p
.4518	.0287	15.7636	.0000

********** ANALYSIS NOTES AND WARNINGS **********

Number of bootstrap samples for bias corrected bootstrap confidence intervals:
5000

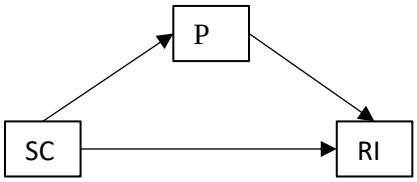
Level of confidence for all confidence intervals in output:
95.00

NOTE: The Johnson-Neyman method is available only for Models 1 and 3

NOTE: Kappa-squared is disabled from output as of version 2.16.

------ END MATRIX -----

SC-PR-RI



User-defined estimands: (Group number 1 - Default model)

A x B	.002

User-defined estimands: (Group number 1 - Default model)

Parameter	SE	SE-SE	Mean	Bias	SE-Bias
A x B	.018	.000	.002	.000	.000

User-defined estimands: (Group number 1 - Default model)

Parameter	Estimate	Lower	Upper	P
A x B	.002	-.030	.030	.954

Run MATRIX procedure:

********** PROCESS Procedure for SPSS Release 2.16.3 **********

Written by Andrew F. Hayes, Ph.D. www.afhayes.com
Documentation available in Hayes (2013). www.guilford.com/p/hayes3

****
Model = 4
Y = RI
X = SC
M = PR

Sample size
297

****
Outcome: PR

Model Summary

R	R-sq	MSE	F	df1	df2	p
.7833	.6136	.2747	468.4749	1.0000	295.0000	.0000

Model

	coeff	se	t	p	LLCI	ULCI
constant	1.3504	.1797	7.5151	.0000	.9967	1.7040
SC	.9162	.0423	21.6443	.0000	.8329	.9995

****
Outcome: RI

Model Summary

R	R-sq	MSE	F	df1	df2	p
.9761	.9528	.0114	2967.4120	2.0000	294.0000	.0000

Model

	coeff	se	t	p	LLCI	ULCI
constant	.1271	.0399	3.1878	.0016	.0486	.2056
PR	.6224	.0118	52.5685	.0000	.5991	.6457
SC	-.0855	.0138	-6.1729	.0000	-.1127	-.0582

********** TOTAL EFFECT MODEL **********
Outcome: RI

Model Summary

R	R-sq	MSE	F	df1	df2	p
.7135	.5091	.1177	305.9934	1.0000	295.0000	.0000

Model

	coeff	se	t	p	LLCI	ULCI
constant	.9676	.1176	8.2255	.0000	.7361	1.1991
SC	.4847	.0277	17.4927	.0000	.4302	.5393

********** TOTAL, DIRECT, AND INDIRECT EFFECTS **********

Total effect of X on Y

Effect	SE	t	p	LLCI	ULCI
.4847	.0277	17.4927	.0000	.4302	.5393

Direct effect of X on Y

Effect	SE	t	p	LLCI	ULCI
-.0855	.0138	-6.1729	.0000	-.1127	-.0582

Indirect effect of X on Y

	Effect	Boot SE	BootLLCI	BootULCI
PR	.5702	.0360	.4971	.6397

Partially standardized indirect effect of X on Y

	Effect	Boot SE	BootLLCI	BootULCI
PR	1.1663	.0599	1.0539	1.2868

Completely standardized indirect effect of X on Y

	Effect	Boot SE	BootLLCI	BootULCI
PR	.8394	.0350	.7702	.9073

Ratio of indirect to total effect of X on Y

	Effect	Boot SE	BootLLCI	BootULCI
PR	1.1763	.0454	1.0971	1.2762

Ratio of indirect to direct effect of X on Y

	Effect	Boot SE	BootLLCI	BootULCI
PR	-6.6708	1.8688	-11.2993	-4.6211

R-squared mediation effect size (R-sq_med)

	Effect	Boot SE	BootLLCI	BootULCI
PR	.5030	.0519	.4002	.6034

Normal theory tests for indirect effect

Effect	se	Z	p
.5702	.0285	20.0111	.0000

********** ANALYSIS NOTES AND WARNINGS **********

Number of bootstrap samples for bias corrected bootstrap confidence intervals:
5000

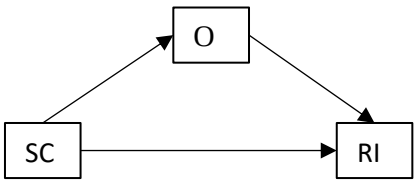
Level of confidence for all confidence intervals in output:
95.00

NOTE: The Johnson-Neyman method is available only for Models 1 and 3

NOTE: Kappa-squared is disabled from output as of version 2.16.

------ END MATRIX -----

SC-OP-RI



User-defined estimands: (Group number 1 - Default model)

A x B	-.034

User-defined estimands: (Group number 1 - Default model)

Parameter	SE	SE-SE	Mean	Bias	SE-Bias
A x B	.008	.000	-.034	.000	.000

User-defined estimands: (Group number 1 - Default model)

Parameter	Estimate	Lower	Upper	P
A x B	-.034	-.049	-.021	.001

Run MATRIX procedure:

********** PROCESS Procedure for SPSS Release 2.16.3 **********

Written by Andrew F. Hayes, Ph.D. www.afhayes.com
Documentation available in Hayes (2013). www.guilford.com/p/hayes3

****
Model = 4
Y = RI
X = SC
M = OP

Sample size
297

****
Outcome: OP

Model Summary

R	R-sq	MSE	F	df1	df2	p
.8012	.6419	.3166	528.7189	1.0000	295.0000	.0000

Model

	coeff	se	t	p	LLCI	ULCI
constant	.6508	.1929	3.3738	.0008	.2712	1.0304
SC	1.0449	.0454	22.9939	.0000	.9555	1.1343

****
Outcome: RI

Model Summary

R	R-sq	MSE	F	df1	df2	p
.7767	.6032	.0955	223.4559	2.0000	294.0000	.0000

Model

	coeff	se	t	p	LLCI	ULCI
constant	.7939	.1080	7.3528	.0000	.5814	1.0063
OP	.2669	.0320	8.3474	.0000	.2040	.3299
SC	.2058	.0417	4.9355	.0000	.1238	.2879

********** TOTAL EFFECT MODEL **********
Outcome: RI

Model Summary

R	R-sq	MSE	F	df1	df2	p
.7135	.5091	.1177	305.9934	1.0000	295.0000	.0000

Model

	coeff	se	t	p	LLCI	ULCI
constant	.9676	.1176	8.2255	.0000	.7361	1.1991
SC	.4847	.0277	17.4927	.0000	.4302	.5393

********** TOTAL, DIRECT, AND INDIRECT EFFECTS **********

Total effect of X on Y

Effect	SE	t	p	LLCI	ULCI
.4847	.0277	17.4927	.0000	.4302	.5393

Direct effect of X on Y

Effect	SE	t	p	LLCI	ULCI
.2058	.0417	4.9355	.0000	.1238	.2879

Indirect effect of X on Y

	Effect	Boot SE	BootLLCI	BootULCI
OP	.2789	.0405	.1985	.3577

Partially standardized indirect effect of X on Y

	Effect	Boot SE	BootLLCI	BootULCI
OP	.5705	.0833	.4078	.7340

Completely standardized indirect effect of X on Y

	Effect	Boot SE	BootLLCI	BootULCI
OP	.4106	.0603	.2954	.5279

Ratio of indirect to total effect of X on Y

	Effect	Boot SE	BootLLCI	BootULCI
OP	.5754	.0991	.3939	.7841

Ratio of indirect to direct effect of X on Y

	Effect	Boot SE	BootLLCI	BootULCI
OP	1.3550	1.6978	.6499	3.6308

R-squared mediation effect size (R-sq_med)

	Effect	Boot SE	BootLLCI	BootULCI

OP .4763 .0408 .3978 .5582

Normal theory tests for indirect effect

Effect	se	Z	p
.2789	.0356	7.8398	.0000

********** ANALYSIS NOTES AND WARNINGS **********

Number of bootstrap samples for bias corrected bootstrap confidence intervals:
5000

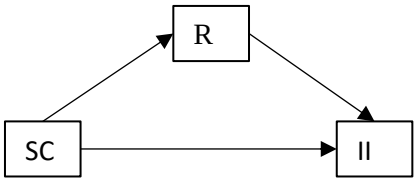
Level of confidence for all confidence intervals in output:
95.00

NOTE: The Johnson-Neyman method is available only for Models 1 and 3

NOTE: Kappa-squared is disabled from output as of version 2.16.

------ END MATRIX -----

SC-RT-II



User-defined estimands: (Group number 1 - Default model)

A x B	.013

User-defined estimands: (Group number 1 - Default model)

Parameter	SE	SE-SE	Mean	Bias	SE-Bias
A x B	.020	.000	.013	.001	.000

User-defined estimands: (Group number 1 - Default model)

Parameter	Estimate	Lower	Upper	P
A x B	.013	-.020	.046	.559

Run MATRIX procedure:

********** PROCESS Procedure for SPSS Release 2.16.3 **********

Written by Andrew F. Hayes, Ph.D. www.afhayes.com
Documentation available in Hayes (2013). www.guilford.com/p/hayes3

****
Model = 4
Y = II
X = SC
M = RT

Sample size
297

****
Outcome: RT

Model Summary

R	R-sq	MSE	F	df1	df2	p
.7446	.5545	.1746	367.1452	1.0000	295.0000	.0000

Model

	coeff	se	t	p	LLCI	ULCI
constant	1.3944	.1433	9.7337	.0000	1.1125	1.6764
SC	.6467	.0337	19.1610	.0000	.5802	.7131

****
Outcome: II

Model Summary

R	R-sq	MSE	F	df1	df2	p
.9260	.8574	.0828	884.0495	2.0000	294.0000	.0000

Model

	coeff	se	t	p	LLCI	ULCI
constant	.0444	.1134	.3919	.6954	-.1787	.2676
RT	1.2029	.0401	30.0053	.0000	1.1240	1.2818
SC	-.0933	.0348	-2.6804	.0078	-.1618	-.0248

********** TOTAL EFFECT MODEL **********
Outcome: II

Model Summary

R	R-sq	MSE	F	df1	df2	p
.6487	.4208	.3352	214.3441	1.0000	295.0000	.0000

Model

	coeff	se	t	p	LLCI	ULCI
constant	1.7218	.1985	8.6751	.0000	1.3312	2.1125
SC	.6846	.0468	14.6405	.0000	.5925	.7766

********** TOTAL, DIRECT, AND INDIRECT EFFECTS **********

Total effect of X on Y

Effect	SE	t	p	LLCI	ULCI
.6846	.0468	14.6405	.0000	.5925	.7766

Direct effect of X on Y

Effect	SE	t	p	LLCI	ULCI
-.0933	.0348	-2.6804	.0078	-.1618	-.0248

Indirect effect of X on Y

	Effect	Boot SE	BootLLCI	BootULCI
RT	.7779	.0546	.6774	.8880

Partially standardized indirect effect of X on Y
     Effect   Boot SE   BootLLCI   BootULCI
RT   1.0243   .0610   .9094   1.1486

Completely standardized indirect effect of X on Y
     Effect   Boot SE   BootLLCI   BootULCI
RT   .7371   .0439   .6541   .8280

Ratio of indirect to total effect of X on Y
     Effect   Boot SE   BootLLCI   BootULCI
RT   1.1363   .0874   .9715   1.3240

Ratio of indirect to direct effect of X on Y
     Effect   Boot SE   BootLLCI   BootULCI
RT   -8.3356   361.4608 -123.2541   10.6169

R-squared mediation effect size (R-sq_med)
     Effect   Boot SE   BootLLCI   BootULCI
RT   .4173   .0615   .2953   .5335

Normal theory tests for indirect effect
    Effect   se   Z   p
     .7779   .0482   16.1428   .0000

********** ANALYSIS NOTES AND WARNINGS **********

Number of bootstrap samples for bias corrected bootstrap confidence intervals:
    5000

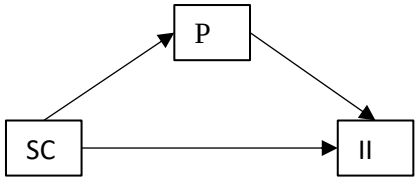
Level of confidence for all confidence intervals in output:
   95.00

NOTE: The Johnson-Neyman method is available only for Models 1 and 3

NOTE: Kappa-squared is disabled from output as of version 2.16.

------ END MATRIX -----

SC-PR-II



User-defined estimands: (Group number 1 - Default model)

A x B	.002

User-defined estimands: (Group number 1 - Default model)

Parameter	SE	SE-SE	Mean	Bias	SE-Bias
A x B	.021	.000	.003	.001	.000

User-defined estimands: (Group number 1 - Default model)

Parameter	Estimate	Lower	Upper	P
A x B	.002	-.034	.036	.953

SPSS

Run MATRIX procedure:

********** PROCESS Procedure for SPSS Release 2.16.3 **********

Written by Andrew F. Hayes, Ph.D. www.afhayes.com
Documentation available in Hayes (2013). www.guilford.com/p/hayes3

****
Model = 4
Y = II
X = SC
M = PR

Sample size
297

****
Outcome: PR

Model Summary

R	R-sq	MSE	F	df1	df2	p
.7833	.6136	.2747	468.4749	1.0000	295.0000	.0000

Model

	coeff	se	t	p	LLCI	ULCI
constant	1.3504	.1797	7.5151	.0000	.9967	1.7040
SC	.9162	.0423	21.6443	.0000	.8329	.9995

****
Outcome: II

Model Summary

R	R-sq	MSE	F	df1	df2	p
.9488	.9003	.0579	1326.8054	2.0000	294.0000	.0000

Model

	coeff	se	t	p	LLCI	ULCI
constant	.3647	.0901	4.0498	.0001	.1875	.5420
PR	1.0050	.0267	37.5924	.0000	.9524	1.0576
SC	-.2362	.0313	-7.5546	.0000	-.2978	-.1747

************************** TOTAL EFFECT MODEL ****************************
Outcome: II

Model Summary

R	R-sq	MSE	F	df1	df2	p
.6487	.4208	.3352	214.3441	1.0000	295.0000	.0000

Model

	coeff	se	t	p	LLCI	ULCI
constant	1.7218	.1985	8.6751	.0000	1.3312	2.1125
SC	.6846	.0468	14.6405	.0000	.5925	.7766

********** TOTAL, DIRECT, AND INDIRECT EFFECTS **********

Total effect of X on Y

Effect	SE	t	p	LLCI	ULCI
.6846	.0468	14.6405	.0000	.5925	.7766

Direct effect of X on Y

Effect	SE	t	p	LLCI	ULCI
-.2362	.0313	-7.5546	.0000	-.2978	-.1747

Indirect effect of X on Y

	Effect	Boot SE	BootLLCI	BootULCI
PR	.9208	.0577	.8083	1.0336

Partially standardized indirect effect of X on Y

	Effect	Boot SE	BootLLCI	BootULCI
PR	1.2124	.0635	1.0910	1.3414

Completely standardized indirect effect of X on Y

	Effect	Boot SE	BootLLCI	BootULCI
PR	.8726	.0367	.7970	.9403

Ratio of indirect to total effect of X on Y

	Effect	Boot SE	BootLLCI	BootULCI
PR	1.3451	.0840	1.2012	1.5284

Ratio of indirect to direct effect of X on Y

	Effect	Boot SE	BootLLCI	BootULCI
PR	-3.8979	.8484	-5.9704	-2.8925

R-squared mediation effect size (R-sq_med)

	Effect	Boot SE	BootLLCI	BootULCI
PR	.4015	.0653	.2670	.5219

Normal theory tests for indirect effect

Effect	se	Z	p
.9208	.0491	18.7524	.0000

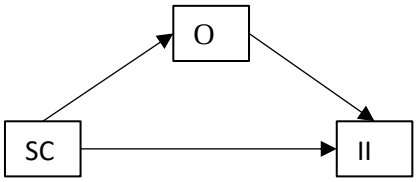
********** ANALYSIS NOTES AND WARNINGS **********

Number of bootstrap samples for bias corrected bootstrap confidence intervals:
5000

Level of confidence for all confidence intervals in output:
95.00

NOTE: The Johnson-Neyman method is available only for Models 1 and 3
NOTE: Kappa-squared is disabled from output as of version 2.16.
------ END MATRIX -----

SC-OP-RI



User-defined estimands: (Group number 1 - Default model)

A x B	-.083

User-defined estimands: (Group number 1 - Default model)

Parameter	SE	SE-SE	Mean	Bias	SE-Bias
A x B	.017	.000	-.083	.000	.000

User-defined estimands: (Group number 1 - Default model)

Parameter	Estimate	Lower	Upper	P
A x B	-.083	-.113	-.058	.001

Run MATRIX procedure:

********** PROCESS Procedure for SPSS Release 2.16.3 **********

Written by Andrew F. Hayes, Ph.D. www.afhayes.com
Documentation available in Hayes (2013). www.guilford.com/p/hayes3

****
Model = 4
Y = II
X = SC
M = OP

Sample size
297

****
Outcome: OP

Model Summary

R	R-sq	MSE	F	df1	df2	p
.8012	.6419	.3166	528.7189	1.0000	295.0000	.0000

Model

	coeff	se	t	p	LLCI	ULCI
constant	.6508	.1929	3.3738	.0008	.2712	1.0304
SC	1.0449	.0454	22.9939	.0000	.9555	1.1343

****
Outcome: II

Model Summary

R	R-sq	MSE	F	df1	df2	p
.7031	.4943	.2936	143.7037	2.0000	294.0000	.0000

Model

	coeff	se	t	p	LLCI	ULCI
constant	1.4833	.1893	7.8346	.0000	1.1107	1.8559
OP	.3666	.0561	6.5374	.0000	.2562	.4769
SC	.3015	.0731	4.1232	.0000	.1576	.4455

********** TOTAL EFFECT MODEL **********
Outcome: II

Model Summary

R	R-sq	MSE	F	df1	df2	p
.6487	.4208	.3352	214.3441	1.0000	295.0000	.0000

Model

	coeff	se	t	p	LLCI	ULCI
constant	1.7218	.1985	8.6751	.0000	1.3312	2.1125
SC	.6846	.0468	14.6405	.0000	.5925	.7766

********** TOTAL, DIRECT, AND INDIRECT EFFECTS **********

Total effect of X on Y

Effect	SE	t	p	LLCI	ULCI
.6846	.0468	14.6405	.0000	.5925	.7766

Direct effect of X on Y

Effect	SE	t	p	LLCI	ULCI
.3015	.0731	4.1232	.0000	.1576	.4455

Indirect effect of X on Y

	Effect	Boot SE	BootLLCI	BootULCI
OP	.3830	.0680	.2534	.5220

Partially standardized indirect effect of X on Y

	Effect	Boot SE	BootLLCI	BootULCI
OP	.5043	.0913	.3301	.6870

Completely standardized indirect effect of X on Y

	Effect	Boot SE	BootLLCI	BootULCI
OP	.3630	.0656	.2406	.4991

Ratio of indirect to total effect of X on Y

	Effect	Boot SE	BootLLCI	BootULCI
OP	.5595	.1223	.3492	.8316

Ratio of indirect to direct effect of X on Y

	Effect	Boot SE	BootLLCI	BootULCI
OP	1.2702	10.5110	.5340	4.7952

R-squared mediation effect size (R-sq_med)

	Effect	Boot SE	BootLLCI	BootULCI
OP	.3916	.0477	.2967	.4849

Normal theory tests for indirect effect

Effect	se	Z	p
.3830	.0610	6.2827	.0000

********** ANALYSIS NOTES AND WARNINGS **********

Number of bootstrap samples for bias corrected bootstrap confidence intervals:
5000

Level of confidence for all confidence intervals in output:
95.00

NOTE: The Johnson-Neyman method is available only for Models 1 and 3

NOTE: Kappa-squared is disabled from output as of version 2.16.

------ END MATRIX -----