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FORMAL NETWORKING AND PERFORMANCE IN SOUTH AFRICA'S ICT INDUSTRY

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A research report submitted to the Faculty of Commerce, Law and Management, University of the Witwatersrand, in partial fulfilment of the requirements for the degree of Master of Management specialising in Entrepreneurship and New Venture Creation

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ABSTRACT

Globally, information communication technologies (ICT) have experienced rapid growth since the 1990's. In South Africa, information communication technology now accounts for a larger percentage of the Gross Domestic Product than other sectors. Thus, ICT is an important driver of entrepreneurship, employment creation and economic development in SA. As such, one of the critical questions is how to ensure the competitiveness and performance of ICT firms.

Entrepreneurship studies argue that the performance of entrepreneurial firms is affected by, amongst other things, the firms' social capital such as formal networks. This study, therefore, examined the impact of formal networks on firm entrepreneurial performance of ICT firms in SA, paying specific attention to weak ties as well as the moderating role of the environment. The study adopted a positivist paradigm which relied on quantitative data, using a descriptive survey method. Applying probability sampling, a sample of 120 firms were surveyed from an industry database, achieving a 14% response rate. This response rate is adequate for the generalisation of the results (Urban & Sefalafala, 2015).

In analysing the data, factor analysis to reduce several variables into latent factors was performed. Thereafter, statistical linear regression modelling was performed using the continuous dependent variable – Firm Entrepreneurial Performance indicated by: Growth in Sales and Market Share, and Profitability; and the continuous independent variable of Formal Networking indicated by: Network Tie Strength and Relationship Quality and Nature sub-constructs.

The results demonstrate significant correlation between formal networking and firm entrepreneurial performance as well as weak ties. However, the results indicate no evidence for the moderating role of the environment. At a theoretical level, this shows that formal networking and weak ties are beneficial to ICT firms but the environment is a contingent factor. At a practical level, managers and firm owners should consider joining formal networks that promote weak tie relationships in order to access complementary assets and valuable information. Policy makers and other

stakeholders should devise policies and programmes that support entrepreneurial ICT firms to engage in formal networking.

The limitations of the study include the following: first, the study was cross sectional and limited to ICT firms on an industry database; second, the control variables did not include firm size. Future research should consider a longitudinal study to test the long-term impact of firm entrepreneurial behaviour as well as firm size to inform firm specific research. More studies should test the moderating role of environment.

KEY WORDS: ICT, Social Capital, Formal Networking, Weak Network Ties, Environment, Firm Entrepreneurial Performance

DECLARATION

_____, declare that this research report is my own work except as indicated in the references and acknowledgements. It is submitted in partial fulfilment of the requirements for the degree of Master of Management in the University of the Witwatersrand, Johannesburg. It has not been submitted before for any degree or examination in this or any other university.

RIZELLE MARIA SAMPSON

Signed at …….

On the …….. day of ……. 2017

DEDICATION

I thank Almighty God who granted me the opportunity to go back to school - each day was gift.

I dedicate this work to my parents: Christopher and Theresa Sampson who I know watch over me always.

And, especially to my children: Sizwe, Thandiwe and Mkhetheni - you give my life purpose.

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The process to get to submission of this research report was as daunting as it was interesting and humbling. It compelled me to stay focused and disciplined. Even as I relied on many people for support and encouragement because even though the work can be lonely and immersive, one can only succeed knowing that you have the support and love of friends and family.

Therefore, I would like to start by thanking my family, especially my sister Catherine for believing in me. My gratitude also goes to ‘my people’: Dr. Adele Bleazard, Mrs. Irene Charnely, Mrs. Desiree Jones, Dr. Phumzile Mlambo-Ngcuka, Dr. Sebiletso Mokone-Matabane and Ms. Lyndall Shope-Mafole. Individually and collectively you never fail to inspire me and to show me that an attitude of life long learning and perseverance are catalysts for success.

To my supervisor, Dr. José Barreira, I am eternally grateful for your patience and guidance without which I would not have been able to master the subject matter of my research, and ultimately own it.

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A special thank you to all the fabulous people in my life who add colour to my life and keep me sane: Akeida, Aziza, Busi, Jacqui, Mandla, Neil, Nthabi, Thembisa, - knowing that I could lean on you a little more this past year is a gift I will always cherish. Also to Chrissie and Sis Phathi, I appreciate and love you.

Finally, my gratitude also goes to my friends and former colleagues in the ICT industry who voluntarily completed my survey - your contribution and insights have served to enrich my study.

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1 CHAPTER 1: INTRODUCTION

1.1 Purpose of the study

The purpose of this study is to understand the perceived impact of the decision to participate in formal networks on the firm entrepreneurial performance. The study focuses specifically on information communication technology (ICT) firms in South Africa. Evidence from entrepreneurship studies suggests that a key precondition for firms to be innovative and grow is the ability to establish and leverage networks (Jarillo, 1989; Partanen, Moller, Westerlund, Rajala & Rajala, 2008). Limited internal resources push firms to seek complementary assets required for organisational performance by leveraging various relationships and networks with external parties (Teece, 1996; Tzanakis, 2013). These include the personal and business relationships and networks of core personnel, such as the owner, and other strategic managers (Stam, Arzlanian & Elfring, 2014).

Empirical studies on social capital and entrepreneurship (Honig, 1998; Lake, 2004; Kwon & Arenius, 2008; Schoonjans, Van Cauwenberge & Bauwhede, 2013) point to the benefits of formal networks on firm entrepreneurial performance and success. Firm entrepreneurial performance can be measured using financial indicators such as growth of sales, market share and profit (Foley & Edwards, 1999; Tzanakis, 2013). Furthermore, scholars such as Barreira (2004), and Schoonjans et al. (2013), showed that firms with formal networks comprising membership in industry and professional associations, are likely to show growth in the above-mentioned performance indicators.

While these positive performance indicators apply to firms in all industries, it has been proven to be more evident in high technology industries in Western countries (Bhagavatula, Elfring, van Tijlberg & van de Bunt, 2010; Schoonjans et al., 2013). The extent to which these studies are applicable to countries behind the technological frontier, such as South Africa, given their peculiar conditions, seems to have received less attention. There is a need to understand the impact of formal networks on the entrepreneurial performance of ICT firms in South Africa.

Formal networks consider constructs relating to the relational and structural dimensions of social capital. These dimensions deal with the nature and quality of relationships, the strength of network ties, and how the position of the firm within the network structure creates advantage for the firm (Granovetter, 1983; Westlund & Bolton, 2003; Kwon & Arenius, 2008; Stam et al., 2014). The usefulness of any inter-firm relationship is informed by the cultural and social context within which the firm operates (Urban, 2011).

Social capital is context dependent, meaning that the environment within which social interactions and relationships occur influences the nature of formal networks (Foley & Edwards, 1999; Tzanakis, 2013). It can also be argued that the environment can play either a constraining or facilitating role on firm performance (Adler & Kwon, 2002; Kwon & Arenius, 2008), moderating the relationship between formal networking and firm entrepreneurial performance. In the case of technological firms, their technological capability may also impact the entrepreneurial performance of the firm, depending on the operating environment (Zahra & Garvis, 2000; Sefalafala, 2012). Thus, this study will examine how formal business network relations of high technology firms in South Africa's ICT industry affects business success.

The subsequent sections provide the background and context of the study, the problem statement and significance of the study. This is followed by the delimitations and assumptions made by the researcher as well as the definition of terms and concludes with a brief outline of the subsequent chapters.

1.2 Background of the study

Empirical evidence (Wiklund & Shepherd, 2003; DeCarolis & Saparito, 2006; Schoonjans et al., 2013) supports the link between firm growth and entrepreneurial behaviour. While there are a limited number of exceptions (Maurer & Ebers, 2006), the majority of studies postulate that social capital and network relationships are beneficial to the firm (Maurer et al., 2011). In line with Schumpeter's (1934) entrepreneurship theories, scholars such as Miller (1983) noted that both firms and individuals can be entrepreneurial. Scholars (Schumpeter, 1934; Ireland, Kuratko &

Covin, 2003; Kirzner, 2009) have described firms and individuals who: 1. engage in activities of new product, technology and market innovation; 2. undertake business ventures that carry an element of risk; and 3. proactively seek to outdo their competitors by exploiting opportunities in new markets, as embodying entrepreneurial orientation (EO), and therefore, define them as entrepreneurs.

This study follows Leyden, Link & Siegel's (2014) thesis that focused on entrepreneurial behaviour and social context. In line with Granovetter's (1985) argument that economic behaviour does not occur within a social vacuum, their thesis recognised that entrepreneurship occurs in uncertain environments and that social networking is a strategic management tool that help firms manage their responses to the environment and thus increase entrepreneurial success. Inter-firm economic transactions occur within a social context and are based on past experiences of dealings and social relations between firms (Granovetter, 1985; Uzzi, 1997; Elfring & Hulsink, 2013).

Leyden et al. (2014) hypothesised that social networks are key to knowledge acquisition. They found a positive correlation between the probability of entrepreneurial success in terms of desired innovation and the size and heterogeneity of the entrepreneurs' social network. Thus, their thesis aligns with Granovetter's (1973) notion of weak ties of socially distant connections, and the resource-based view of social capital theory that suggests that actors utilise social relations to access resources, knowledge and information owned by other actors within their network (Jarillo, 1988) in order to achieve organisational goals. These formal networks are accessed by leveraging the personal involvement of key personnel as both office bearers and active members of these networks.

Traditionally, studies on entrepreneurship have focused on the individual and general characteristics of EO: proactiveness, risk taking and innovativeness (Lumpkin & Dess, 1996). However, in recent times, technological entrepreneurship and corporate entrepreneurship have emerged as new areas of study (Shane & Venkataraman, 2004). Consequently, scholars have recognised the role of techno-entrepreneurship and corporate entrepreneurship in fostering national prosperity (Rothwell & Ziegfeld, 1982). Techno-entrepreneurship can be described as a

business leadership style (Dorf & Byers, 2005), whereas, corporate entrepreneurship involves the integration of innovation in business processes, in business models, and in the overall management and strategic functions of the firm (Teng, 2007; Morris et al., 2011; Kuratko, Hornsby & Covin, 2013). Thus, technological firms that decide to behave entrepreneurially can be described as engaging in corporate technological entrepreneurship.

Successful technology innovation and entrepreneurship require that firms adapt to change by building their complementary assets through collaboration and strategic alliances with actors external to the firm (Teece, 1996; Teng, 2007). Accordingly, the firm would be able to access beneficial knowledge, capabilities and resources required to achieve the firms' strategic objectives (Gulati, 1995a; Teng, 2007). Some scholars regard these alliances as strategic management tools that support organisational efforts to achieve its mission and vision (Dyer & Singh, 1998; Schoonjans et al., 2013; Jafri, Ismail, Khurram & Soehod, 2014).

This study is consistent with the notion that technological entrepreneurship (also referred to as techno-entrepreneurship and technopreneurship) development is key to innovation, economic development and the sustainable growth of firms, in particular those that operate in volatile technology environments (Jafri et al., 2014). Scholars have found EO and technological entrepreneurship to be more evident in dynamic growth environments or highly volatile technology environments such as the ICT industry (Zahra, 1991; Timothy, 1999; Hashi & Krasniqi, 2011; Jafri et al., 2014) in which technological entrepreneurship occurs. Urban and Sefalafala (2015) who argued that EO and entrepreneurial capabilities require environmental conditions that are more dynamic and less hostile in order for the technological firm to thrive, support these findings.

Moreover, successful technological innovation and entrepreneurship requires that firms build their complementary assets by collaborating and building relations with customers, suppliers, and other firms in order to access beneficial knowledge, capabilities and resources (Teece, 1996; Talarowska & Tuzinovic, 2008). This can be achieved through formal networking. Formal networking enables the firm to spread costs, reduce risks and uncertainty, innovate through collaborative R&D

processes, transfer knowledge and skills, collectively lobby government and regulatory authorities for policy and legislative reform, and ultimately benefit from being part of one of the fastest growing industries in the world (Partanen & Moller, 2012; Sefalafala, 2012), the information communication technology (ICT) industry.

Formal networks are conceptualised as a form of strategic inter-firm organisation or cooperative arrangement that can be used to position the firm to achieve strategic objectives and enhance competitive advantage (Jarillo, 1988; Teng, 2007). These arrangements usually entail long term contractual relations designed to give firms in a network more access to information and other resources, than can be secured by their competitors outside the network (Jarillo, 1988). Empirical research has shown that entrepreneurial firms that are more innovative tend to actively engage in interfirm strategic alliances to gain competitive advantage (Eisenhardt & Schoonhoven, 1996). Thus, strategic alliances are useful in filling resource gaps to enable the firm to achieve competitive advantage (Teng, 2007). Therefore, this study examines formal networking from the resource-based view of the firm. Accordingly, social capital, specifically formal networks, can facilitate the acquisition of much needed resources by supplementing the education, experience and financial capital of strategic managers and owners, as well as by facilitating knowledge exchange and collaborative responses to problems in the environment (Granovetter, 1985; Burt, 2004; Greve & Salaff, 2003; Dobson, Breslin, Suckley, Barton & Rodriguez, 2013; Urban, 2011).

Empirical research indicates that whilst entrepreneurial strategies may be successful under certain conditions, it may fail in others (Covin & Slevin, 1989; Teng, 2007). As previously mentioned, network relations are socially contextualised (Granovetter, 1973; Leyden et al., 2014). As such, the literature indicates that the effectiveness of firm networking activities depends on the environmental context in which the firm is located (Barringer & Bluedom, 1999; Pirolo & Presutti, 2010; Urban, 2011; Stam et al., 2014). The environment in which this study is located is South Africa's ICT industry, which is briefly discussed hereafter.

1.3 South Africa's ICT industry

Globally, the ICT industry is one of the fastest growing industries (Partanen & Moller, 2012). In general, the South African ICT industry is regarded as a vector for socio-economic development in South Africa (Network Readiness Index, 2015). A World Bank (2009) study suggested a direct link between the rollout of broadband networks, the provision of access, job creation and socio-economic development. Ho and Wilson (2005) suggested that high technology firms have contributed to the economy through technological innovation, regional development and job creation. However, while there are opportunities arising from an increased uptake of ICTs, specifically internet bandwidth, and from South Africa being regarded as the most innovative country in sub-Saharan Africa (GEM 2015/16), the country has many challenges to overcome before it can realise the full potential of ICTs as a driver of socio-economic development (National Development Plan 2030, 2011).

One such challenge has been highlighted in the Johannesburg Centre for Software Engineering (JCSE) ICT Skills Survey (2016) which found that ICT firms in South Africa face a critical skills shortage. Accordingly, the JCSE (2016) recommended that ICT firms in South Africa come together to find a solution to fill the skills gap and lobby the government and tertiary institutions to create an enabling environment for capacity building. Collaborating under the auspices of a formal network could facilitate an industry wide response to challenges as well as leverage opportunities (Barringer & Bluedom, 1999; Jafri et al., 2014) to sustain and grow the contribution of the ICT industry to the economy. Formal networks have been found to be instrumental in promoting growth and innovation in the ICT industry (Partanen & Moller, 2012). Participation in formal networks could mean joining industry associations such as the South African Communications Forum (SACF) and professional associations such as the Institute of Information Technology Professionals South Africa (IITPSA).

This study therefore seeks to measure the perceived impact of social capital, in particular, formal networks on firm entrepreneurial performance of a high technology industry in South Africa. The data sample was drawn from the ICT industry (Elfring & Hulsink, 2003). It builds on the body of knowledge of the theory of entrepreneurial

networks, focusing specifically on ICT firms, as well as considering the moderating effect of environmental conditions influenced by regulatory and policy developments, competition and business practices within the context of the South African ICT industry.

1.4 Problem statement

1.4.1 Main problem

Social capital theory suggests that better connected individuals and organisations tend to perform better (Bourdieu, 1986; Adler & Kwon, 2002; Granovetter, 1985; Dyer & Singh, 1998; Burt, 2004; Dobson et al., 2013). Hite and Hesterly (2001) argued that formal networking influences firm entrepreneurial performance. Similarly, Teng (2007) proposed that corporate entrepreneurship activities of the firm related to resource acquisition, may benefit significantly from inter-firm cooperative arrangements or strategic alliances. This is especially the case for high-tech firms that are innovative and embedded in on-going social and economic relations based on the personal and business networks of entrepreneurs, managers and owners, which are used to benefit the firm (Barney, 1991; Teece, 1996; Elfring & Hulsink, 2003; Stam et al., 2014). In the South African context, ICT firms have, historically, successfully used formal networking structures as lobby groups to influence the development and implementation of transformative policies and laws by government that benefit the firms.

Notwithstanding the evidence supporting the importance of social capital to firm entrepreneurial performance, research on formal business networking remains scarce (Parker, 2008). Previous studies by scholars such as Dyer and Nobeoka (2000) and Partanen and Moller (2012) have investigated the antecedents and the impact of the cognitive, relational, and structural dimensions of social capital on performance measures. However, these studies have mainly concentrated on stable business environments, such as the automotive industry, neglecting complex (Murimbika, 2011) and dynamic contexts such as the ICT industry. Where attempts have been made to cover dynamic contexts, it seems the focus has largely been on

first world countries such as the United States of America and Germany, with very little emphasis on developing countries, such as South Africa (Barriera, 2004; Venter, 2005; Maurer, Bartsch & Ebers, 2011; Urban, 2011; Schoonjans et al., 2013).

As a result, research on the effect of formal networking on the performance of high technology firms found in the ICT industry, in a developing country context such as South Africa, has not received much attention. It also seems that there is very little known about the impact of the relational and structural dimensions of social capital or the effects of weak and strong inter-firm ties on firm entrepreneurial performance in this industry. In light of this problem statement, the following sub-problems arise:

1.4.2 Sub-problems

1.4.2.1 Sub-problem 1

Literature suggests that firms derive different benefits from being in or out of a formal network (Uzzi, 1996; Urban, 2011; Hite and Hesterly, 2001; Stam et al., 2014; Venter, Urban, Beder, Oosthuizen, Reddy & Venter, 2015). The specific ways in which firms and network actors relate in a network, whether formal or informal, is referred to as network ties, which can be strong or weak (Saha & Banerjee, 2015). These ties relate to the internal and external relationships of the entrepreneur or firm through which information and opportunities can be sourced (Adler & Kwon, 2002; Barriera et al., 2015). While both strong and weak ties are argued to influence the ability of the firm to collaborate and innovate, according to Elfring and Hulsink (2007), it is weak ties and diverse networks rich in structural holes that are required for the development of innovative solutions by ICT firms. Therefore, there is a need to examine the perceived impact of formal network relations, specifically focussing on weak network ties, on the entrepreneurial performance of ICT firms in South Africa.

1.4.2.2 Sub-problem 2

Literature argues that environmental factors play a moderating role on the relationship between social capital and firm entrepreneurial performance (Shree & Urban, 2013, Urban & Sefalafala, 2015). In South Africa, ICT firms operate in an

environment that has both dynamic and hostile characteristics which can promote or constrain the firms' entrepreneurial performance, respectively. Therefore, there is a need to examine the moderating effect of the environment on the relationship between formal networking and the entrepreneurial performance of ICT firms in South Africa.

1.5 Significance of the study

This study is expected to have implications at both the practical and theoretical levels. At a theoretical level, the findings of this study extends and updates the literature relating to the relational and structural dimensions of social capital, looking specifically at formal networking activities of technological firms in South Africa's ICT industry. In so doing, a better understanding of the nature and quality of relationships based on the benefits that firms derive from formal networking (in contrast to informal networking) will be developed.

It is also envisaged that the study will reveal the ideal network ties intensity (Lin, 1999) or mix of entrepreneurial network tie strength: weak or strong (Uzzi, 1996, 1997, 1999; Elfring & Hulsink, 2003), that would be most beneficial to the performance of ICT firms in South Africa. The study also examines the moderating effects of a hostile and dynamic environment on the effectiveness of formal networking on firm entrepreneurial performance (Stam et al., 2014).

From a practical perspective, the study provides insights to policy-makers, and the management of industry network associations as well as their members (firms and individuals) as they devise network membership programmes to foster ICT industry development. As the ICT industry is widely recognised as a significant contributor to socio-economic development (World Bank, 2003; NDP 2030, 2013), it is envisaged that policy makers will obtain useful information to enable them to create appropriate mechanisms and incentives that encourages entrepreneurial behaviour in ICT firms through the creation and use of formal networks, as well as to put in place transformative measures to enhance networking outcomes. Insights are provided to firm owners and strategic managers on the purpose and potential benefits of formal network membership. Thus, this study informs and encourages corporate

technological entrepreneurship through the strategic management tool of formal networking among ICT firms in South Africa.

1.6 Delimitations of the study

Delimitation refers to the deliberate and justifiable scope of study beyond which generalisation of the results is not intended (Muringani, 2015). This study has the following delimitations:

- This research was limited to ICT industry firms in South Africa of any size (large or small) that are registered with the Companies and Intellectual Property Commission (CIPC);
- The online web-based survey was directed to strategic managers and owners of the firms;
- All firms surveyed are established ICT enterprises and have been operating for at least three years in South Africa;
- ICT firms surveyed may or may not be members of a formal member network or business association; and
- ICT firms surveyed may or may not have been licensed by the ICT industry regulator, the Independent Communications Authority of South Africa (ICASA).

1.7 Definition of terms

The following are some definitions deemed necessary in order to understand the report:-

Competitive advantage refers to the ability of the firm or industry to outperform its competitors in terms of profitability (Sefalafala, 2012).

Corporate Entrepreneurship broadly describes the process of developing novel business ideas and new opportunities within established firms (Scheepers et al., 2007).

Entrepreneurial firms refers to those firms that have a willingness to take on business-related risks, to opt for change and innovation, and to assume an aggressive competitive posture compared to its competitors (Leiblein & Reuer, 2004).

Entrepreneurship refers to the recognition and exploitation of opportunities beyond the resources you control (Stevenson & Jarillo, 1991; De Carolis & Shapiro, 2006).

Formal Networking refers to the use of formal industry networks, business associations and strategic alliances through which a collection of actors (people or firms) and their strategic links who belong to the network, exchange information, ideas, resources and skills with each other (Johnsen & Johnsen, 1999; Fuller-Love & Thomas, 2004; Bennet & Ramsden, 2007) for mutual benefit (Lake, 2004) and for the benefit of the firm (Teng, 2007).

Information Communication Technologies (ICT) industry broadly refers to the industry that developed from the convergence of the telecommunications industry, the computing and broadcasting industries (OECD, 2001).

Nature of relationships refers to a subset of the relational dimension of social capital, and generally relates to activities and exchanges between two or more actors that can result in benefits accruing to those actors.

Network ties refer to the specific ways in which actors relate (Saha & Banerjee, 2015). These ties relate to the internal and external relationships of the entrepreneur or firm through which information and opportunities can be sourced (Adler & Kwon, 2002; Barriera et al., 2015), and allude to network structure, links, relationships between network actors, network tie strength as well as the enabling role of networks.

Network tie strength refers to the extensity of weak and strong ties. Weak ties are loose relationships between firms or individuals, whereas strong ties refer to close familial relationships (Lin, 1999; Stam et al., 2014).

Quality of relationships is a subset of the relational dimension of social capital measured by frequency and type of interaction (close or distant, arms-length or embedded), that facilitates trusted resource and knowledge exchanges (Uzzi, 1997; Stam et al., 2014).

Social Capital refers to “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” (Nahapiet & Ghoshal, 1998, p. 243).

Technopreneurship refers to entails the identification of high-potential, technology-intensive commercial opportunities, the acquisition of resources, and the management of significant growth and risk by firm leadership (Dorf & Byers, 2005).

1.8 Assumptions

Assumptions that could influence the outcome of the research report include:

- The convenient sample used in the study represents the population of ICT firms in South African across all geographical areas, and therefore the results can be generalised.
- It is expected that all respondents have in-depth knowledge of the ICT sector within the South African context, and that their responses are truthful and represent their views or the views of their firms.
- It is expected that selected ICT firms and respondents would be co-operative and willing to participate in the research.
- All respondents have access to the internet as a requirement to access the online survey questionnaire.

1.9 Structure and outline of the report

The outline of the subsequent chapters is provided here. Chapter 2 is a review of literature focusing on the main constructs of the study. It begins by introducing the scope and structure of the study. Thereafter, a discussion relating to the background, the dependent, independent, and the moderating variables, follows. It concludes with a theoretical framework and a summary of the hypothesis derived from the research problem discussed in Section 1.4.

Chapter 3 provides a description of the research methodology, identifies the population and sample, research instruments used to develop the actual instrument used for empirical research, the data collection methodology and ends with a discussion on approaches to data analysis and hypothesis testing.

Chapter 4 presents the research empirical results and findings. It starts with descriptive statistics giving the biographical information and frequency of responses, followed by measurement of the scales of the dependent, independent, and moderating variables in terms of reliability and validity. It ends with the results test hypotheses as well as providing a summary.

Chapter 5 provides an analysis of the results in relation to the literature review and addresses the problem statement.

Chapter 6 is the final chapter of this study. It provides concluding remarks, major findings, recommendations, limitations of this study and proposes areas for future research.

2 CHAPTER 2 - LITERATURE REVIEW

2.1 Introduction

A literature review provides a theoretical review of extant theory as it relates to the problem of study (Creswell, 2008). Creswell (2008) further posits that literature reviews provide meaningful context to the research project by locating it within already existing research. Furthermore, he indicated that in a quantitative study such as this, a literature review can be used deductively as a basis for advancing research questions and testing hypotheses.

Entrepreneurship, social capital and strategic management are interrelated and indivisible constructs that have been proven to each contribute to firm success through creating and maintaining competitive advantage, firm sustainability, firm entrepreneurial performance, and wealth creation (Certo, Covin, Daily & Dalton, 2001; Ireland, Kuratko & Covin, 2003; Murimbika, 2011; Urban, 2011). A tradition of studying entrepreneurial relationships and their effect on firm success exists in entrepreneurship theory with scholars referring to this line of research as the 'network approach to entrepreneurship' (Witt et al., 2008). Accordingly, entrepreneurs utilise the relationships embedded in their personal and business contacts to learn, pool inter-firm resources, and collaborate in order to identify new and emerging opportunities in the marketplace that lead to wealth creation (Shane & Venkataraman, 2000; Witt et al., 2008). As argued by Jack, Moult, Anderson, Dodd, & Jack (2010), networking is fundamentally the social enactment of entrepreneurship.

Thus, we view the firm's decision to build networks to augment its own shortcomings, and create competitiveness in pursuit of wealth creation as strategic decisions aimed at bridging the resource and capabilities gaps within the firm (Hitt, Ireland & Hoskisson, 2009). Along with opportunity recognition and exploitation, firms utilise strategic alliances to access knowledge, resources and capabilities (Haeussler, Patzelt & Zahra, 2012) that they lack internally. These alliances are actively and intentionally established strategic networks comprising a specific set of organisations, each with agreed upon roles and tasks that aim to close informational

and resource gaps, whilst bridging the social legitimisation requirements of the firm (Jack et al., 2010; Moller, 2013).

Previous scholars have examined networking from a process perspective, looking at the stages or phases of building relationships of Dutch ICT firms (Elfring & Hulsink, 2007). To build legitimacy of the field, researchers have focused mainly on the relationship outcomes and benefits of networking (Jack et al., 2010). Whilst being acknowledged as crucial for the development of innovations, for competitiveness creation and growth, literature on inter-firm cooperative relationships of formal networks has not been adequately covered in the relation to corporate entrepreneurship (Antoncic & Prodan, 2008). Developing a better understanding of the functional and strategic role of networks in supporting organisational growth requires further research (Jack et al., 2010).

Extant literature was reviewed to provide a theoretical basis for this study relating to entrepreneurship, technological entrepreneurship at firm level (corporate technological entrepreneurship), and social capital, specifically formal networks of inter-firm weak network ties. Economic activity does not occur in a vacuum, but is rooted in culture and social context (Granovetter, 1985; Urban, 2011) which influences entrepreneurial performance. As such, the moderating effect of the social context or external environment on the relationship between firm entrepreneurial performance and inter-firm relations, specifically formal networking (Dess & Beard, 1984; Sarkar, Echambadi & Harrison, 2001) in South Africa's ICT industry is also examined. A conceptual overview of the study is illustrated in Figure 1.

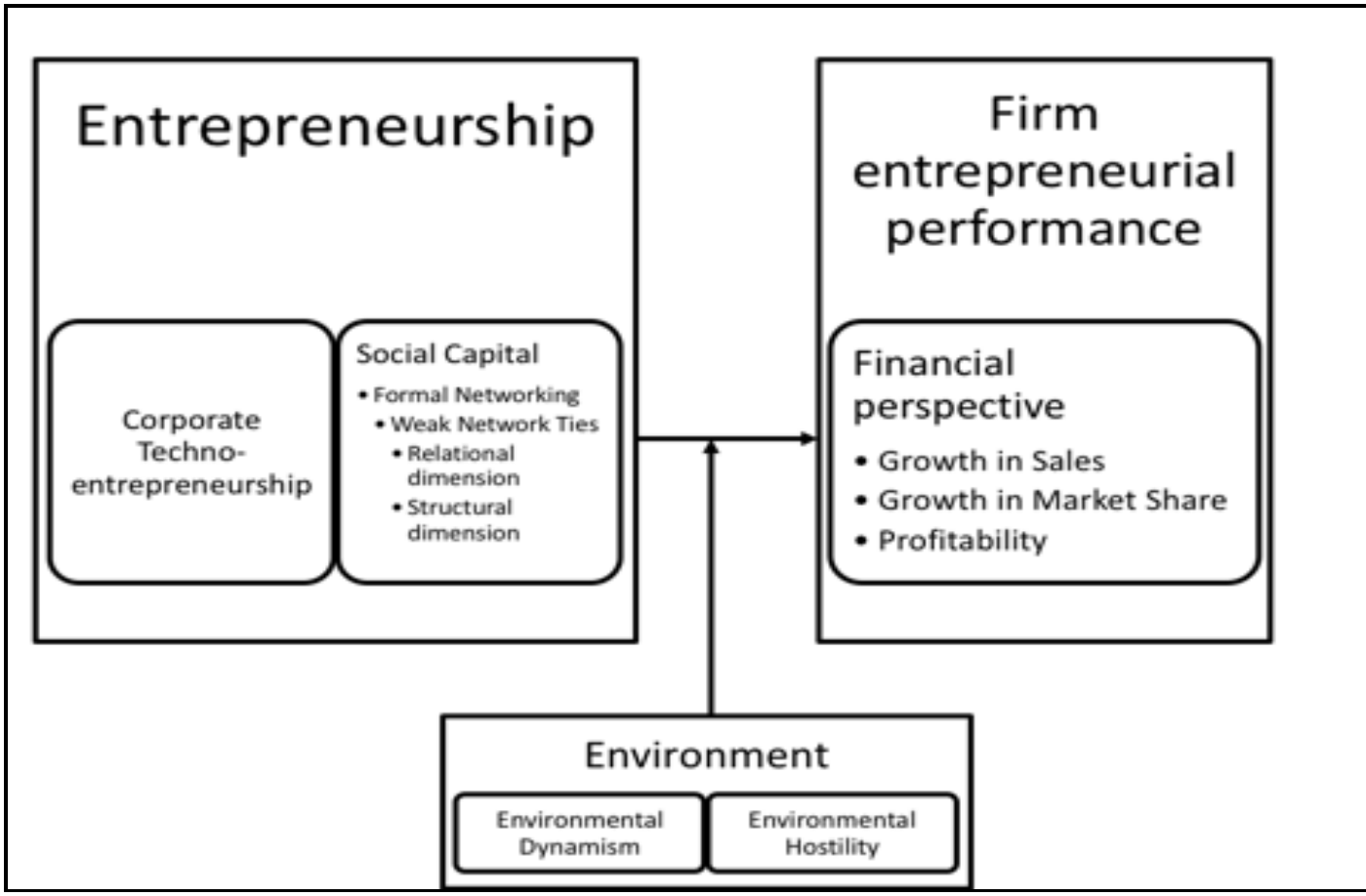

Figure 1: Overview of the study (Author's construction)

The literature review begins with a background discussion on entrepreneurship and entrepreneurial capabilities. It specifically looks at entrepreneurship practices within high technology firms (also referred to as corporate and techno-entrepreneurship or corporate technological entrepreneurship). The section on entrepreneurial capabilities includes an abbreviated review of human capital, technological capital and financial capital literature. Social capital literature is reviewed in more detail to locate the focus on formal networking. This is followed by a detailed discussion of the dependent, independent, and moderating variables being: firm entrepreneurial performance, formal networking, and the environment, respectively. The literature review concludes with a theoretical framework and the summary of hypotheses which illustrates the associations of the proposed constructs.

2.2 Background discussion

This section sets the context of the discussion, defining key theories and constructs. It starts by discussing entrepreneurship in general, and then specifically, corporate entrepreneurship and technological entrepreneurship. A discussion on entrepreneurial capabilities follows. This section culminates with the researcher positioning social capital in the form of formal networking as the focal point of the discussion. Firm entrepreneurial performance and environmental factors that moderate the relationship between formal networking and firm entrepreneurial performance is also elaborated on.

2.2.1 Entrepreneurship

Even though scholars have not reached consensus on the definition of entrepreneurship, they generally agree on the notion of what comprises entrepreneurship studies (Shane, 2013; Zahra & Wright, 2011; Leyden et al., 2014). Shane and Venkataraman (2000, p. 218) defined entrepreneurship as encompassing "the sources of opportunity; the processes of discovery, evaluation and exploitation of opportunities; and the set of individuals who discover, evaluate and exploit them". Most scholarly definitions in the field of entrepreneurship are confined to the person of the entrepreneur (who), and entrepreneurial behaviour (what the person does) (Sirec & Bradac, 2009) in reference to opportunity discovery and exploitation (Shane & Venkataraman, 2000). Other scholars such as Morris, Kuratko and Covin (2008) take a process approach to entrepreneurship, defining it as a value creating process that involves bringing together unique combinations of resources to exploit opportunity.

Evident in these definitions is the notion that exploiting opportunity for value creation is a key driver of entrepreneurial activity (Baltar & de Coulon, 2014). Value creation includes opening new markets; creating new production methods, and capturing new sources of supply through the exploitation of opportunities arising from changes in the external environment (Schumpeter, 1934) in order to enhance firm performance. Schumpeter (1934) viewed value creating individuals as innovative entrepreneurs.

Interestingly, early debates on entrepreneurship seemed to have focused on the individual despite Schumpeter's (1934) advice that entrepreneurship can be undertaken at multiple levels: individual, firm and even state agency. Entrepreneurship literature has evolved to describe the entrepreneurship phenomenon as involving three interrelated elements which influence entrepreneurial success: the individual, the firm, and the environment (Hisrich, 2000; Barreira, 2004). As such, the entrepreneurial process entails activities and behaviours of innovative individuals or firms in relation to opportunities in their environment (Kirzner, 2009; Morris & Sexton, 1996; Shane & Venkataraman, 2000; Venkataraman, 1997; Leyden et al., 2014).

Based on Schumpeter's concept of innovative entrepreneurship, scholars such as Kirzner (2009) and Lumpkin and Dess (1996) have sought to identify the specific qualities that generate successful entrepreneurial decisions. Accordingly, Kirzner (2009) developed the concept of entrepreneurial alertness based on the entrepreneurs' ability to bring change to the existing market. Such change is made possible by the ability of the entrepreneur to notice imminent opportunities that are "around the corner" earlier than others, and to have "flashes of superior insight" that can inform entrepreneurial opportunity seeking as well as stimulate entrepreneurship at firm level (Alvarez & Barney, 2002; Ireland, Hitt & Sirmon, 2003). Innovation relates to the creation and introduction of new products, processes and systems that offer opportunities for growth (Teng, 2007).

Besides the entrepreneurial traits of innovativeness and proactiveness espoused in the alertness quality of the entrepreneur, extant entrepreneurship literature reveals the additional dimension of risk-taking (Lumpkin & Dess, 1996) as an important element of EO. EO refers to the strategy making processes that provides organisations with a basis for entrepreneurial decisions and actions (Wiklund & Shepherd, 2003; Lumpkin & Dess, 2004). It is understood that firms and individuals who are innovative, who undertake business ventures that carry a certain element of risk, and who proactively seek to outdo their competitors have entrepreneurial orientation (Schumpeter, 1934; Miller, 1983; Ireland et al., 2003; Kirzner, 2009). In a recent study, Urban and Barreira (2010) have provided the following explanatory descriptions of the elements of EO:

- Innovativeness - relates to the willingness of an organisation to add newness and value;
- Proactiveness - concerns adaptability and tolerance, and the ability to ensure that initiatives are implemented; and
- Risk-taking - relates to the willingness to take calculated business risks by committing significant resources to opportunities, without being certain of the outcome.

Thus, EO involves the processes, practices and decision-making styles of innovative firms (Urban & Barreira, 2010) and individuals. In addition to the three dimensions of EO, Lumpkin and Dess (1996) argued that autonomy and competitive aggressiveness are also important EO dimensions. However, empirical EO researchers have, in the main, focused on EO measures that examine only the three aforementioned elements (Covin & Slevin, 1989, 1991, 1997; Lumpkin & Dess, 1996, 2001, 2004).

Having EO facilitates the pursuit of new opportunities to enhance entrepreneurial performance. However, it may not be adequate for wealth creation, particularly in new ventures as possessing EO does not automatically translate into improved performance (Wiklund & Shepherd, 2005). Hence, in addition to EO, different factors that impact firm performance have been identified by scholars. These include the firm's industry operating environment; inadequate internal resources; and inadequate absorptive capacity within the firm. In addition, the entrepreneur, whether it is an individual or a firm, can invent or identify technological opportunities to enhance its performance (Kirzner, 2009; Murimbika, 2011; Leyden et al., 2014).

Studies show mixed results for the impact of EO on firm entrepreneurial performance, with some scholars even finding weak, or no correlation between EO and firm entrepreneurial performance (Lumpkin & Dess, 2001; Stam & Elfring, 2008, Urban & Barriera, 2010). Thus, firm-level entrepreneurship or corporate entrepreneurship is considered to be crucial for the survival, growth and renewal of the firm (Vesper, 1990; Covin & Slevin, 1991a, 1991b; Zahra, 1991, 1996; Antoncic & Prodan, 2008), making EO a central construct in corporate entrepreneurship theory. As such, the interface of technology and corporate entrepreneurship (hereinafter referred to as corporate technopreneurship) was the underlying field of

study (Venter, Urban, Beder, Oosthuizen & Reddy, 2015) for this research. This approach is particularly relevant when examining the entrepreneurial behaviour of high technology firms (Elfring & Hulsink, 2003) such as those in the ICT industry. The following sections briefly discusses both corporate entrepreneurship and technological entrepreneurship, respectively.

2.2.2 Corporate entrepreneurship

The conceptual description of corporate entrepreneurship aligns well with the Schumpeterian concept of entrepreneurship as value creating through new combinations that result in discontinuity (Antoncic & Hisrich, 2003) of products, processes, and techniques. Sharma and Chrisman (1999) defined corporate entrepreneurship as a process through which an individual or a group in an existing organisation creates an entity, or starts organisational renewal or innovation within that organisation. Corporate entrepreneurship refers to the processes through which firms form new ventures, innovate and transform by changing their business model or processes (Teng, 2007). Furthermore, effective corporate entrepreneurship has been found to create resource gaps, which precipitates the formation of inter-firm alliances to access external resources (Teng, 2007). Thus, corporate entrepreneurship entails a management decision for the organisation to behave entrepreneurially (Morris, 2008).

Corporate entrepreneurial activities of the firm entail the strategic integration of an entrepreneurial mind-set in the firm's vision, mission, objectives, and operational structures (Covin & Slevin, 1991; Murimbika, 2011). Effective corporate entrepreneurship have been found to result in sustained organisational regeneration, rejuvenation, strategic renewal, and domain redefinition (Dess et al., 2003) as well as specific practices, processes and decision-making methodologies applied by organisational leaders in pursuit of competitive advantage (Covin & Slevin, 1991, Murimbika, 2011). Consequently, Antoncic and Hisrich (2003) argued that firm entrepreneurial performance is the most important outcome of the corporate entrepreneurial process, making it an important contributor to the growth, survival and renewal of the firm (Ireland et al., 2003; Antoncic & Prodan, 2008).

As such, this study located the decision to build and maintain social capital, specifically formal networks, in the construct of corporate entrepreneurship that entails entrepreneurial behaviour. Moreover, combined with the concept of technological entrepreneurship, a simplistic understanding of corporate technological entrepreneurship can thus be described as involving a decision by a technological firm to behave entrepreneurially.

2.2.3 Technopreneurship

Schumpeter (1883-2000) viewed entrepreneurs as innovators who combine the factors of production through the process of “creative destruction” to find better ways to meet existing demand, and create new products that result in technological obsolescence of current products and technologies. Based on this definition, Dorf and Byers (2005) made a case for technological entrepreneurship. Accordingly, they argued that technological entrepreneurship (also referred to as technopreneurship) can be defined as a style of business leadership that involves the identification of high-potential, technology-intensive commercial opportunities, and managing risk and rapid growth using principled decision-making skills.

Literature on technopreneurship theory shows that even though technopreneurs have broad and adequate technical expertise, they generally lack the know-how required to be successful (Shane, 2003; Prodan, 2007; Antoncic & Prodan, 2008). Hence, they search for knowledge and resources outside their firms to compensate for inadequate knowledge and resources within the firm (Teece, 1996). Furthermore, due to the importance of trust in relationships between scientists, technopreneurs tend to consult other scientists more readily to solve problems rather than their non-technical counterparts (Allen et al., 2007).

Technological innovation has long been viewed as an integral part of entrepreneurship (Drucker, 1985), and the individual as its primary driving force (Schumpeter, 1934). Rothwell and Zegveld (1982) concluded that technology based firms play a role in the prosperity and development of a nation. As such, technological entrepreneurship development is key to innovation and the sustainable growth of firms (Jafri et al., 2014) and the economy. Furthermore, the technological capability of innovative firms is also a key driver of competitive advantage through

superior performance that is a critical contributor to firm performance (Walker, Boyd, Mullins & Larréché, 2003; Gunday, Ulusoy, Kilic & Alpkan, 2011). Consequently, technopreneurs are considered to be entrepreneurial individuals with technical skills, expert knowledge of emerging technological developments and innovativeness, who can recognise and anticipate high technology opportunities that can be discontinuous and disruptive and that lead to the emergence of entirely new markets (Shane, 2003; Urban & Barreira, 2010).

Petti and Zhang (2011) highlighted two dimensions of technopreneurship, namely: 1. the entrepreneurial dimension being the enterprise's capability to recognise technological business opportunities; and 2. the managerial dimension found in the ability of the enterprise to develop compelling value propositions and business models to exploit opportunities. Thus, entrepreneurial firms combine organisational resources and technical systems with strategies to pursue opportunities (Shane & Venkataraman, 2004). Studies also indicate that both internal and external factors, such as: intellectual property, technical knowledge and human resources; and social norms influence firm level technological entrepreneurship (Elfring & Hulsink, 2003; Antoncic & Prodan, 2008; Petti & Zhang, 2011). As with the general understanding of entrepreneurship, it can be argued that technopreneurship is a complex, multi-disciplinary and multi-level construct that occurs at both the individual and firm level (Morris & Sexton, 1996; Venkataraman, 1997; Shane & Venkataraman, 2000; Hitt, Lee & Yucel, 2002; Prodan, 2007; Kirzner, 2009). Therefore, techno-entrepreneurship is considered to build upon the body of knowledge that the emergence of a technological path cannot be attributed to any one individual actor, but involves a collective or group of actors (Braun & Macdonald, 1982; Bijker, Hughes, Pinch,1987; Garud & Van de Ven, 1987; Latour, 1991; Bijker & Law, 1992; Karnøe, 1993).

2.2.4 Entrepreneurial capabilities

Entrepreneurial capabilities comprise the broad range of abilities, such as skills and knowledge that are located within the firm which the firm can deploy in response to its organisational requirements (Urban & Sefalafala, 2015). There are three perspectives of entrepreneurial capabilities, namely: the resource based view (RBV),

the information based view (IBV) and the knowledge based view (KBV). These perspectives identify the capabilities that a firms needs, and how they are acquired and deployed within the firm.

The capabilities perspective suggests that firms need to have appropriate stocks of resources and capabilities, which if used effectively would result in a competitive advantage (Haeussler et al., 2012). Such capabilities and resources include: human capital, social capital, technological capital and financial capital, of firms considered to be critical for firm entrepreneurial performance (Teece et al., 1997; Deeds, 2001; Obrecht, 2004; Zhou, 2007; Shree & Urban, 2012; Urban & Sefalafala, 2015). Similarly, Sirmon and Hitt (2003) regarded these capabilities and the stocks of capital they represent to be the most important resources for the effective management of company capability and resources. The following subsection firstly discusses the three perspectives, providing detail in the RBV theory of entrepreneurship, and secondly, identifies the entrepreneurial capabilities required by firms.

2.2.4.1 Resource-based view theory of entrepreneurship

The resource-based view theory of entrepreneurship (RBV) espouses the notion that the availability of resources, or lack thereof, can contribute to a firm's decision to enter into strategic alliances (Hauessler et al., 2012). Accordingly, firms are seen as bundles of resources and capabilities that influence success (Lu, 2007). These resources which must be valuable, rate, imperfectly imitable and imperfectly substitutable (Barney, 1991) may result in competitive advantage for the firm. As few firms possess all the resources, skills and knowledge required to reach their strategic objectives, they are forced to leverage their internal resources to access resources in the possession of external actors within its network (Jarillo, 1989). Therefore, Teece et al. (1997) argued that firm success can be attributed to the rents accruing to owners of scarce, firm-specific, difficult to copy knowledge and resources that a firm uses to lower costs and offer superior quality products.

Scholars (Haeussler et al., 2012) treat resources and capabilities as two interchangeable constructs, or draw distinction between the constructs. For instance, literature presents resources as stocks of tangible or intangible assets such as knowledge, information, patents, funding, physical equipment and machinery and

technology which are used by the firm as production inputs for conversion into products and services (Grant, 1991). Capabilities are considered to refer to special types of intangible assets or knowledge-based factors that are associated with individuals, are organisationally embedded, non-transferable, unique to the firm, and purposive for improving productivity of other resources owned by the firm (Amit & Schoemaker, 1993; Deeds, 2001; Makadok, 2001). Thus, both constructs point to tangible and intangible assets owned by the firm which it can leverage to identify and exploit opportunities, and create competitive advantage.

The resource-based view also suggests that the purpose of all strategy is to enhance the value creation potential of firm resources (Teng, 2007). Therefore, it follows that in order to achieve entrepreneurial success, the firm must develop competitive advantages that are value creating (Li & Ogunmokun, 2001; Lu & Beamish, 2001; Peng, 2001; Dhanaraj & Beamish, 2003; Ruzzier, Hisrich & Antoncic, 2006; Lu, Zhou, Bruton & Li; 2010). Thus, the RBV assumes that firms have unique collections of resources and capabilities that can be integrated into their processes and systems for conversion into competitive advantage, performance, and wealth creation (Acedo, Barroso & Galan, 2006; Murimbika, 2011). In support of this view, Deeds (2001) proposed that firm performance is reliant on the its unique internal resources and capabilities, and that firm capabilities are the main source of the firm's entrepreneurial performance advantages (Grant, 1991; Knight & Cavusgil, 2004).

However, simply owning resources cannot be considered a source of competitive advantage (Teng, 2007; Murimbika, 2011). Appropriate stocks of resources and capabilities do not guarantee financial success (Haeussler et al., 2012). Rather, organisations require appropriate stocks of tangible and intangible resources and capabilities that can be utilised effectively to achieve competitive advantage (Amit & Shoemaker, 1993; Teece, Pisano & Shuen, 1997). This suggests that the correct balance of intangibles comprising: innovative ideas, enterprising individuals, knowledge, processes and a culture that promotes risk taking; be combined with tangible resources such as: financial capital and infrastructure, to develop technologically superior businesses (Venkataraman, 2004; King, Felin & Whettin, 2010). The work of King et al. (2010) and Lefebvre, Sorenson, Henchion, and Gellynck (2016) make reference to two other perspectives that inform how

entrepreneurial firms secure and utilise resources and capabilities. These are discussed below.

2.2.4.2 Other perspectives of entrepreneurial resources and capabilities

As with the RBV, other perspectives of entrepreneurial resources and capabilities relate to the firm securing competitive advantage. These include the internal perspective of the firm and the knowledge-based view of the firm are described below:

1. The internal perspective of the firm refers to the view that the firm's resources, knowledge and capabilities are important bond-building processes through which the firm can achieve its goals (King, Felin & Whettin, 2010). These processes represent the inter-firm social relations in which all economic activity is rooted that has gained wide acceptance among scholars (Granovetter, 1985; Anderson & Miller, 2003; Ulhøi, 2005; Jack et al., 2010).

   Moreover, scholars (Hitt et al., 2009; Zahra, Sapienza & Davidsson, 2006; Murimbika, 2011) contend that resources become a source of competitive advantage only when they enable firms to perform tasks and activities that are convertible to organisational capabilities that lead to wealth creation. Therefore, it is argued that the exploitation of resources to formulate and implement value creating strategies through business processes that support entrepreneurial posture is the actual source of competitive advantage (Murimbika, 2011). In order to survive and grow, firms are required to invest in the development of their internal resources and capabilities, failing which, they are forced to look to the resources and capabilities of external actors to fill their internal resource and capability gaps. Given the inexperience of new technology firms and the limited resources they are able to assemble; these firms can be vulnerable to their more established counterparts based on their ability to exploit opportunities (Haeussler et al., 2012).

   Haeussler et al. (2012) argued that in order for firms to gain significantly from joining strategic alliances or networks and mitigate against the risk of failure, careful exploitation of the firm's own capabilities and an assessment of the

capabilities of potential network actors is required (Haeussler et al., 2012) prior to joining a network. In so doing, resources and capabilities may enable the firm to create economic profit and competitive advantage from both the assets owned and those acquired by the firm (Teece et al., 1997).

2. The knowledge-based view (KPV) considers knowledge to be the most important resource of firm competitiveness. This view is based on the notion that the creation and application of knowledge exposes the firm to new opportunities (Grant, 1996; Lefebvre et al., 2016). In the KPV, the firm is viewed as a knowledge repository, and knowledge and competency are key contributors to competitiveness (Nelson & Winter, 1982).

2.3 Types of Entrepreneurial capabilities

Based on the three perspectives of entrepreneurial capabilities: RBV, IBV and KBV, a firm has to acquire and deploy different types of capabilities and resources. These capabilities and references can be grouped into four categories: human capital, technological capital, financial capital, and social capital, (Teece et al., 1997; Deeds, 2001; Obrecht, 2004; Zhou, 2007; Shree & Urban, 2012; Urban & Sefalafala, 2015). These capabilities are discussed in sequentially order in the section here below.

2.3.1 Human capabilities

Human capital comprises the stock of knowledge and skills that resides within individuals (Becker, 1964). It can be developed over time, acquired and transferred between individuals (Wright, Hmieleski, Siegel & Ensley, 2007; Marvel, 2011). Elements such as education, work experience, entrepreneurial experience, prior knowledge of customer problems, experiential knowledge, productive and efficient potential, business knowledge and skills, all define human capital (Venter, Urban & Rwigema, 2008; Shree & Urban, 2012; Sefalafala & Urban, 2015). The knowledge capacity of the individuals and the firm are important factors of competitive advantage (Duneas, 2013). Human capital is embedded in individuals and is also expressed as a collective of individual efforts organized within a firm (Lin, 2001; 2005; Zhou, 2005). As argued by Duneas (2013), individuals with high levels of

human capital are most likely the champions of technological entrepreneurship which involves the commercialisation of unique technical knowledge and human capital. Furthermore, any shortfalls in human capital that the firm identifies internally, may be overcome through its relationships with other network actors. Thus, in addition to the expected high human capital of successful technopreneurs, they also generally require high social capital (Bozeman, Dietz & Gaughan, 2001; Duneas, 2013). Becker (1964) regarded education and experience as the most central descriptors of human capital. As technology industries are typically knowledge based, Duneas (2013) suggested that the experience of the technopreneur is the source of social relations through which they can acquire resources.

Shrader and Siegel's (2007) longitudinal study on the role of human capital in the growth and development of 198 new technology-based ventures emphasised the importance of the fit between strategy and team experience in the long-term performance of high-tech entrepreneurial ventures. Human capital stimulates entrepreneurial alertness, opportunity recognition and exploitation (Urban & Sefalafala, 2015). Thus, employing strategies that are complementary to the human capital of the firm contributes to technological firm success. Furthermore, research shows that human capital is important for opportunity recognition (Davidsson & Honig, 2003; Ucbasaran, Westhead & Wright, 2008; Marvel, 2011), and therefore it is critical for entrepreneurial success. (Sefalafala, 2012).

Along with the entrepreneurs' human capital, entrepreneurship literature generally agrees that the growth of new technology firms (Colombo & Grilli, 2005), and relationships to other actors contribute to technological business performance (Bates, 1990; Cooper et al., 1994). Thus, we discuss technological capability and capital next, followed by an introduction to social capital capabilities of firms.

2.3.2 Technological capabilities

Technological development drives economic development, and as such, it contributes to building competitive advantage for developing countries to compete globally (Urban & Barreira, 2010). Technological capabilities are knowledge based strategic orientations that manifest in the firm's scientific knowledge and competencies (Leiblein & Miller, 2003; Urban & Barreira, 2010; Haeussler, Patzelt &

Zahra, 2012). Technological capability skills are internal to the firm and are activated by market, competitor, and external challenges and opportunities (Song, Di Benedetto & Nason, 2007). These capabilities involve manufacturing processes, technological innovation, new product development, production facilities, and the forecasting of technological change in the industry (Urban & Sefalafala, 2015).

Technological capital and capabilities refer to the effective use, acquisition and conversion of the firm's existing technology and technological knowledge through a process of commercialisation in support of its performance strategy (Duneas, 2013; Urban & Sefalafala, 2015). Harnessing these technological capabilities can result in improved efficiency in the production process, thus reducing costs and improving quality consistency, and therefore, competitiveness (Day, 1994; Lumpkin & Dess, 1996; Slater & Narver, 2000). Walker et al. (2003) considered the ownership of technological capabilities to be of greater importance to those that thrive in competitive environments marked by rapid technological change, such as: ICT, biotechnology, medical care, and aerospace firms. In the case of technology firms, technological capability is usually based on the prior knowledge and experience, or the human capital of the technopreneur, founder and managers (Leiblein & Miller, 2003; Haussier et al., 2010), as well as on their social capital (Duneas, 2013). Duneas (2013) suggested that due to the 'liability of newness' suffered by new technological ventures, and the importance of accessing and controlling technological resources required for innovation and sustaining competitive advantage of existing technological firms, inter-firm collaboration and cooperation through social networks is important for the survival of technological firms.

2.3.3 Financial capabilities

Financial capability refers to the firm's ability to access and employ financial capital: equity capital, debt capital, and venture capital (Sefalafala, 2015), for resource acquisition in pursuit of organisational goals. Scholars generally agree that firms created by higher human capital individuals find it easier to access financial capital (Colombo & Grilli, 2009). Furthermore, research shows that entrepreneurs who have social ties to resource providers, such as financial institutions and strategic equity

partners, are more likely to secure required resources from those ties (Ekhardt & Shane, 2010).

Financial capital is a key contributor to firm success, and plays an important role in the establishment of new technology firms. Conversely, the lack of funding is a major contributor to the failure of entrepreneurial ventures. It therefore follows that a shortage of financial capital negatively affects firm EO as the ability of the firm to behave innovatively, proactively, and to be risk-taking is compromised. Access to adequate financial resources is critical to high technology firms, particularly at the start-up phase in the lifecycle of the firm as financial capital provides the resources to cover high set-up costs such as researching the market, setting up international and foreign offices, setting up communication flows, catering for duties and tariffs (Cooper et al., 1994; Shree & Urban, 2012; Urban & Sefalafala, 2015).

As such, financial capability is considered to be an important construct of the resource-based theory as the more financial capital available to the firm, the greater the opportunities for conversion of financial capital into other resources such as capital equipment and technology (Cooper, Gimeno-Gacson & Woo, 1994; Shree & Urban, 2012; Urban & Sefalafala, 2015).

2.3.4 Social capabilities

Social capital refers to the goodwill and resources that emanate from social relations that a collective of actors can mobilise in pursuit of shared goals (Adler & Kwon, 2002; Urban, 2011). Accordingly, the effects of social capital flow from the information, influence, and solidarity available to the entrepreneur (Adler & Kwon, 2002). Social capability comprises both the resources that firms can mobilise through networking activities, as well as the actual network that facilitates action (Urban, 2011; Urban & Sefalafala, 2015). In other words, it refers to the resources embedded in social networks and relationships that can be accessed or mobilised through network ties (Lin, 2001a). Accordingly, networks and relationships provide the firm with the ability to gain competitive advantage through mutually supportive relationships that provide information, create opportunities and enable resources to be accessed (Urban & Sefalafala, 2015). As indicated by Urban (2011), some scholars argue that social capital may be the most significant source of competitive

advantage for entrepreneurs. Supporting this view, entrepreneurship scholars (Jarillo, 1989; Hoang & Antoncic, 2003; Hung, 2006; Jack, 2005; Partanen, Moller, Westerlund, Rajala & Rajala, 2008) suggest that network mobilisation capability or the ability to establish partnerships and networks, is a critical contributor to firm innovation and growth

Bozeman and Dietz (2005) highlighted the interdependence between social and human capital of technopreneurs. Social interaction enables an actor to leverage another actors' capital including their human, financial, technological, and even social capital (Lin, 2001a) in order to improve performance (Ajayi, 2016). Interestingly, other forms of capital such as financial, human, and technological seem to have some degree of "fixedness", whereas social capital is more fluid, present within networks of individuals, constituting the distributed capital embedded within a community or ecosystem (Lin, 2001a; 2005; Zhou, 2005). Along with human and technological capital, social capital is seen as an important capability required for firm performance (Obrecht, 2004). Participation in a strategic network implies cooperation amongst firms in the network, and competitive behaviour against other networks (Partanen & Moller, 2011).

Research on social capital indicates that network relationships between firms vary between weak arm's-length; and strong, embedded ties (Uzzi, 1999). This study looked at social capital and specifically, focuses on formal networks as far as the quality, nature and strength of relationships and network ties (Granovetter, 1985; Yli-Renko, Autio & Sapienza, 2001) influence firm performance.

2.4 Firm entrepreneurial performance

Researchers have, for some time, acknowledged that firm performance is a broad, multidimensional construct (Venkatraman & Ramanujam, 1986; Stam et al., 2014) that is difficult to determine (Delmar & Shane, 2004; Leiva, Alegre & Monge, 2014), and that the choice of measurement indicator, and the task of measuring performance is challenging (Mayer-Haug, Read, Brinkmann, Dew & Grichnik, 2013). There are various ways to measure firm performance, ranging from financial: profitability, to non-financial: innovativeness measures. The lack of consensus on the

appropriate measure of firm performance is exacerbated by the interchangeable use of the terms ‘firm performance’ and ‘success’ by scholars (Urban, Van Vuuren & Barreira, 2008). Notwithstanding this broadness and the lack of consensus on a measurement indicator for firm performance, there is strong agreement among scholars that entrepreneurial activities such as networking correlate positively with enhancing firm entrepreneurial performance (Wiklund & Shepherd, 2005; Batjargal, 2003; Mohutsiwa, 2012).

This section discusses firm entrepreneurial performance in detail. It is structured accordingly in this sequence: first it discusses measurement of firm entrepreneurial performance. This is followed by reviewing influencing factors and types of measurement or indicators, as well as the challenges with measurement of firm entrepreneurial performance. It concludes with examining the approach adopted by scholars to measure firm entrepreneurial performance and motivate for its applicability in this study.

Firm performance is an indicator of how well or poorly a firm is doing (Phandya & Rao, 1998), and it is considered to be an outcome of entrepreneurship (Mayer-Haug et al., 2013). Firm entrepreneurial performance can be defined as the degree of fulfilment of strategic goals (Arino, 2003). This definition was adopted for this study as it allows firms to choose measurements peculiar to their context and in line with their mission and vision.

It can be argued that how well a firm performs depends on a number of factors, including: its relationships with other organisations and its ability to secure competitive advantage (Sirec & Bradac, 2009; Roy, 2012); and its competencies related to financial management, strategic planning, marketing and human resource management (Urban et al., 2008). Numerous studies have provided an empirical basis for the effect of networking on the performance of entrepreneurial firms (Talarowska & Tuzinovic, 2008; Bernadino & Jones, 2009; Gronum, Verreynne & Kastelle, 2012; Ajayi, 2016). Networking has been linked to sales (Pirolo & Presutti, 2010) and availability of credit (Uzzi, 1999).

Sandberg and Hofer (1987) argued that industry conditions greatly impact firm performance as it affects the resources available to the venture and, as a result, its

strategic choices (Young, Tsai, Wang, Liu & Ahlstrom, 2014). The fit between the firm's unique resources and the entrepreneur's networking and social capital resources, stimulates the firm's innovative capacity, which contributes to growth (Jafri et al., 2014). Thus, firms in growing and hi-tech industries may outperform other firms, regardless of their behaviour (Lumpkin & Dess, 1996; Zahra & Covin, 2003; Sefalafala, 2012; Schoonjans et al., 2013).

Scholars use various measurements, to measure performance (Barreira, 2004). The choice of measurement used seems to be influenced by various factors including firm age, industry type, and even the reason for creating the venture (Deeds, DeCarolis & Coombs, 1998). For instance, based on the economic perspective to create wealth, Deeds et al. (1998) proposed the use of market value added as a performance measure in preference to the growth and accounting measures used traditionally in entrepreneurship literature. Furthermore, scholars have found that some entrepreneurial behaviour correlates weakly to some performance measures (Deeds et al., 1998). Based on a survey amongst Australian SMEs, Watson (2007) found a positive relationship between formal networking and the probability of survival and growth.

While these measurements apply to entrepreneurial ventures in general, performance measurement can occur at multiple levels including at the individual (Burt, 1997a, 2007), and organisational levels (Alegre & Shiva, 2013). This discussion focuses on the latter, specifically looking at firm entrepreneurial performance as a result of formal networking activities. At the individual level, performance measures include earnings and career advancement (Audretsch, 2003; Payne et al., 2011). At the firm level, performance can be measured in terms of: objective financial measures (Park & Luo, 2001) or subjective financial measures (Yiu & Lau, 2008), and innovativeness (Maurer & Ebers, 2006). Organisational level assessments are based on comparisons with competitors to determine whether the firm is achieving its operational and strategic goals (Wiklund, Patzelt & Shepherd, 2009).

Dess and Robinson (1984) suggested that performance could be measured either objectively or subjectively. While objective measurements in general rely on financial data, subjective measurements depend upon managerial assessments. As done by

other authors, this study used perceptual measures of performance (Lu et al, 2010). Accordingly, in the main, previous research found the relationship between strategic networking and perceived or subjective firm performance to be positive, with few researchers showing mixed results.

Even though subjective performance measurements have been widely used in new venture research over the past two decades (Deeds et al., 1998; Wiklund & Shepherd, 2005; Li & Zhang, 2007; Campos et al., 2011; Sefalafala, 2012), the variation in the level of expectations of entrepreneurs make subjective measurement of specifically new venture performance particularly problematic (Deeds et al., 1998). Additionally, the ability to verify financial performance figures is virtually impossible in the absence of audited financial statements (Covin & Slevin, 1990; Gruber, 2007; Urban et al., 2008). Additionally, scholars such as Murimbika (2011), writing on corporate entrepreneurship in large firms have also adopted subjective measures.

Previous studies have found that perceptual and subjective measures of firm performance correlate well with objective measures of performance (Lu et al., 2010). Furthermore, perceptual information is argued to provide higher levels of reliability and validity (Campos et al., 2011) as they are aligned with the internal objective performance measures of the firm (Su et al., 2015). This alignment is particularly so when this information comes from senior management who are responsible for driving strategy and realising the firms' goals (Covin & Slevin, 1990; Eisenhardt, 2013).

Venkatraman and Ramanujam (1986) recommended that researchers distinguish between financial and non-financial performance measures. Non-financial performance indicators focus on technical performance, survival, competitive capabilities, innovation, export performance, and perceptions of success, satisfaction, happiness, employee retention, market share, innovation, growth in employee numbers (Urban et al., 2008; Mayer-Haug et al., 2013; Stam et al., 2014) that captures the firm's broad operational effectiveness (Arino, 2003; Stam et al., 2014) as an indication of how well the firm has fulfilled its strategic goals. On the other hand, financial indicators refer to the achievement of economic goals (Stam et al., 2014). These financial indicators include accounting based measures of profitability such as: return on assets (ROA), return on equity (ROE), and return on

sales (ROS). Zahra (1996) argued that due to a possible trade-off arising between profitability and growth, both these variables should be used as they capture distinct facets of performance. Growth measures include perceived and objective growth in sales, profit, employment and market share (Stam et al., 2014).

Financial and non-financial performance measures can be used individually or in combination to determine firm entrepreneurial performance (Mohutsiwa, 2012). Accordingly, the impact of networking on firm entrepreneurial performance has been measured using both financial and non-financial indicators (Uzzi & Gillespie, 2002; Pirolo & Presutti, 2010; Schoonjans et al., 2013). Furthermore, specifically looking at the formal networking and firm entrepreneurial performance, Arino (2003) argued that there are three main measurement areas:

1. Financial measures – profitability, growth and cost position;
2. Operational measures – contract stability and survival; and
3. Organisational effectiveness measures – overall measure of how well the firm or the alliance/network has achieved its strategic goals.

Deeds et al. (1998) however, mentioned a different set of measurement areas: accounting, growth, and market-based measures in their summary of firm performance measures.

Other scholars emphasise firm age as a determinant of firm growth or success; indicating that based on a liability of newness, start-up firms (Elfring & Hulsing, 2003) tend to form relationships with external actors in the market (Uzzi, 1997) to gain access to knowledge and resources possessed by older, more established, firms in the network. Geographic proximity is also considered to be a source of innovation (Deeds, DeCarolis & Coombs, 1998). For instance, Deeds et al., 1998 argued that external sources of knowledge among like-minded firms located within the same geographical area is imperative to innovation as it promotes idea exchange through organisational networks. Moreover, innovation is considered to have the highest degree of risk amongst all types of business activities (Teece, 1992). To improve returns on their innovation investments, firms may choose to form alliances (Teng, 2007) with firms that are geographically close and like-minded. As such, it is clear

that authors assign different causes to the growth impact of formal networking. Therefore, even though the outcomes of networking in general represents the bulk of network research (Jack et al., 2010), the underlying causes and benefits of formal business-to-business networks amongst high technology firms in South Africa's ICT industry that voluntarily share information and resources deserves further attention (Parker, 2008; Schoonjans et al., 2013).

The variances among scholars about measurement areas, reveals that researchers have not agreed on the appropriate measure of firm performance. However, growth is considered to be the crucial indicator of entrepreneurial success (Urban et al., 2008). Growth has been found to be a more accurate and easily accessible performance indicator than any other accounting measure, and hence it is regarded as superior to other indicators of financial performance (Barreira, 2004). Furthermore, Davidsson et al. (2006) and Wiklund et al. (2009) argued that the use of multiple indicators of growth to measure firm entrepreneurial performance is more advantageous than a single growth indicator as it provides richer information to practitioners and researchers. Of the various growth metrics used to measure firm entrepreneurial performance, sales growth is considered to be the best measurement of firm growth (Barreira, 2004; Davidsson et al., 2006) for the following reasons:

1. Sales is indicative of both short and long term changes in the firm;
2. Sales data is fairly easy to secure;
3. Entrepreneurs commonly use sales growth to measure their own performance;
4. Sales growth is the most likely antecedent to growth of other resources e.g. employee and equipment acquisition takes place only after sales have increased – thus sales justify employment of additional workers and purchase of new machinery to meet growing demand; and
5. Sales applies to most firms and is insensitive to degree of capital intensity of operations and degree of integration.

Growth in the number of employees is regarded as the second most popular metric used to measure growth (Wiklund et al., 2009). Profitability has always been a popular indicator of firm entrepreneurial performance, and recent studies are

showing its importance as a precursor to growth, particularly in SMEs (Davidsson, Achtenhagen & Naldi, 2010). Davidsson et al. (2010) suggested that firms that grow successfully do so by first securing profitability, and then go for growth.

It is also argued that while it is easier to obtain information from publicly listed firms (Lu et al., 2010; Leiva et al., 2014) due to their disclosure requirements, it is a challenge to do so for privately owned firms and in particular, new ventures (Li & Zhang, 2007; Urban et al, 2008; Lu et al., 2010; Mohutsiwa, 2012; Sefalafala, 2012; Su et al., 2015). Accordingly, these scholars have found that in private companies this can be due to several reasons, among them:

- The inability and/or unwillingness of firms to provide absolute financial data for objective firm performance measurement, particularly in the case of SMEs;
- Variations in accounting practices across firms and countries that hamper the reconciliation of differences;
- Fluctuations in exchange rates between home and host countries of internationalising firms;

Following the work of previous scholars, this study adopted growth and financial indicators as measures for firm entrepreneurial performance, namely: profitability (Batjargal, 2010); growth in sales (Stam & Efring, 2008; Roy, 2012); and growth in market share (Maurer et al., 2011; Su et al., 2015). Adler and Kwon (2002) implied that social networks help explain entrepreneurial success as firms exploit their contacts and connections and the resources they bring to their own advantage. This study specifically examined the level of entrepreneurial success that firms in South Africa's ICT industry attribute to their ability to initiate, develop, maintain and utilise inter-firm relationships to access resources not under their control, and thus influence the success of the firm (Ajayi, 2016). Since firm entrepreneurial performance is defined as the degree of fulfilment of strategic goals, measures of growth in sales, growth in market share and profitability (Barreira, 2004; Davidsson et al., 2006, De Jong, 2009) will be adopted. These measures are arguably flexible and subjective (Arino, 2003). Furthermore, certain networking activities of entrepreneurial firms such as frequent meetings between network actors have been positively associated with firm performance (Urban, 2011). As such, the approach of this study justifies the reliance on the perceptions of strategic managers of ICT firms

operating in South Africa in the examination of the impact of formal networking on firm entrepreneurial performance.

2.5 Networking

Network theory relates to how firms gain competitive advantage by developing mutually supportive relationships with other actors in a network (Adler & Kwon, 2002). DeCarolis and Saparito (2006) advanced a theory that in part attributed entrepreneurial behaviour to the interplay of the environment, i.e. social networks. These networks are an asset residing in informal and formal relationships composed of the goodwill of friends, business associates, colleagues and other contacts (Burt, 1992; DeCarolis & Saparito, 2006).

Even though there has been an increase in literature that acknowledges the critical role of networking in entrepreneurship, few studies have examined social relations in an emerging economy context (Urban, 2011). In a developing economy context such as South Africa, with one of its primary goals being firm growth, firms can effectively use network relationships to gain competitive advantage (Urban & Sefalafala, 2015). As indicated by Partanen and Moller (2011), extant literature focuses primarily on stable business environments such as the automotive industry, neglecting complex dynamic industries such as the ICT industry.

Partanen and Moller (2012) viewed networks as strategic management tools through which organisational goals can be achieved. As the process of networking is premised on mobilising and accessing resources that are lacking within a firm, it involves the exploitation of more resources than what the firm owns (Jarillo, 1988). Accordingly, actors are able to mobilise the assets of the network and those embedded in the network that are available to members for mobilisation through the network (Bourdieu, 1986; Burt, 1992). As such, modern scholars view networking as an entrepreneurial behaviour that affects the entrepreneurial process positively by creating entrepreneurial opportunities for high technology innovation (Moenstad, 2010; Reeg, 2013).

Recently, studies on formal and informal networks have featured prominently in entrepreneurship theory (Witt et al., 2008; Soda & Zaheer, 2012). However, as much

as some scholars do not draw distinction between these networks, others, such as Allen, James and Garmien (2007) do, and still others concentrate on a particular form of networking (Fuller-Love & Thomas, 2004). Informal networks are based on the personal relations between individual entrepreneurs, established with the objective of sharing information, learning and mutual support and cooperation (Urban et al, 2015). In contrast, formal networks are seen as voluntary arrangements within which multiple actors interactively engage other firms in activities that will benefit the firm (Partanen & Moller, 2012). Other scholarly (Fuller-Love & Thomas, 2004) definitions of formal networks include the concept of cooperation, emphasising the interdependency that network actors have on each other for the achievement of goals. Scholars also argue that formal networks bridge organisational planning and strategic decisions within firms, whereas informal networks are opportunistic and uncertain (Allen et al. 2007).

Thus, the network success hypothesis which postulates a positive relationship between networking activities and firm success prevails in entrepreneurial network theory literature (Hoang & Antoncic, 2003; Elfring & Hulsink, 2007; Siu & Bao, 2008; Witt, Schroeter & Merz, 2008; Sirec & Bradac, 2009; Jack et al., 2010; Partanen & Moller, 2012; Eggis, 2016). Notwithstanding the relationship between networking and firm entrepreneurial performance, the literature shows that network research has mainly focused on the importance of informal social structures operating ‘behind the scenes’ (Soda & Zaheer, 2012), neglecting the role of formal networks. Therefore, this study focuses specifically on formal networks.

2.5.1 Formal networking

Formal networks are connections among organisations and members that constitute the network structure, and the processes that enable firms to access, exchange, or transmit critical organisational resources (Soda and Zaheer, 2012). Formal networking behaviour can be described as purposive actions by an entrepreneur or firm to build a long term relationship with other firms in order to gain something that it lacks (Witt, 2004). Therefore, formal networks can be viewed as productive resources that can be leveraged to achieve particular organisational goals that would otherwise not have been achievable, which resides in the social structure of

relationships among actors (Coleman, 1988). Scholars generally agree that networks assist the firm to achieve the following: 1. acquire and access resources at a lower cost than they could be obtained in the market; and 2. secure resources that would otherwise not be available in markets (Witt et al, 2008).

Formal networks can be characterised by overarching agreements, shared management, the pursuit of common goals (Partanen & Moller, 2012), and membership rules requiring each network actor to interact within the alliance for the benefit of the network. This type of network can be defined according to the strength of network ties, the quality of these ties, the frequency of meetings and other interactions, as well as the structural configuration of the network (Urban, 2011). Formal networks can be viewed as collaborative, voluntary relationships with competitors that firms build and maintain for strategic reasons (Fuller-Love & Thomas, 2004). This approach views network structures as: a collection of actors (individuals, business units, groups, firms), and their strategic links (family, community, peers, business partners, co-members in a network) with one another. Thus, emphasising that actors in a network are defined by the activities they perform and resources they hold (Talarowska & Tuzinovic, 2008). Since the objective of engaging in networking activities, such as: meeting with suppliers, attending conferences, presenting papers to government and regulatory authorities, etc., is informed by the strategic intention underpinning participation in the network, reasons for formal network participation vary amongst firms (Talarowska & Tuzinovic, 2008).

This line of thinking however, only addresses the motivation for networking, and does not deal with the processes and the dynamic nature of networks over time (Coviello, 2005). Consequently, an emerging theory focusing on network change is coming to the fore that addresses both process and content of networks (Jack et al., 2005). Their research proposed “that networks actually create the environment, as it is understood and operated by the entrepreneur, and that consequently the networking process is the enactment of the environment” (Jack et al., 2008, p. 125). Bollingtoft’s (2012) study of “bottom-up incubators” likewise supports the idea that networks can create an environment for entrepreneurship rather than being created by it.

Literature assumes that networking activities, network resources and network support are strategic management tools employed for the establishment, survival and sustenance of firms (Fuller-Love & Thomas, 2004; Eggis, 2016). Several studies investigate aspects of networking related to the value of networks, network redundancy and types of networks within small firms (Fuller-Love & Thomas, 2004; Schoonjans et al., 2013). Other scholars look at networking from the perspective of managerial and strategic networks, highlighting the level of decision-making involved in the decision to network.

Partanen et al. (2008) argued that the main difference in definitional emphasis of networking stems from whether the analysis of social capital is done from an individual organisation (the internal perspective), or between organisations (the external perspective). Inter-firm collaboration and strategic business-to-business network relationships have been a focus area in academic and business circles for some time (Partanen & Moller, 2011). This interest emanates from the position that networks are strategic management tools that affect the economic behaviour of firms (Uzzi, 1997; Partanen & Moller, 2011), and consequently is related to growth (Sefalafala, 2012). However, even though there is growing interest in entrepreneurial network theory, and research on this construct has increased, the concept is still considered to be in the developmental phase by some scholars as it comprises different uses and meanings from several scholarly perspectives (Adler & Kwon, 2002). Consequently, it is important for researchers to clarify their approach to, and definition of, social capital.

Furthermore, scholars describe the strategic decision to belong to, and cooperate with other firms in a formal network (Partanen & Moller, 2012) by numerous terminologies, making the study of the formal networking construct challenging (Jack et.al., 2010). These terms: strategic networks (Partanen & Moller, 2012), strategic alliances (Arino, 2003; Fuller-Love & Thomas, 2004), cooperative alliances (Fuller-Love & Thomas, 2004), alliances (Lavie, 2007), business networks (Fuller-Love & Thomas, 2004; Schoonjans et al., 2013); formal business-to-business networks (Talarowska & Tuzinovic, 2008; Schoonjans et al., 2013), and formal networks (Soda & Zaheer, 2012) tend to be similar and are often used interchangeably in literature.

Of these, Fuller-Love and Thomas (2004) described at least four different formal

network arrangements, including: strategic networks between at least two firms that merge to create a larger organisation; a cooperative venture where firms collaborate to establish a venture by pooling their resources for the benefit of the new venture; and strategic alliances comprising voluntary arrangements between firms, involving exchanging, sharing and co-developing products and services. Common among these descriptions of formal networking is the purposeful decision to build relationships with other firms in order to gain competitive advantage (Fuller-Love & Thomas, 2004). Although the variety of terminology is broad, authors generally agree that actors and their strategic connections or links with each other (Fuller-Love & Thomas, 2004; Partanen & Moller, 2012) comprise formal networks.

Participants in formal networks typically have agreed to the coordination of actions and resources (Kingsley & Malecki, 2002, Talarowska & Tuzinovic, 2008). Accordingly, these scholars suggested that these structural and procedural design choices are the consequences of decision to create organisation-environment fit, find strategic alignment, and implement process optimisation which reflect the firm's culture, values and strategic goals. Unlike hierarchies in which a unit controls and managers from the top, formal business networks can evolve (change shape) and be organised according to the willingness of actors in the relationship (Hollensen, 1998; Talarowska & Tuzinovic, 2008). Besides facilitating the acquisition of required resources, strategic networking can create an environment conducive to learning, and accelerate business formation, growth and innovation capacity; all factors that also contribute to innovation (Reeg, 2013). In this way, networking may enable access to information and resources which are important components of entrepreneurial opportunities (Shane & Venkataraman, 2000). Furthermore, networking improves the timeliness, quality and relevance of information (Burt, 1992; Adler & Kwon, 2002). For example, entrepreneurs with access to technical experts either directly or through their business associations, find out about an emerging technological innovation before their peers. Thus, giving them the ability to act upon this new information before it gets into the market and loses value.

The above perspectives of network relations indicate that it can provide individual network members access to the assets of the collective membership within the network, giving rise to credits and obligations among members of the social network

(Bourdieu, 1986). Networks are important strategic tools through which firms access resources and build competitive advantage. As such, the advancement of networks have been used extensively as a policy intervention by both the private and public sectors to promote competitiveness amongst firms (Kingsley, Malecki, 2002); Scholars (Hakansson & Snehota, 1994; Talarowska & Tuzinovic, 2008) suggest that the success and performance of network participants depends on their ability to cooperate with other actors, their capability to gain access to resources, and their ability to attach value of new, exogenous information, to assimilate it, and apply it for financial gain (Teng, 2007).

Furthermore, as mentioned, a close fit of the entrepreneurs' social capital resources and the firms' other resources may result in the enhancement of the firms' innovative capability deemed necessary for firm growth (Stam & Efring, 2008). To ensure that formal network relations remain an asset to the firm, it is important that the entrepreneur works to build and nurture relationships within the industry whilst augmenting this with close family and friend ties (Jafri et al., 2014). In this way, as suggested by Jafri et al. (2014), high levels of network centrality that could potentially inhibit firm growth can be avoided. Thus, for these firms, formal networks provide opportunities to access and acquire much needed resources for the firm to sustain itself, grow and survive. Therefore, alignment between strategic goals and networking activities is also critical for the firm to achieve its objectives.

Previous studies also suggest that to operate efficiently and achieve network goals, strategic networks require a central focal firm (Partanen & Moller, 2012). Partanen & Moller (2012) maintained that in the absence of such a central firm that for instance, drives the network vision, determines the best configuration for effective interaction, and builds a strong network brand, it is unlikely that the network will achieve its strategic goals. Network members are dependent on each other due to the investment in alliances, knowledge, shared resources, routines and governance structures (Talarowska & Tuzinovic, 2008; Partanen & Moller, 2012). Consequently, understanding a firm's embeddedness as it relates to the firm's position in a network, the quality of its ties to network actors, and the configuration or structure of the network provides the basis on which to make assumptions about firm performance and capability (Uzzi, 1996). As more firms are opting to enter into strategic alliances

as a way of extending firm operational boundaries in the search of knowledge and competencies (Antoncic & Prodan, 2008), this study argues that the corporate entrepreneurship and strategic management related decisions to engage in formal networking has an impact on firm entrepreneurial performance that is growth oriented (These terms tend to have similarities and are often used interchangeably in literature, for example (Barreira, 2004).

2.5.1.1 Motivations and benefits of formal networking

Literature on strategic networking mainly emphasises relationship benefits and outcomes, network roles and positions, network size, relationship strength, strategic fit, trust and network management capabilities and competences; largely disregarding how strategic networks are built (Urban & Sefalafala, 2015). Das and Teng's (2001) resource-based theory of alliances proposed that securing valuable and critical resources owned by other network actions is the raison d'être of alliance formation. As such, Partanen and Moller (2012) proffered a strategic management and RBV perspective of formal networks as voluntary, intentionally created inter-organisational structures consisting of various independent firms who have predetermined roles.

Entrepreneurial firms trade and acquire resources through networks (Lu et al., 2010). If entrepreneurship is the nexus of opportunity and enterprising individuals (Shane & Venkataraman, 2000), this study suggests that the nexus can be explained by looking at how firms build and leverage their social relationships to access required resources to exploit opportunities. Accordingly, entrepreneurial firms use formal networks as strategic tools to enhance business performance by linking entrepreneurs to opportunities, facilitating innovation, lowering transaction costs, providing support and legitimacy, and filling resource gaps (Teng, 2007; Barreira et al., 2015). The outcomes of networking represent the bulk of network research (Jack et al., 2010). Supporting the view of an outcomes based approach to research on formal networking, Haeussler et al. (2012) and Schoonjans et al. (2013) empirically found a positive correlation between formal networking and firm growth. Accordingly, scholars (Lin, 2001; Fuller-Love & Thomas, 2004) suggest that the usefulness and suitability of formal networking can be considered to be a firm-level investment in the future economic development or success of the firm.

Literature indicates that alliance building behaviour is particularly prevalent in new and small firms that suffer from the liability of newness (Zhang & White, 2016) due to their limited internal resource capability. Small and new firms often lack the internal capability and resources required to be successful and in order to survive and grow, external resources have to be generated and activated (Moensted, 2010). Scholars attribute firm growth to the ability of formal networking to minimise the effects of the liability of newness in small firms and the liability of foreignness in internationalising firms, as well as its ability to provide legitimacy and prevent firm failure (Jack et al., 2010; Lu et al., 2010; Moller, 2013; Barreira, Botha, Oosthuizen & Urban, 2015). Accordingly, Lu et al. (2010) suggested that firms in emerging economies, could overcome the above mentioned liabilities by proactively mobilising resources from other network actors. This is particularly relevant amongst high technology firms that have been found to extensively use formal networks to access knowledge resources and capabilities (Haeussler et al., 2012). Nahapiet & Ghoshal (1998) suggested that value lies both in the network ties and in the assets that can be mobilised through those ties. By participating in a formal network, entering firm managers are able to gain distant perspective and the opportunity to enter into alliances with third parties against their competitors (Talarowska & Tuzinovic, 2008).

As such, Fuller-Love and Thomas (2004) suggested that in general, networks do not operate out of concern for others, but out of self-interest. Some interdependency (Fuller-Love & Thomas, 2004) amongst firms driven by self-interest is thus an intrinsic feature of formal networking. Talarowska and Tuzinovic (2008) suggested that for cooperation in a network to be meaningful to the firm, the firm must have a dependency on the network to achieve at least some of its strategic goals. Further, those entrepreneurs who are able to tap into to a broad and diverse social network and who receive support from their network, are likely to be more successful.

This study takes the bridging approach to networking and network relations. This approach is consistent with the literature on how entrepreneurs use network connections to gain competitive advantage (Aldrich & Zimmer, 1986; Burt, 1992; Nahapiet & Ghoshal, 1998; Adler & Kwon, 2002; DeCarolis & Saparito, 2006). Thus, formal networks are manifested through the individual/firm's external connections to other actors. Thus, as argued by Hite and Hesterly (2001), personal relations evolve

from identity-based networks of strong links to an intentionally managed formal network comprising many weak ties (Elfring & Hulsink, 2007). The next section discusses the concept of formal network embeddedness, looking specifically at how the characteristics of formal networks affects entrepreneurial firm performance.

2.5.2 Characteristics of formal networks

Formal networks can be characterised by the embeddness of the firm in a network (Uzzi, 1996, 1997, 1999). This embeddeness can have two constituent parts: relational and structural embeddedness of network actors (Uzzi, 1996; 1997, 1999). Therefore, this section first gives an understanding of embeddeness, followed by discussing its constituent parts: relational and structural embeddedness of network actors. It ends with a summary of the key points of weak network ties and firm entrepreneurial performance, positioning the research hypotheses of the study.

2.5.2.1 Embeddedness of formal networks

In their study of the relationship between social and intellectual capital, Nahapiet and Ghoshal (1998) identified three distinct but interrelated dimensions of social capital: structural, relational and cognitive. Scholarly definitions of formal networking describe how it is formed, who is involved, what benefits arise from formal networking activities, and why formal networks are important mechanisms for achieving firm objectives (Sefalala, 2012). Broadly defined, relational embeddedness refers to the nature and quality of relationships; whereas structural embeddedness relates to the structural configuration of a firm's network, the firms positioning within that configuration (Moran, 2005), as well as the benefits the firm derives as an outcome of the position it occupies in the network.

It is generally accepted that the two dimensions of relational embeddedness and structural embeddedness could explain the beneficial effects of networking on firm performance (Granovetter, 1985; Gulati, 1998; Schoonjans et al., 2013). The cognitive-relational dimension of social capital is considered to inter-organisational strong tie, whereas the structural dimension is considered to be inter-organisational weak tie (Coviello, 2006; Presutti, Boari & Fratocchi, 2007; Bhagavatula et al., 2010).

Therefore, weak ties in principal applies to both relational and structural ties. Furthermore, Burt (1992) argued that strategically building networks through arms-length weak ties, increases the probability of high returns to firms by linking them to diverse pools of market information and resources, which in turn can be brokered to less informed actors in closed, strong tie relationships that tend to block out economically useful information. Therefore, both networking dimensions can have complementary roles in enhancing performance, implying that it is essential for firms to combine and integrate a mix of strong and weak networks into their networks, thus optimising the benefit of network activity as indicated by the financial performance of the firm (Uzzi, 1999; Schoonjans et al., 2013). Both strong and weak ties are useful and contribute to firm growth (Elfring & Hulsink, 2007).

Firm performance benefits of networks can be impacted by the influence and power that entrepreneurs who span disconnected networks have (Burt, 1992). These entrepreneurs determine who will gain from the disconnection, locating them in a favourable position during negotiations. Researchers (Uzzi, 1997; Rost, 2011) classify network ties as either “strong” or “weak”, depending on their intensity and strength, and these ties are considered to be complementary and not opposing. Granovetter (1995) defined network tie strength as the intensity and diversity of relationships based on the following criteria: 1. emotional intensity of the relationship 2. frequency of interaction 3. degree of closeness, and 4. mutual commitments between actors in the network. According to Granovetter (1973), strong ties of frequent contact, emotional attachment, and reciprocity serve as supports to firms and their members in the mobilisation, assimilation and use of each other’s resources. Emotional closeness and reciprocity are motivators for firms to share private and valuable resources (Granovetter, 1983). Weak network ties have been described as arms-length and unembedded (Uzzi, 1999) based on proximity, interaction frequency, type of information sourced from the network members, and the benefits derived from networking.

Furthermore, social scientists describe two dimensions of network relations: "bonding" and "bridging". Bonding refers to the impact of the firm’s internal ties and the value of the network relationships within that organisation (Leana & Van Buren, 1999; Adler & Kwon, 2002), whereas the bridging perspective relates to external

network links, and how social capital as a resource within the firm's network is used entrepreneurial benefit (Burt, 1992, 1997; Adler & Kwon, 2002). However, in contrast to these bonding and bridging definitions related to the purpose of network relations, Putman (1993) conceptualised bonding and bridging (binding) social capital as indicative of the strength and diversity of ties, comprising strong and weak ties, respectively. These bonding and bridging ties are located in both formal and informal network relationships of actors. Accordingly, Putman's (1993) strong ties comprise close familial relations and friendships of informal relations that are generally useful to access resources during the start-up phase in the lifecycle of the firm, whereas weak ties of bridging social capital comprise business networks that are imperative for the growth of hi-tech firms (DeJong, 2009). The varying perspectives on networking relations and the underlying constructs that explain the interaction among firms, further highlight that to contextualise their work, researchers are require to clarify and define their approach to social capital and networking.

In acknowledgement of the relationship value of formal networks in entrepreneurship, this study took the relational-structural perspective of networking, by examining: the quality and nature of social interactions between formal network actors, how the position of actors within a network yields benefits for the firm (Stam et al., 2014), and the frequency and intensity of participation in the network (Granovetter, 1995; Lefebvre et al., 2016) in order to determine how the strength of network ties (Uzzi, 1997) influences performance. The section below discusses the structural and relational embeddedness of network actors in more detail.

2.5.2.2 Relational embeddedness

The relational dimension of social capital is based on historical interaction or engagement among actors (Nahapiet & Ghoshal, 1998), and can be traced back to Uzzi's (1996) research on embeddedness. In his research, Uzzi (1996, 1997) viewed firm networks as relational structures immersed in a logic of exchange that promotes performance through inter-firm resource sharing, collaboration, cooperation that can either facilitate or constrain performance. Thus, networks occur between two or more persons who work together for their own benefit or for the benefit of the network.

Furthermore, the relational dimension relates to the quality and nature of relationships, and the strength of the ties found in perceptions of trust, proximity and

frequency of social interaction between actors that influences the willingness and ability of actors to provide needed resources and information (Batjargal, 2003; Westerlund & Svahn, 2008; Lindstrand et al., 2011; Stam et al., 2014). Trust and geographical closeness are considered to be important mechanisms to govern relationships, by reducing transactional uncertainty and the risk of opportunistic behaviour by networking partners (Uzzi 1996; Molina-Morales & Martinez-Fernandez, 2010).

The core intuition of the firm is that investing in social capital creates goodwill that can be mobilised to achieve organisational goals (Adler & Kwon, 2002). Entrepreneurially oriented firms align themselves to actors and networks in which they find trust, long-term commitment to cooperate and mutual benefit (Hitt & Ireland, 2002; Teng, 2007). Scholars (Das & Teng, 2001; Hitt & Ireland, 2002) conceptualised trust as the positive expectations related to goodwill and competence of an actor in a social network, and is considered to be a basic component of social capital (Hitt & Ireland, 2002). Therefore, formal network members assume high reliability of the information shared by other actors in the network due to an expectation of quality information and good intention among members. Trust results in less search and verification of shared knowledge and resources whilst increasing the likelihood of mobilisation and use (Mayer, Davis & Shoorman, 1995; Dyer & Chu, 2003; Levin & Cross, 2004; Maurer et al., 2011). Studies indicate that trust encourages knowledge transfer within a network due to network actors being more willing to share private information for the benefit of the firm (Hitt & Ireland, 2002; Maurer et al., 2011). Since trust also results in the behaviour of network actors becoming more predictable and reliable, it can foster an environment in which the transfer of tacit high-quality knowledge is strongly encouraged (Uzzi 1996). The relational view of the firm suggests that investments in relationship-building capabilities are assets that can enhance firm entrepreneurial performance (Maurer et al., 2011). Therefore, the ability to use informal relations to access formal organisational networks and the benefits they hold, is a strategic choice (Sefalafala, 2012).

A combination of time, emotions, intimacy and reciprocity determines the strength of network ties (Granovetter, 1973). Three additional factors that define network

strength: level of maturity, degree of trust, and the history of interaction between network actors, have been proposed by Johannissonn (1986). These perspectives highlight the different levels of trust, diversity in network actor resources and capabilities, and relationship history required for relations between entrepreneurial firms to impact network effectiveness (Maurer et al., 2011).

Researchers use Granovetter's (1973) weak tie theory to argue that entrepreneurs can access new information through relationships with diverse and socially distant network actors (Stam et al., 2014). This approach is supported by Elfring & Hulsink (2007) who argued that the development of innovative solutions by ICT firms require multiple weak ties of diverse networks with many structural holes. Strong ties are generally characterised by high degrees of trust and social closeness between the actors. Proponents of strong tie networks maintain that stronger ties increase the probability of the firm accessing required resources through network contacts (Uzzi, 1997; Batjargal, 2003; Stam et al., 2014).

However, Uzzi (1996, 1997) found that strong-tied relationships could become 'over-embedded'. This over-embeddedness in network relations arises in a situation where the more frequent contact between network actors occurs over a long period, increasing the chances that these actors will ultimately have the same competencies and knowledge at their disposal (Sosa, 2011). This could lead to a reduction in creative thinking and group apathy, which could negatively affect the firm's ability to adapt to changes in the environment (Uzzi 1997; Eisingerich & Bell 2008). Since networking requires an investment of time and money, preserving over-embedded and mutually redundant ties is inefficient use of firm resources. However, firms often maintain redundant ties due to emotional reasons, for example feelings of indebtedness to other network actors (Uzzi 1997). Therefore, it may be more advantageous for firms to invest in a mix of weak and strong network relationships (Uzzi, 1999), rather than investing in relationships that are either strong tie relationship or weak tie relationships.

Although weak ties are essential to access novel and innovative information, they are often characterised by low levels of trust and emotional investment (Sirec & Bradac, 2009) between the actors. Consequently, a higher risk of opportunistic behaviour, and reduced inclination to share qualitative and tacit knowledge, may

develop in networks of weak tie relationships. Uzzi (1996) maintained that strong ties provide better access to benefits circulating in a network. Accordingly, Uzzi (1996) argued that as a result of the high levels of trust, emotional investment, information exchange, proximity and shared problem-solving behaviour found in embedded relations of strong ties, firms can benefit more rapidly. Furthermore, Pirolo and Presutti (2010) found that depending on whether the performance target is innovation or economic, strong and weak ties influence firms differently. Accordingly, strong ties have been found to be critical for transmitting sensitive information, whereas weak ties have been found to facilitate the dissemination of valuable information (Ding, Steil, Dixon, Parrish & Brown, 2011).

As much as formal networks are important constructs that contribute to firm entrepreneurial performance, and as much as different factors may be used to measure relationship quality and tie strength (Granovetter, 1973; Johannissonn, 1986), some authors refer to relational network quality and tie strength as one construct. The lack of consensus about whether weak or strong network intensity is more beneficial for a technology firm is a concern in this study. Some scholars even suggest that there is merit in measuring the impact of both strong and weak ties on firm entrepreneurial performance in order to determine if there is value in having a mix of complimentary network tie strengths (Uzzi, 1999; Sirec & Bradac, 2009), as opposed to having either network tie extensity (Lin, 1999).

2.5.2.3 Structural embeddedness

Structural embeddedness refers to the network links or patterns of connections between actors, i.e. with whom entrepreneurs and firms connect, how they are reached, and how often they share resources and information (Harpham, 2008; Nahapiet & Ghoshal, 1998). Coviello (2006) suggested that firm behaviour and performance can be explained by the network relationships within which a firm is embedded. Accordingly, network structures and the position of the firm within the network represent opportunities or constraints for the firm (Uzzi, 1996; Coviello, 2006).

The structural dimension of social capital relates to network configuration of, i.e. how the firm is linked to the network (Uzzi, 1996), and the beneficial knowledge or information available through individuals and organisations in the structure

(Lindstrand, Melén & Nordman, 2011; Westerlund & Svahn, 2008). The key characteristics of network structures are connectivity, centrality and the existence or absence of ties (Moran, 2005; Nahapiet & Ghoshal, 1998; Westerlund & Svahn, 2008). As such, structural embeddedness focuses on the resource and informational advantages that a firm can derive from occupying a beneficial position within its network structure (Gulati 1998; Moran 2005). The overlap between ideas of structural and relational ties is highlighted by the inclusion of ties in their scope.

Nahapiet and Ghoshal's (1998) structural dimension is grounded in Burt's (1992) structural hole theory. Accordingly, firms that bridge the 'structural holes' of actors that are unconnected in the network, obtain the most valuable information. Therefore, the larger the more structural holes that are spanned within the network, the more beneficial the firms network activities are (Burt 2000). Consequently, opportunities and threats can be more quickly identified and the adaptability of the firm can be enhanced (Moran, 2005). Besides informational advantages, bridging structural holes can also lead to control advantages (Burt, 1992). These perspectives align with the RBV of weak network ties (Partanen & Moller, 2011).

Firms that are well positioned in their network are highly visible, which engenders important reputational effects and improves the external legitimacy of a firm (Sirec & Bradac, 2009). Furthermore, the fact that a firm occupies a focal or central position can induce an important signal to potential other network partners of the firm's willingness and ability to network (Gulati, 1998, 1999). This may enable a focal firm to further extend its network ties. Despite the rich benefits of bridging structural holes in the network structure, there is, however, a possible drawback associated with it. Structural holes are more likely to exist between network partners that are weakly tied to the focal firm, for it is unlikely that strongly tied network partners are unconnected among themselves (Granovetter, 1973).

This study focuses on the nature and quality, as well as the strength of network ties connecting firms that have formed strategic alliances, and that have membership in ICT industry networks. Accordingly, it follows Baxter and Matear's (2004) thesis that in combining the structural and cognitive dimensions of social capital, a meaningful description of the relational dimension of social capital is provided (Westerlund & Svahn, 2008).

The use of network tie strength (weak vs. strong) in both the structural and relational dimensions that this study deals with poses a difficulty due to the interconnectedness of these relational and structural aspects of networking. Some scholars (Uzzi, 1996, 1997; Elfring & Hulsink, 2003) suggest that a combination of weak and strong ties may be more beneficial to the firm. As previously mentioned, consensus on whether weak or strong ties positively correlate with firm entrepreneurial performance (Rowley, Behrens & Krackhardt, 2000; Elfring & Hulsing, 2003) is lacking. While strong and weak ties are argued to influence the ability of the firm to collaborate and innovate, literature proposes that weak ties are more beneficial to firms operating in high technology industries (Zaheer & Zaheer, 1997; Stam et al., 2014). Zaheer and Zaheer (1997) argued that high technology firms operating in fast-moving and information-intensive industries perform better when they are connected to disparate social networks that make them alert to environmental threats and opportunities that are known to be imminent. The influence of weak ties in the ICT industry has not been tested empirically.

2.6 Weak network ties and firm entrepreneurial performance

Weak network ties are characterised by lean and intermittent transactions through which network actors can access diverse information and resources in the market environment (Uzzi, 1999). In general, weak ties facilitate cost-effective searches for new information and innovations, whilst strong ties can facilitate the cost-effective transfer of tacit knowledge and complex information (Barreira et al., 2015). In the long term, frequent interaction establishes rich communication channels and common understanding as well as feedback loops that enhance network member use of resources (Maurer et al., 2011), emphasising that network actors can rely on strong tie relationships in good and bad times (Elfring & Hulsink, 2007). These views highlight the importance of nurturing the entrepreneurs' ability to exploit networks by what Burt (2005) referred to as brokerage and closure. This can be done by combining heterogeneous or diverse social ties to form social networks and facilitate the co-ordination of those networks to bring about innovation and growth. Weak network ties denote loose and non-embedded ties amongst actors operating in unrelated contexts with infrequent business contact, resulting in a wider reach of new and useful contacts and linkages to the marketplace (Pirolo & Presutti, 2010). Strong

network ties denote trusting relationships with people on whom the entrepreneur can rely (Sirec & Bradac, 2009).

Burt's (1992) structural hole theory suggested that network ties to those with whom the entrepreneur has no direct relation, can lead to strategic benefits such as access to new information that may change market conditions. These benefits are particularly valuable to firms operating in dynamic and turbulent environments such as the high technology ICT sector (Stam et al., 2014). As such, ICT firms will benefit more from weak ties to actors in unrelated contexts as these promote broad opportunity searches, access to new information and resources (Stam et al., 2014). According to Elfring and Hulsink (2007) the development of innovative solutions by ICT firms require multiple weak ties and diverse networks rich in structural holes.

Therefore, there was a need to examine the perceived impact of the nature and quality of formal network relations, and weak network tie strength, on the entrepreneurial performance of ICT firms in South Africa. The following hypotheses are thus proposed:

> H1: Formal networking has a positive impact on firm entrepreneurial performance of ICT firms in South Africa.
>
> H1a: Weak network ties have a positive impact on firm entrepreneurial performance of ICT firms in South Africa.

2.7 The environment

The environment refers to internal and external systems with which the firm interacts to produce and market its products, and pursue and achieve its strategic vision and goals (Akibu, 2000; Oyebisi & Agboola, 2003). The operational environment within which a network is located, contributes to its effectiveness (Fuller-Love & Thomas, 2004) and determines the success or failure of the firms' strategy (Teng, 2007). As networking occurs within the context of the social environment within which the firm operates, the environment plays both a facilitating and constraining role (Adler & Kwon, 2002; Kwon & Arenius, 2008; Tzanakis, 2013) on the impact of social networking on firm entrepreneurial performance. Literature shows that companies

that proactively respond to environmental threats are more likely to succeed (Adler & Kwon, 2002; Kwon & Arenius, 2008; Tzanakis, 2013). Internal environmental factors relate to that which the firm can control, whereas the external environment of the firm are largely uncontrollable by the firm and includes factors outside the firm that provide opportunities and pose threats to the firm and influences on firm behaviour (Lumpkin & Dess, 1996; Olawale & Garwe, 2010).

Dess and Beard (1984) identified three dimensions of the environment being: munificence, complexity and dynamism. Munificence, reflected in a firm's reliance on dynamic and hostile environmental conditions to secure resources (Lumpkin & Dess, 2001) held by other actors, is inferred by the focus on environmental dynamism and environmental hostility in this study. Besides these three environmental dimensions, literature also refers to environmental hostility, dynamism and diversity as characteristics of firm environments (Zahra & Garvis, 2000; Wiklund & Shepherd, 2005; Urban, 2010). These dimensions conceptualise the environment as a source of knowledge and a stock of resources (Aldrich & Mindlin, 1978 cited in Lumpkin & Dess, 2001).

The external environment of the firm includes everything that exists outside the firm and that has the potential to affect the firm wholly or partly (Dess et al., 1997). Thus, the relationship with, and effect of the firm's external environment on its performance is widely acknowledged (Boyd, Dess & Rasheed, 1993; Coving et al., 2000; Wiklund & Shepherd, 2005). Bhagavatula et al. (2010) suggest that different elements of social capital lead to specific benefits depending on a number of aspects, such as environmental conditions. From a networking perspective, the environment includes inter-firm relationships between suppliers, customers, and even competitors (Fuller-Love & Thomas, 2004). Batjargal (2007) explored ways to manage hostile environments in transition economies and found that entrepreneurs effectively did this by doing business through personal networks of relationships.

The concept of the environment focuses on political, regulatory, economic and social contexts external to the firm that influences the discovery and exploitation of entrepreneurial opportunities. Thus, it is important to consider context and its influence on entrepreneurship. The institutional approach (North, 1990) refers to the environment as comprising formal, regulatory and political or informal constraints

devised by humans that shape interactions (Ferri & Urbano, 2015). Environments are commonly conceptualised as a source of information and as a stock of resources (Aldrich & Mindlin, 1978), thus aligning with the RBV of entrepreneurial behaviour. Jones and Coviello (2005) emphasised that certain internal conditions and environmental factors explain firm performance. For instance, in a hypercompetitive environment that requires a timely response to opportunities (D'Aveni, 1994), firms may lack the internal capability to develop such technological resources and therefore miss opportunities if they do not look to acquiring resources from other firms. Batjargal (2007) explored ways of managing hostile environments during times of change in economies and concluded that entrepreneurs effectively did this using their personal networks for conducting business.

Accordingly, Leyden et al. (2014) viewed the entrepreneurial process as incorporating innovation that occurs in the social context of an uncertain environment. Understanding, controlling and managing these uncertainties and the sociological context in which they occur, will ensure that entrepreneurial success is achieved (Jack et al., 2010; Eggis, 2016). Furthermore, extant literature reveals that scholars found the firms' external environmental to moderate the relationship between strategy and firm performance (Zahra & Bogner, 2000; Urban & Barreira, 2010).

In todays' dynamic and hostile business environment characterised by rapid technological, political and social change, increased customer demands and involvement, and globalisation, ICT firms are under pressure to adapt to the environment in order to stay relevant and competitive. This study is based on one industry in order to control for the fact that inter-industry environmental conditions vary (Dess & Beard, 1984) as well as to control for age, to obtain comparative financial perspectives based on economic performance over at least a three (3) year period.

Environments characterised as dynamic and hostile, i.e. competitive, require greater levels of innovation and entrepreneurship as managers are forced to respond to competition by employing technology strategies in order to survive (Urban & Barreira, 2010). These strategies may include cost cutting in an effort to optimise value from firm assets, investment in technology and social network relationships in

order to secure required resources and supplement organisational capability (Lumpkin & Dess, 2001). The literature acknowledges environmental hostility, dynamism and diversity as characteristics of firm environments. Lumpkin and Dess (2001) studied the moderating effects of environmental dynamism and environmental hostility on the relationship between proactiveness and firm performance in relation to the introduction of innovative new product-market niches and optimising resource utilisation in order to save costs. As EO characteristics have been found to be more prevalent in dynamic, volatile technological environments (Miller, 1990; Zahra, 1991; Hashi & Krasniqi, 2011; Jafri et al., 2014), this study examines the moderating effect of environmental dynamism and hostility on the relationship between formal networking and firm entrepreneurial performance in the ICT industry in South Africa.

Given that organisations and the environment in which they operate are continually evolving, this study looked into the moderating effect of the environment on the relationship between formal networking of technopreneurs in South Africa's ICT industry and the performance of their firms. It focused on two constructs prevalent in research and theory on the environment, namely, dynamism and hostility (Lumpkin & Dess, 2001). For technology firms that operate in highly dynamic and competitive environments, being able to build and sustain capabilities assists in mitigating against failure (D'Aveni, 1994; Haussier et al., 2010). Firms (entrepreneurs and managers) are able to make strategic decisions which optimise environmental factors by using information to identify opportunities in turbulent environments and by lowering prices in hostile environments with high competition (Zahra & Bogner, 2000). Thus, the following broad hypothesis was tested:

> H2: The relationship between formal networking and firm entrepreneurial performance of ICT firms in South Africa is moderated by the environment.

2.7.1 Environmental dynamism

Studies on environmental dynamism are scarce (Sefalafala, 2012). Dynamism reflects the unpredictability of change, and the rate of change in the firm environment. Thus, it reflects the uncertainty that entrepreneurs are required to manage in order to mitigate negative impacts on the firm performance (Dess & Beard, 1984; Lumpkin & Dess, 2001). In dynamic environments where change is

high, opportunities arise that firms with high social capital are able to capitalise on, thus indicating a positive relationship between firms with high social capital and dynamic environments (Zahra, 1993). Uncertainty in dynamic environments can be attributed to high rates of competitor entry and exit in the market as well as changes in customer needs and technological conditions (Lumpkin & Dess, 2001; Scheepers, Hough & Bloom, 2007). Firms are forced to behave more entrepreneurially in dynamic environments and as such, are able to develop and introduce new products to the market ahead of their competitors. Wiklund and Shepherd (2008) found that dynamism in the environment moderates the relationship between entrepreneurial behaviour and business performance. Thus, the following hypothesis is proposed:

H2a: The relationship between formal networking and firm entrepreneurial performance of ICT firms in South Africa is moderated by the environmental characteristic of dynamism.

2.7.2 Environmental hostility

Environmental hostility is indicative of an environment that is highly regulated with a large number of competitors, and unfavourable supply conditions (Zahra & Bogner, 2000). Lumpkin and Dess (2001) view environmental hostility to be indicative of a highly competitive environment brought about by competition for resources. Hostile environments create threats that force the firm to respond innovatively to minimise threats and create opportunities. Firms that aggressively behave entrepreneurially in hostile environments have been found to experience higher returns (Urban & Sefalafala, 2015). Therefore, firms that align their strategic decisions to their external environments are able to perform better (Sefalafala, 2012).
Thus, the following hypothesis is proposed:

H2b: The relationship between formal networking and firm entrepreneurial performance of ICT firms in South Africa is moderated by the environmental characteristic of hostility.

2.8 Conclusion of literature review

Several studies in entrepreneurship have attempted to explain performance by investigating the relationship between social capital and firm entrepreneurial performance. Extant literature was reviewed to provide a theoretical basis relating to entrepreneurship, technological entrepreneurship at firm level and social capital, specifically formal networks within the context of a dynamic and hostile environment. The purpose of the literature review was to examine how formal networking affects characterised by arms-length weak network links affect firm entrepreneurial performance of ICT firms in South Africa.

The literature review indicates that entrepreneurial ICT firms possessing stronger social capital will have more of a competitive advantage over competitors in the ICT sector and hence, better performance. The literature explains that relations among unconnected actors within the entrepreneur's network of contacts bring advantages of valuable strategic information and resources and alertness to changing market conditions which gives the firm the ability to change its strategic direction to the benefit of the firm. The literature also explains that certain conditions within the environment explain and affects the relationship between the firm's social capital and entrepreneurial performance.

A lack of consensus about the appropriate measure of firm performance is evident in the research. As such, the multidimensional construct of firm entrepreneurial performance has been synthesised into three financial growth indicators: growth in sales, growth in market share and profitability. These measurements were used because of they are indicative of how close the firm is to achieving its strategic goals, and are driven by the strategic managers of the firm. Perceptual measurements have been used extensively by scholars (Lu et al, 2010; Murimbika, 2011) to evaluate the impact of entrepreneurial formal networking on the firm performance.

As ICT firms experience higher levels of environmental dynamism and hostility due to competition and uncertainty, it is proposed that they would benefit more from weak ties (Stam et al., 2014). Weak network ties to those with whom the entrepreneur has no direct relation, promote broad opportunity searches, access to new information

and resources (Stam et al., 2014) required for the firm to achieve its strategic objectives. Thus, the following hypotheses are proposed: -

H1: Formal networking has a positive impact on firm entrepreneurial performance of ICT firms in South Africa.

H1a: Weak network ties have a positive impact on firm entrepreneurial performance of ICT firms in South Africa.

The environmental factors reviewed in this chapter are environmental hostility and environmental dynamism. The ICT sector in South Africa displays traits of dynamism and hostility, being prone to high technological innovation and change, and high levels of market competition (Urban & Sefalafala, 2015). Informed by internal conditions and an entrepreneurial orientation, firms (entrepreneurs and managers) are able to make strategic decisions which optimise environmental factors by using information to identify opportunities in turbulent environments, and by lowering prices in hostile environments with high competition (Zahra & Bogner, 1999; Jones & Coviello, 2005). Drawing on the existing body of knowledge, hypotheses were formulated for this study. The environment has been found to moderate the relationship between the social capital of technopreneurs and firm entrepreneurial performance or growth (Shree & Urban, 2012, Urban & Sefalafala, 2015), hence the following hypotheses are proposed:

H2: The relationship between formal networking and firm entrepreneurial performance of ICT firms in South Africa is moderated by the environment.

H2a: The relationship between formal networking and firm entrepreneurial performance of ICT firms in South Africa is moderated by the environmental characteristic of dynamism.

H2b: The relationship between formal networking and firm entrepreneurial performance ICT firms in South Africa is moderated by the environmental characteristic of hostility**.**

Based on the literature review, the study used a theoretical model illustrated in Figure 2. It clearly shows the variables and the relationship between them. This

theoretical model informed the research instrument as well as acted as a focusing device for the study.

2.8.1 Theoretical Framework

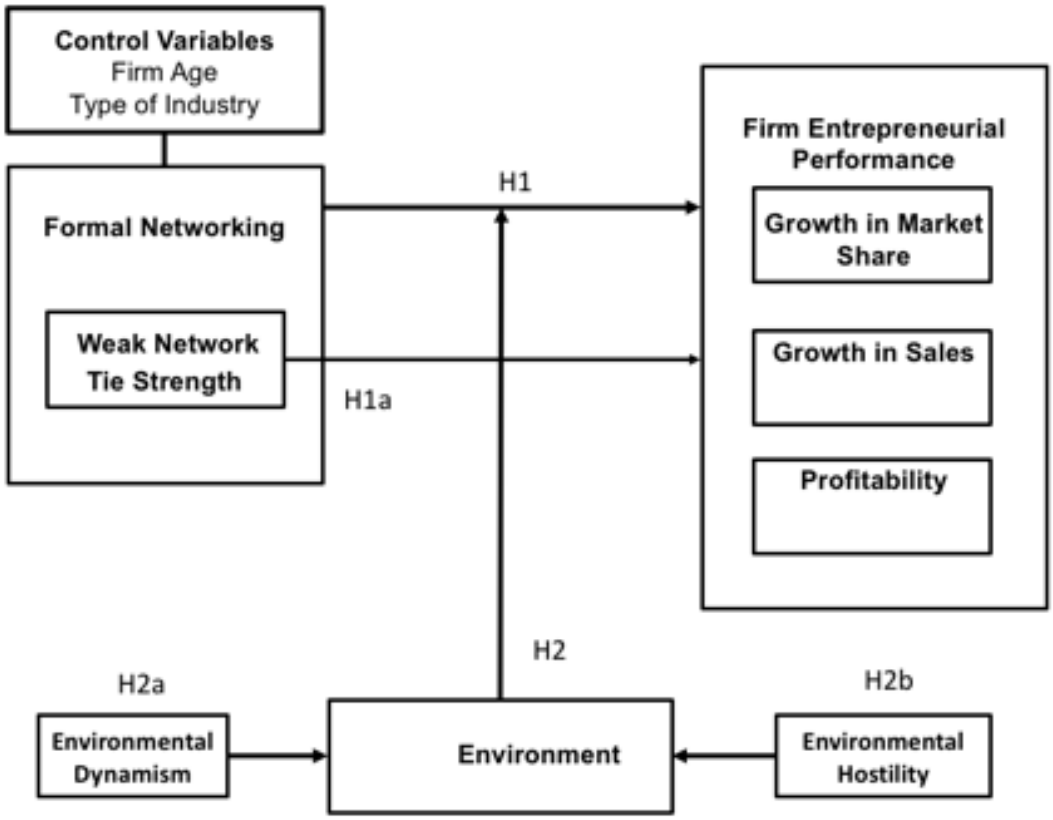

Figure 2: Theoretical Model

Dependent Variable:	Firm Entrepreneurial Performance: Growth in Sales; Profitability; Growth in Market Share
Independent Variable:	Formal Networking: Weak Network Tie Strength
Moderating Variables:	Environment: Dynamism; Hostility

2.8.2 Summary of hypotheses

Figure 2 represents the conceptual framework for the study including the hypothesised relationships that were tested.

H1: Formal networking has a positive impact on firm entrepreneurial performance of ICT firms in South Africa.

H1a: Weak network ties have a positive impact on firm entrepreneurial performance of ICT firms in South Africa.

H2: The environment moderates the relationship between formal networking and firm entrepreneurial performance of ICT firms in South Africa.

H2a: The relationship between formal networking and firm entrepreneurial performance of ICT firms in South Africa is moderated by the environmental characteristic of dynamism.

H2b: The relationship between formal networking and firm entrepreneurial performance ICT firms in South Africa is moderated by the environmental characteristic of hostility.

3 CHAPTER 3: RESEARCH METHODOLOGY

3.1 Introduction

This chapter describes the methodological and procedural steps taken to solve the main research problem (Leedy & Ormond, 2005) stated in Chapter 1, namely: the perceived impact of formal networking in technological firms found in the ICT industry in a developing country context; and the perceived impact of the environment on the relationship between formal networking and firm entrepreneurial performance in this industry. The description of the methodological and procedural steps is important for justifying the researcher's approach to gaining knowledge (Kraus, 2005) pertaining to the choice of tools used for data collection, analysis and sampling. The chapter is structured in the following sequential order: 1) Research paradigm, 2) Research design, 3) Research population and sampling, 4) Research instrument, 5) Data collection procedure, 6) Data analysis and interpretation, 7) Validity and reliability, and 8) Limitations of the study.

3.2 Research paradigm

Saunders et al. (2009) indicated that there are four major research philosophies: positivism, realism, interpretivist, and pragmatism. A positivist philosophy is the epistemological position adopted for this study. It advocates the application of the methods of the natural sciences to the study of social reality and beyond (Kraus, 2005). As such, it views relationships as identifiable concepts that are tangible and that can be studied and measured. It also takes an ontological position that is objective in nature. This means the researcher can stand outside the phenomenon to be studied and can give an objective view based on the perceptions and statements of respondents (Thomas, 2010).

Based on these epistemological and ontological positions, the research is quantitative and deductive in nature. Quantitative research entails the systematic collection of data whose values can be measured numerically (Saunders et al., 2009; Creswell, 2014). Furthermore, it is deductive in nature as it uses theory as the basis

for testing hypotheses to examine the relationship between variables (Saunders et al., 2009). This involves formulating a problem, developing hypotheses, testing these and drawing conclusions (LoBiondo-Wood & Haber, 2006).

Accordingly, the study examined the relationship between formal business networking and the entrepreneurial performance of ICT firms in South Africa, as well as the moderating effect of the environment on the performance-formal networking relationship. The study tested the proposition that relationships exist between the constructs denoted as variables in Table 1.

Table 1: Variables

Variable type	Level 1 Construct	Level 2 Construct	Level 3 Construct	Sources	Prior Sources
Independent variable (IV)	Social Capital	Formal Networking	Relational quality and nature	Barreira, 2004; Mavungu, 2007; Sefalafala, 2012	Granovetter, 1985; Granovetter, 1973; Foley & Edwards, 1999; Leanna & Van Buaren, 1999; Yli-Renko, Autio & Sapienza, 2001; Adler & Kwon, 2002 ; Westlund & Bolton, 2003; Kwon & Arenius, 2008; Westerlund & Svahn, 2008; Lindstrand, Melén & Nordman, 2011; Sefalafala, 2012; Tzanakis, 2013; Stam et al., 2014
			Network tie strength	Barreira, 2004; Mavungu, 2007; Sefalafala, 2012	Granovetter, 1973; Granovetter, 1985; Burt, 1992; Putman, 1993; Uzzi, 1996; Uzzi, 1997; Uzzi, 1999; Nahapiet & Ghoshal, 1998; Lin, 1999; Hite & Hesterly, 2001; Yli-Renko, Autio & Sapienza, 2001; Elfring & Hulsink, 2003; Coviello, 2006; Elfring and Hulsink, 2007; Presutti, Boari & Fratocchi, 2007; Sirec & Bradac, 2009; Bhagavatula et al,, 2010; Pirolo & Prescutti, 2010; Rost, 2011; Sefalafala, 2012; Saha & Banerjee, 2015; Lefebvre et al., 2016
Dependent Variable (DV)	Firm Entrepreneurial Performance	Financial performance	Growth in Sales	Barreira, 2004; Sefalafala, 2012	Barreira, 2004; Davidsson et al., 2006 Stam & Efring, 2008; Pirolo &

					Presutti, 2010; Roy, 2012
			Growth in Market Share	Barreira, 2004; Sefalafala, 2012	Deeds et al., 1998; Maurer et al., 2011; Su et al., 2015
			Profitability	Barreira, 2004; Sefalafala, 2012	Batjargal, 2010; Davidsson et al., 2010
Moderator	Environment	Environmental Dynamism		Grootaert et al., 2004; Sefalafala, 2012	Zahra, 1993; Zahra & Garvis, 2000; Lumpkin & Dess, 2001; Wiklund & Shepherd, 2005; Scheepers, Hough & Bloom, 2007; Wiklund & Shepherd, 2008; Urban, 2010; Shree & Urban, 2013, Stam et al., 2014; Urban & Sefalafala, 2015
		Environmental Hostility		Grootaert et al., 2004; Sefalafala, 2012	Zahra & Bogner, 2000; Zahra & Garvis, 2000; Lumpkin & Dess 2001; Wiklund & Shepherd, 2005; Batjargal, 2010; Bhajavatula et al., 2010; Urban, 2010; Sefalafala, 2012; Urban & Sefalafala, 2015;
Control	Firm Age	At least 3 years of operations in South Africa		Grootaert et al., 2004; Jones & Woolcock, 2004; Barreira, 2004; Sefalafala, 2012	Wiklund, 1999; Davidsson, 2004; Urban & Barreira, 2010
	Industry	Industry type - ICT firms operating in South Africa only		Grootaert et al., 2004; Jones & Woolcock, 2004; Barreira, 2004; Sefalafala, 2012	Urban & Barreira, 2010

Compiled and adapted by author from Murimbika (2011) and Sefalafala (2012)

Table 1 shows the independent variable (IV): formal networking and the dependent variable (DV): firm entrepreneurial performance, moderating variable (MV): environment, and control variables (CV) firm age and industry. The measurement attributes used in empirical research may be classified as either independent or dependent constructs or variables (Cooper & Schindler, 2014). The dependent variable is the variable the study predicts will have a certain outcome based on the influence of the independent variable on the dependent variable (Sefalafala, 2012). The moderator variable is a second class of independent variable that may be included in the empirical research based on its effect on the IV-DV relationship (Cooper & Schindler, 2014). In this case, the environment is the moderating variable.

It is important that when the firm is the chosen unit of analysis, its size, age and industry be taken into account (Wiklund, 1999; Davidsson, 2004; Urban & Barreira, 2010). Thus, the controls in this study include industry type and firm age. As such, the study focuses on a specific industry in order to control for the fact that environmental conditions vary from one industry or sector to another (Dess & Beard, 1984). The second control is firm age (Wiklund, 1999; Davidsson, 2004; Urban & Barreira, 2010) to ensure comparative analysis of firm performance over at least a three (3) year period. The inclusion of these controls enabled the researcher to obtain data related to respondents' perception of firm entrepreneurial performance measured by financial indicators of: profitability, growth in sales and growth in market share of ICT industry firms only. The control variables were tested for their statistical significance to evaluate whether the research model should include these factors to provide added validity to the results.

Based on the variables stated in Table 1 the researcher formulated the hypotheses as research hypotheses rather than as statistical null and alternative hypotheses. Equally so, correlational hypotheses were formulated to avoid causation (Creswell, 2008). As such, the researcher examined the following hypotheses:

> H1: Formal networking is positively related to firm entrepreneurial performance of ICT firms in South Africa.

H1a: Weak network ties are more positively related to firm entrepreneurial performance of ICT firms in South Africa.

H2: The relationship between formal networking and firm entrepreneurial performance of ICT firms in South Africa is moderated by the environment.

H2a: The relationship between formal networking and firm entrepreneurial performance of ICT firms in South Africa is moderated by the environmental characteristic of dynamism.

H2b: The relationship between formal networking and firm entrepreneurial performance ICT firms in South Africa is moderated by the environmental characteristic of hostility.

3.3 Research design

The research design specifies the methods and procedures for the collection, measurement and analysis of data (Cooper and Schindler, 2014). The choice of sampling methods, data collection and analysis methodologies, and measurements are dependent on the research question that the particular study aims to address (Babbie & Mouton, 2009). The research design of this study is a cross-sectional study using the survey method. It follows previous studies such as Urban and Sefalafala (2015) that measured the impact of entrepreneurial capability constructs on firm performance of South African firms.

Surveys are useful in that they enable the researcher to gather primary data using a questionnaire to collect data directly from the respondent. Surveys can be described as studies as the broadest category of non–experimental designs and delineate them into descriptive, explorative, and comparative designs (LoBiondo-Wood & Haber, 2014). This study can be classified as descriptive. Descriptive studies provide an efficient and effective way to gather large amounts of data on a research problem, and a framework for exploring the relationship between variables (LoBiondo-Wood & Haber, 2014).

3.4 Research population and sample

3.4.1 Population

The population is the group of potential respondents from which the sample is taken, and inferences are made (Cooper & Schindler, 2014). The population is often specified in terms of demographic characteristics, geographical area, awareness measures and/or product or service usage characteristics (McDaniel & Gates, 2005). Stangor (2011) emphasized the importance of clearly defining the population for a study. The population for this study as shown in Table 2 is ICT firms in South Africa that have been in existence for over three years.

Table 2: Study population

Population	930 ICT firms in South Africa
Variable	Formal Network Membership
Demographics	3 years or more of operations in South Africa's ICT industry Strategic level decision-makers
Geographical Area	South Africa

3.4.2 Sample and sampling method

After defining the population for a study, the next step is to define the sampling frame and, lastly to select a sample (Cooper & Schindler, 2014). According to Brink (2006) and Polit and Beck (2010), a sample is a smaller component of the population, and sampling represents the process of sample selection. Samples have to be representative and reflect most of the population's characteristics in order to be generalisable to the population (Polit & Beck 2010). As such, the sampling frame chosen for this study was drawn from the industry regulator (ICASA) database of ICT firms in South Africa. As the regulator is responsible for oversight and regulation of

the industry, and as it recently conducted a study to audit the state of ICTs in South Africa (ICASA Report on the state of the ICT sector in South Africa, 2016), the researcher assumes that ICASA's database is up to date and comprehensive.

The rationale for sampling is to enable researchers to select a sizeable representative subset of the population in order to observe and make inferences across the broader population (Cooper & Schindler, 2014). Sampling can be conducted using both non-probability and probability techniques. Probability sampling is defined by Saunders, Lewis and Thornhill (2009, p. 213) as "the chance, or probability, of each case being selected from the population is known and is usually equal for all cases". In contrast, with non-probability sampling the chance of each case being selected from the total population is unknown, making it impossible to answer research questions or to address objectives that require one to make statistical inferences about the characteristics of the population.

The main objective of the study was to answer the research question using statistical estimates to generalise the study results across the population, probability sampling technique was used for this. Saunders et al. (2009) described five main techniques to select a probability sample:

- simple random
- systematic
- stratified random
- cluster
- multi-stage.

The researcher used simple random sampling to select firms from which to collect data. Ideally, simple random sampling requires the researcher to have easy access to an accurate and easily available sampling frame that lists the entire population on a computer (Saunders et al., 2009; Cooper & Schindler, 2014). It is easy to use and accommodates surveying large databases of geographically dispersed respondents (Saunders et al., 2009; Cooper & Schindler, 2014). For this study, the researcher had a large enough database of close to 900 ICT firms, which were assigned a unique number and a random selection was made of companies to survey.

Saunders et al. (2009) suggested that researchers should include all qualifying respondents in order to achieve a 95 % confidence level. Based on Krejcie and Morgan's (1970) table for determining sample size from a given population, the ideal sample size for this study is between 269 and 274 respondents. This is indicative of the need for a large sample size to ensure representation when using a survey research design (Krejcie & Morgan, 1970) and probability sampling. The researcher distributed an estimated 900 emails to potential respondents to ensure a high response rate. Moreover, periodical reminders were sent out to potential participants. However, based on more contemporary empirical studies by researchers in the field (Vehovar & Manfreda, 2008; Sefalafala, 2012; Lefebvre et al., 2016), and the indicated expected response rate for online surveys of similar length and complexity, the achievement of a sample size of 120 responses or a response rate of 14%, was deemed to be satisfactory. The researcher also viewed the response rate as adequate given that: 1. a number of the online survey links were emailed to potential respondents over the festive season; 2. staff are mobile; and 3. the prevalence of strict email policies of some of the firms contacted. Furthermore, based on experience, the researcher anticipated that the intended respondents being strategic managers and firm owners may have been constrained by their leadership and management capacity and responsibilities to respond to the survey.

Since the unit of analysis is ICT firms in South Africa, the points of data collection were individuals who were owners or strategic managers within the ICT firms, such as such as CEOs, CTOs and CIOs. This is because formal networking is a strategic management tool for accessing external resources by firms, it is expected that these individuals routinely interact with external actors and are aware of these networking activities (Jarillo, 1989, Burt; 1992; Nohria, 1992; Johannisson, 2000; Grant & Baden-Fuller; 2004). This approach is consistent with entrepreneurship studies that a senior managers' self-perception of a firms' strategic orientation and aspects represents firm behaviour (Urban & Oosthuizen, 2009).

The primary challenge experienced in this research was that there was a lack of comprehensive sampling frames, i.e. some e-mail listings were out-dated due to various reasons such as staff mobility and strict email policies to safeguard company information. Secondly, the intended recipients were strategic managers and firm

owners who may have been constrained by their leadership and management capacity to respond to the survey. Recipients are also typically sceptical of unsolicited emails and may simply have chosen not respond. In order to counter these challenges, and achieve an adequate sample size, effort was being made to avoid ambiguity (Creswell, 2008), thus ensuring that the survey was easy to read and understand.

3.5 The research instrument

Consistent with the chosen research design, a structured questionnaire was used to conduct the survey (Appendix A). This questionnaire was tested in a pilot study in which the level 1 construct of Social Capital was the independent variable that was tested against the dependent variable of firm performance, whereas this study tested the level 2 construct of formal networking as the independent variable. The researcher controlled for age and sector during the pilot study conducted over two weeks. The pilot study questionnaire was only made available to companies that have been in operation for over three years (average business age was 12.57 years) and those within the ICT industry.

Questionnaires are the most common form of data collection (Cooper & Schindler, 2014). They are used to measure perceptions and attitudes, and therefore are an appropriate instrument to measure the perceptions of ICT firms towards formal networking and to examine their perception of how it affects economic performance of their firms. To ensure a well-designed questionnaire, the researcher ensured that questions are concise, clear, have one thought per question, and are relevant to the purpose of the questionnaire.

The survey instrument (Appendix A) was developed based on literature and the adaptation of various existing research instruments such as: Barreira (2004), Mavungu (2007), Sefalafala (2012), the World Bank's Integrated Questionnaire for the Measurement of Social Capital (SC-IQ) and the World Bank Social Capital Assessment Tool (SCAT). The questionnaire was subjected to a pilot study conducted over two weeks. This approach increased the construct validity and reliability of the research instruments (Saunders et al., 2009). The questionnaire

scales were comprised of multi-item sub-scales for each of the constructs as well as a demographic section. The instrument consisted of four (4) Sections, 1 to 4, as illustrated in Table 2.

Table 3: Research Instrument Scale Classification

Section Number	Main Sections	Sub-Sections	Number of items	Sources
1	Introduction and Demographic Information	Introductory information Demographic information Control variables: controls for firm age and industry type	11	Grootaert, Narayan, Jones & Woolcock (2004); Barreira (2004); Sefalafala (2012)
2	Firm Entrepreneurial Performance	Growth in Sales Growth in Market Share Profitability	11	Barreira (2004); Sefalafala (2012)
3	Formal Network**ing**	Network Tie Strength Relationship Quality & Nature Nature of Networking Relations	38	Barreira (2004); Mavunga (2007); Sefalafala (2012)
4	Environment	Environmental Hostility Environmental Dynamism	21	Grootaert et al. (2004); Sefalafala (2012);

The preamble to the questionnaire clarified to the respondents the purpose of the survey and assured confidentiality and compliance with research ethics. The research instrument comprised multi-item sub-scales for the constructs and consisted of four (4) Sections 1 to 4.

- Section 1 pertained to the Introduction and Demographic Information questions to provide insights into the respondent profile, and the firm s/he represents.
- Section 2 comprised the Firm Entrepreneurial Performance subscale. Performance was measured using three economic dimensions of financial growth: growth in sales, growth in market share and profitability. Economic performance was taken to be a perceptive measure of company performance for the past three years of operations.
- Section 3 related to the Formal Networking construct, dealing with perceptions of the quality of relationships among actors as well as the nature and strength of network ties.
- Section 4 had two sub-scales for the moderating variable, the Environment construct, which are environmental hostility and environmental dynamism.

Some questions in Sections 2 to 4 were measured using a one directional 5-point Likert-type scale, with 1 being the least impression and 5 the most, e.g. 1 = strongly disagree - 5 strongly agree; or 1 = significant decline – 5 significant increase (Zhou, 2007). In this way, the dependent variable of firm entrepreneurial performance as indicated by perceptions of financial performance indicated by growth in sales, growth in market share and profitability could be measured. Using similar scale values or anchors (“extremely” vs. “somewhat,” “always” vs. “never,” and “strongly agree” vs. “strongly disagree”) made the questionnaire more user-friendly and easier to completed (Podsakoff, MacKenzie, Lee & Podsakoff, 2003).

3.6 Procedure for data collection

Data collection refers to the method or technique used to gather information (LoBiondo-Wood & Haber, 2006). Polit and Beck (2010) indicated that of the three main data collection methods, namely: self-report, observation and bio-physiological

measures, self-reports are most commonly used in quantitative research. Questionnaires are one of the most widely used survey data collection techniques (Saunders et al., 2009), therefore, this study used a survey questionnaire as the primary data collection method. The questionnaire was compiled using Qualtrics, an online survey application tool and a link were emailed to potential respondents.

Malhotra (1999), mentioned five main types of questionnaires, namely: online, postal, delivery and collection, telephone, and interview schedule. The researcher distributed the survey online using the email addresses of the sample taken from the database. In so doing, a wider audience was reached and respondents were assured of more anonymity than could be given using other communication methods (Cooper & Schindler, 2014). An additional benefit of self-administered online surveys is that it typically costs less than other communications methods (Cooper & Schindler, 2014).

Online surveys are effective data collection tools, enabling the researcher to collect data from large samples as they are fast, cheap, automated, and able to reach geographically dispersed populations (Wegner, 2007). Effectively more firms are given the opportunity to report on their links and express opinions on the effect of business network on their business (Fuller-Love & Thomas, 2004). Limitations of surveys include the inability of the researcher to probe deeply into topics allowing themes and new information to emerge about the subject under investigation as would be the case in an interview (Turner, 2010), and lack of incentive for respondents to participate answer a long questionnaire (Cooper & Schindler, 2014). Furthermore, as indicated above, respondents generally require an incentive to participate in long computer delivered questionnaires (Cooper & Schindler, 2014). Therefore, the questionnaire was carefully designed to avoid ambiguity, being mindful to keep questions concise so time required to complete the questionnaire is minimised.

Surveys often have non-responses based on refusal by some respondents to participate in the research (Saunders et al., 2009). Following the recent work of other scholars, Lefebvre et al. (2016), potential respondents received an invitation email which included the link to the online questionnaire. It was anticipated that some

surveys would not reach all their intended recipients due to incorrect email addresses, strict firewall policies among the firms sampled, or email address changes due to labour mobility. Therefore, the researcher sent out four reminders over the thirteen (13) weeks that the online survey was open as is standard practice for online surveys (Lefebvre et al., 2016). Furthermore, the researcher made provision that the sample might not have been representative of the population of ICT firms in South Africa and bore this in mind when interpreting the results. As such, the research report included the response rate for the study.

3.7 Data analysis and interpretation

Data analysis involves reducing collected data to a manageable size, applying statistical techniques to data, searching for patterns in the data, and developing summaries (Cooper & Schindler, 2014). Data analysis and interpretation were aided by the use of a statistical software, namely Stata Statistical Software: Release 14. This study used descriptive and analytical statistics, respectively.

3.7.1 Descriptive statistics

Saunders et al. (2009) stated that descriptive statistics are informed by the research question and objectives that enable the researcher to describe and compare variables numerically, focusing on centrality and dispersion of the variable. Skewness and Kurtosis indices were also presented. Descriptive statistics of the composite variables were presented to numerically profile the sample data. Continuous variables, means, standard deviations and variances in the variables were presented and analysed. Frequency distributions were used to describe the categorical demographic characteristics of the respondents.

3.7.2 Analytical statistics

Statistical software, namely Stata Statistical Software: Release 14, was used to validate and conduct descriptive analysis of collected data; using the mean, standard deviations and correlations of the sample. A summated scale was computed for each of the constructs and sub-constructs and used for further analysis.

3.7.2.1 Explanatory data analysis

Explanatory data analysis is about investigating the reasons for the relationship between two or more variables using hypotheses and variables following an initial descriptive analysis (Cooper & Schindler, 2014). In this study, explanatory data analysis involved collecting quantitative data to explain the reasons why ICT firms in South Africa that engage in formal networking experience higher levels of sales growth and attain higher market share and profitability compared to their competitors.

Prior empirical research has highlighted the importance of firm: size, industry and age in relation to performance based on the effect of these variables on the firms' ability to obtain and deploy resources (Zahra & Bogner, 2000; Yli-Renko et al., 2001; Coviello & Jones, 2004; Javalgi & Todd, 2010). In general, large firms possess the resources and competencies for innovation that gives them a performance edge over their smaller counterparts who may suffer from a liability of newness (Elfring & Hulsing, 2003). However, the researcher decided to exclude firm size as a control variable in this study. Control variables of firm age and industry type were tested for their statistical significance to evaluate whether the inclusion of these factors provided added validity to the results. Industry type was included because entrepreneurial activity has been found to differ per industry (Morris et al., 2008). Firm age was included due to the influence of age on the ability of respondents to provide perceptual financial indications (Scheepers et al., 2007); only firms that have a trading history in South Africa's ICT industry of three years and more were included in this study.

3.7.2.2 Regression analysis

In order to test the hypothesised relationships, the researcher constructed statistical linear regression models using continuous dependent variable – Firm Entrepreneurial Performance indicated by: Growth in Sales and Market Share, and Profitability; and the continuous independent variable of Formal Networking indicated by: Network Tie Strength and Relationship Quality and Nature sub-constructs. Linear regression was used to test the hypothesised relationships between the dependent and independent variable, as well as the moderator's effects on this relationship. This is ideal when there are two or more independent variables (Saunders et al.,

2009). Accordingly, the perceived impact of both quality and nature of the relationships as well as network strength on firm entrepreneurial performance was tested. In addition, the effect of the moderators was tested using hierarchical regression analysis to facilitate analysis of correlations between the variables, including the moderator, as represented by the constructs in order to accept or reject the different hypotheses put forward in the study.

3.7.3 Moderator effects

Moderation refers to the examination of the interaction of independent variables in predicting the outcome of a dependent variable on a statistical basis. Moderator effects occur when a moderator variable changes the strength of the relationship between one or more dependent and independent variables (Baron & Kenny, 1986). In order to assess the significance of the moderator, in this case the environment, Hair, Black, Babin & Anderson (2010) suggested the following steps:

1. Estimate the unmoderated equation
2. Estimate the moderated relationship
3. Assess the change in R-squared. If the change is statistically significant, then the moderator effect is significant.

3.8 Validity and reliability

The credibility of quantitative research depends on the validity, reliability, and generalisability of the research results (Saunders et al., 2009). Therefore, research outcome quality is dependent on the quality of units of measurement. As research bias poses a threat to the reliability and validity of a study, control measures must be put in place to avoid a situation in which the researcher selectively notes only those findings that support the study (Brink, 2006: 158; LoBiondo-Wood & Haber, 2006: 337). The following sub-section discusses validity and reliability in detail, in particular what actions were taken to achieve this.

3.8.1 Validity

Validity refers to confirmation that the measurement is actually measuring the intended construct and answers the following question: does the test measure what the researcher intended to measure? (Cooper & Schindler, 2014). Any differences revealed by the measurement tool must be a true reflection of differences among respondents drawn from a population.

3.8.1.1 External validity

According to Cooper and Schindler (2014), external validity measures the degree to which research findings are generalisable across persons, times and settings. Thus, limiting the study to one industry may enhance the external validity of the study as subjects were selected from the same population as the one in which the generalisation applied.

3.8.1.2 Internal validity

Internal validity is important in quantitative research as it ensures that the research instrument indeed measures what it is purported to measure, i.e. if the conclusions and relationships inferred from the research are accurate (Cooper & Schindler, 2014). Therefore, to ensure internal validity, definitions of the constructs are grounded in theory (Sefalafala, 2012). As in similar studies (Urban & Barreira, 2010; Mulatu, 2014) Cronbach's alphas were used, with the cut-off being 0.7 (Lee, 2015) to measure internal validity. This study also utilised confirmatory factor analysis to measure and ensure validity (Dennick, 2011).

3.8.1.3 Reliability

Reliability is concerned with accuracy, precision and consistency of the score obtained from the measurement scale and it contributes to validity (Saunders et al., 2009). Reliability measures the extent to which the measurement is free from random error and thus is indicative of how much reliance the researcher can place on the technique giving consistent results (Yin, 1994; Cooper & Schindler, 2014).

Scholars indicate that there are numerous approaches for establishing reliability including reliability-equivalence, reliability-internal consistency and reliability-stability. Reliability-equivalence is the most often used measure to determine whether an

instrument provides consistent results with repeated testing by the same researcher or by different samples, under different conditions, and at different times (Saunders et al., 2009; Cooper & Schindler, 2014). Since the research instrument used in this study is an adaptation of various other instruments, it may have proved not to be reliable. To ensure reliability, the instrument was pre-tested in a pilot study and only tested and validated scales from prior studies were used in this study.

The piloted survey item scales underwent Cronbach's alpha coefficient tests to ensure reliability of the different constructs within the instruments, and to confirm that the study was acceptable (Tseng, Lin, & Vy, 2012). These scale items were found to have high reliability as the Cronbach's alpha values were all above 0.7, the minimum acceptable value. The Cronbach's alpha values for the constructs were: Firm Performance-Growth in Sales (1.000); Firm Performance-Market Share in Sales (0.993), Social Capital (0.993), Environment factor 1 (0.982) and Environment factor 2 (0.924). To enhance the reliability of data, adjustments to eliminate inconsistencies and ambiguity have been made to the pilot in finalising the instrument used in this study (Appendix A).

Factor analysis was conducted on the pilot instrument to ensure content reliability by assessing whether all the items within each construct loaded highly onto their respective constructs. In the pilot, the Firm Performance factor retained two factors with 2 items in each factor, namely, Growth in Sales and Growth in Market Share. One item (Profit) was eliminated from the Firm Performance construct during factor analysis because it had an anti-imagery value less than 0.4. However, in the final study, the financial indicator of profitability was reintroduced to capture both the profitability and growth facets of performance (Zahra, 1996). The Social Capital construct of the pilot retained one factor while the Environment construct retained two factors namely: Environment factor 1 and Environment factor 2. A summated scale could be computed for each of the 4 constructs/sub-constructs and further analysis was conducted using these summated scales. Based on the Pearson Correlation for the summated scales, there was significant correlation between Social Capital and Growth in Sales and Social Capital and Environment Factor 1, with no significant correlation among the rest of the variables. However, the Social Capital scale at level 1 that was used in the pilot to depict the independent variable

was dropped and replaced by its level 2 sub-construct of formal networking in the study. This approach enabled the researcher to specifically measure the independent variable that became the subject of the study post the pilot study. For this study, factor analysis was also conducted to ensure content reliability by assessing whether all the items within each construct loaded highly onto their respective constructs. The analysis of the survey item scales also underwent Cronbach's alpha coefficient tests to ensure reliability of the different constructs within the instruments and to ensure that the study is acceptable (Cronbach, 1970; Tseng, Lin, & Vy, 2012).

3.9 Limitations of the methodology of the study

Based on the methodology chosen for the study, the following potential limitations were identified:

- Respondents may have been biased in answering the questionnaire.
- The research tool was an adaptation of several research instruments, some of which, like the World Bank SCAT, were not specifically designed for developing economies such as South Africa.
- The study used perceptual measurements of performance and did not ask respondents to provide evidence of performance information during the survey. Therefore, the researcher was not able to cross-reference with actual audited financial statements. Even though conclusions could be made based on the direction of the responses, it was impossible to measure the actual magnitude of the responses.
- Performance questions may have influenced respondent responses. For instance, entrepreneurs with poorer performance compared to their competitors may have been reluctant to give a truthful account of performance information pertaining to the scale items related to growth in sales and growth in market share, resulting in biased results.
- The letter of support from the ICASA CEO may have alienated respondents who were not licensed by the industry regulator.

- The emphasis on business network associations may have alienated respondents who were not affiliated to any member organisation at the time of the survey.
- The survey method by its nature is likely to have low response rates, unless respondents were incentivised to participate.
- The survey method by its nature is likely to have low response rates, unless respondents were incentivised to participate.

3.10 Research ethics

Cooper and Schindler (2014) described ethics as behavioural norms or standards that guide moral choices related to our relationships with others and our behaviour. They maintain that as in business, research must strive to be ethical, ensuring that research activities do not lead to adverse consequences to anyone; that participants do not suffer embarrassment, loss of privacy, discomfort or pain. To achieve this, ethical research must protect the rights of the participant and be voluntary, obtaining informed consent from respondents and giving full disclosure on the consequences of the research. Cooper and Schindler (2014) further advised that the researcher must:

- be honest about the purpose and benefits of the research and his or her motives in a manner that demonstrates integrity during the research process.
- guarantee the right to privacy of respondents to ensure that the validity of the research is maintained as well as to ensure the protection of participants. This requires that confidentiality is assured by obtaining signed non-disclosures, restricting access to participant identities and only revealing participant information with their written consent.
- provide participants with the option to agree or not agree to participate in the research.

The researcher took the following steps and actions to ensure that ethics is maintained in this study:

- Firstly, the go-ahead for the research was given by the University of the Witwatersrand and an official ethics letter from Wits Business School was

attached to the online survey request email to ensure anonymity, confidentiality and good ethical treatment of the participants (Appendix A).

- Secondly, the results of the survey will be destroyed after the research report is published.
- Thirdly, potential respondents could chose not to participate in the survey and were advised accordingly.

3.11 Conclusion

This chapter was concerned with discussing the research design, methods and the processes followed in conducting the research. The research methodology practices used in the study were designed to test the constructs based on one directional positively correlated hypotheses developed by the researcher. A quantitative cross sectional study of ICT firms was carried out to examine the perceived impact of formal networking on firm entrepreneurial performance in South Africa's ICT industry. Particular attention was given to explaining the choice of data collection technique, the requirement for validity and reliability of the research, as well as ethical considerations taken into account by the researcher. The data collection method was described and the results of this study are discussed in the next chapter.

4 CHAPTER 4: PRESENTATION OF RESULTS

4.1 Introduction

The methodology for analysing the data aligns with the research methodology discussed in Chapter 3, including the research instrument and data collection methods. Chapter 4 presents the results of the data gathered from the research survey questionnaire, and an analysis of the relationships between the independent variable, the dependent variable and moderating variable. First, the demographic characteristics of the individual respondents is presented. Second, the characteristics of firm respondents is presented. Third, the properties of the scales of the independent variables and dependent variables are measured in terms of reliability and validity. Fourthly, descriptive statistics are provided, followed by results of the correlation and factor analyses, linear regression and equation modelling. This chapter ends with a summary of the hypotheses tested and their respective findings.

4.1.1 Sample description

The questionnaire was directed at strategic managers and owners in ICT firms only. A web-based online survey was emailed to an estimated 900 firms in South Africa's ICT industry, using convenience sampling, in accordance to the criteria discussed in Chapter 3. Strategic level management and firm owners were contacted directly. Other managers were also approached, although not specifically targeted as the researcher deemed them to play a supporting role to strategic managers, specifically in terms of executing the formal networking strategy of the firm. These managers included Communications/Media Liaison and Stakeholder Relations Managers.

The sample size comprised 120 responses, yielding a response rate of 14% achieved over a thirteen (13) week period. This response rate was satisfactory as it is higher than the minimum sample size of 10% or 90 responses targeted by the researcher for quantitative analysis. The response rate is also in line with the expected response rate for online surveys of similar length and complexity (Vehovar & Manfreda, 2008; Lefebvre et al., 2016). The researcher also viewed the response

rate as adequate given that a number of the online links were emailed to potential respondents over the festive season, anticipated staff mobility, the strict email policies of some of the companies contacted, and the designation of respondent targeted – firm owners and strategic managers. Furthermore, four (4) reminders were emailed to the potential respondents over a 13week period in order ensure an adequate response rate.

Only a few survey questions were incomplete, therefore the missing information was imputed using neighbouring information. Eight respondents in the sample indicated that due to their firm being a multi-national, the survey does not apply to them and that they do not participate in South African ICT industry forums, associations or business networks. Accordingly, they declined to complete the survey.

4.2 Demographic profile of respondents

Descriptive statistics of the demographics of individual respondents are presented below.

4.2.1 Individual level

4.2.1.1 Respondent Gender

There were 120 respondents. As indicated in Figure 3, the majority of them, 50.8% were male, and the rest (49.2%). There is a very small margin difference between them.

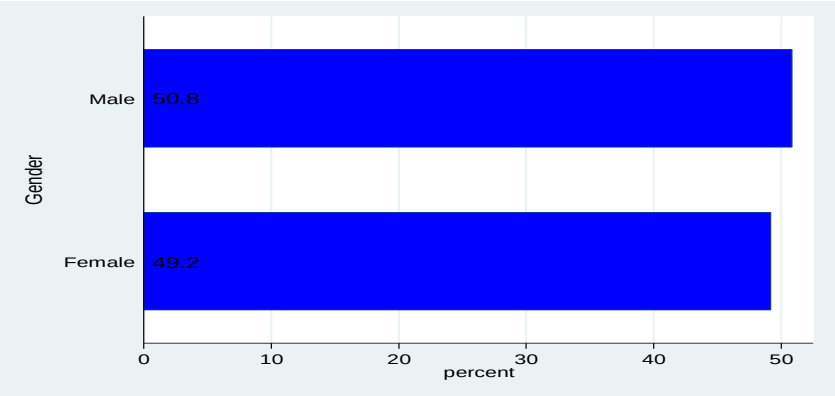

Figure 3: Respondent characteristics: Gender

4.2.1.2 Respondent designation in the firm

Strategic management, i.e. directors (32.5%), executive managers (24.2%) and senior managers (21.7%) comprised 78% of the respondents. Respondents at other levels of management made up the balance as shown in Figure 4. These respondents include managers (14.2%), communications/media liaison managers (5.8%) and stakeholder relations managers (1.7%).

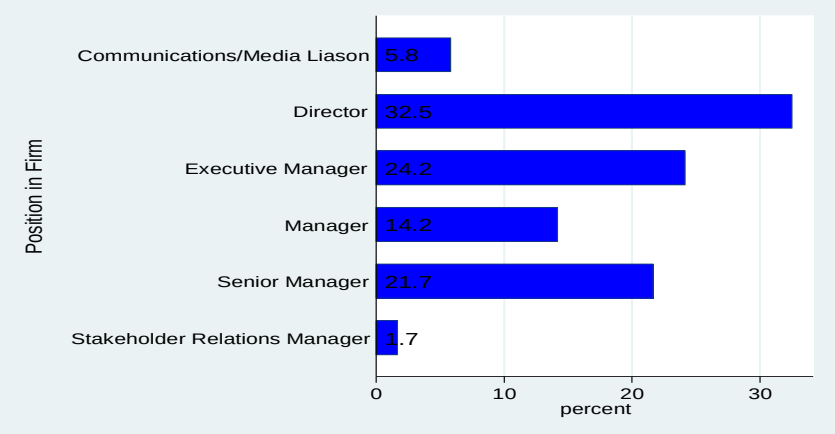

Figure 4: Respondent characteristics: Position in the firm

4.2.1.3 Years of experience in current position

Respondent tenure was almost evenly distributed. Figure 5 shows that 35.8% of respondents have occupied the same position for at least 11 years. Almost two thirds of the respondents (64.2%) have worked in the same position for 6 years and less: 0-3 years (32.5%) and 3-6 years, (31.7%).

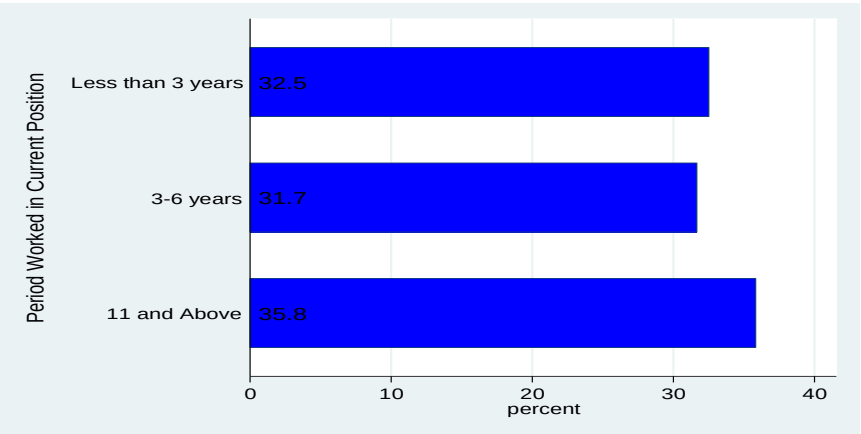

Figure 5: Respondent characteristics: Years of experience in current position

4.2.1.4 Years of experience in South Africa's ICT industry

Over 70% of respondents had been involved in the South Africa's ICT industry for over 7 years. According to Figure 6, 17% of the respondents have at least three years' experience. Twenty-three percent (22.5%) have between 7 and 10 years' experience and only 13% have less than 3 years' experience in this industry.

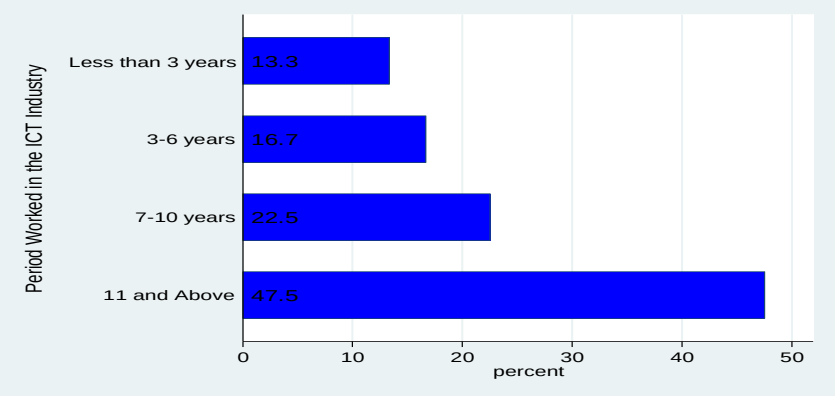

Figure 6: Respondent characteristics: Years of experience in South Africa's ICT industry

4.2.1.5 Respondent equity shareholding of at least 10% in the firm

Fifty-five percent (55%) of the respondents were shareholders of more than 10% in the firm. Figure 7 indicates that the remaining 45% do not own at least 10% of the business. There is only a ten percent margin of difference in ownership by respondents.

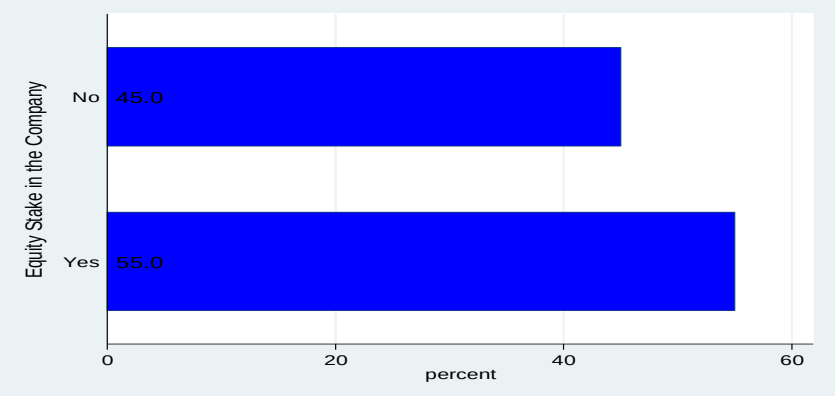

Figure 7: Respondent characteristics: Respondent equity shareholding of at least 10% in the firm

4.2.1.6 Respondent participation in strategic decision-making

The majority (85%) of respondents indicated that they participated in strategic management decision-making. Figure 8 shows that 15% of respondents indicated that they had no involvement in that level of decision making.

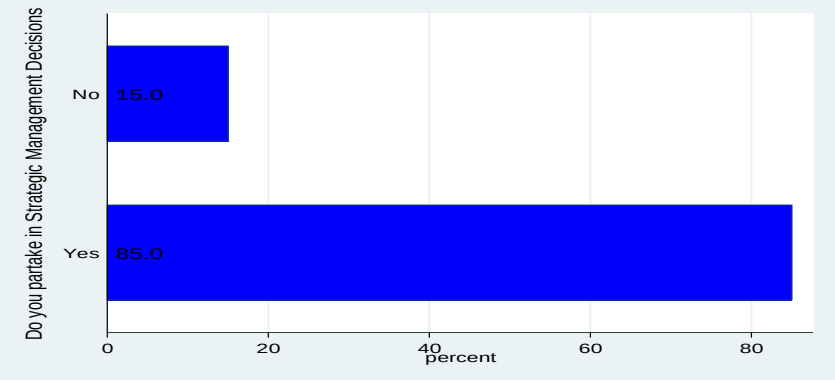

Figure 8: Respondent characteristics: Respondent participation in strategic decision-making

4.2.1.7 Respondent highest level of education

Just under two thirds (64.5%) of respondents had a postgraduate qualification, with 14% indicating that they had undergraduate qualifications and 15.1% indicating that they had either a certificate or diploma. Only 6.5% indicated that their highest level of education completed was matriculation. None of the respondents had not achieved a matric.

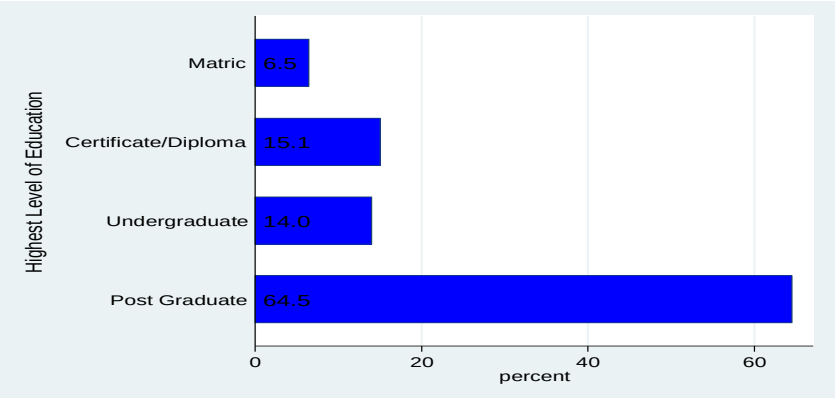

Figure 9: Respondent characteristics: Respondent highest level of education

4.2.2 Firm level

4.2.2.1 Firm legal entity

More than half (55.8%) of the respondents are private companies. Almost ten per cent of respondents (9.2%) indicated that they were state-owned enterprises and 18% were listed on the Johannesburg Stock Exchange. The balance (18%) indicated that the legal entity of their firm was either a close corporation, partnership or a sole proprietorship.

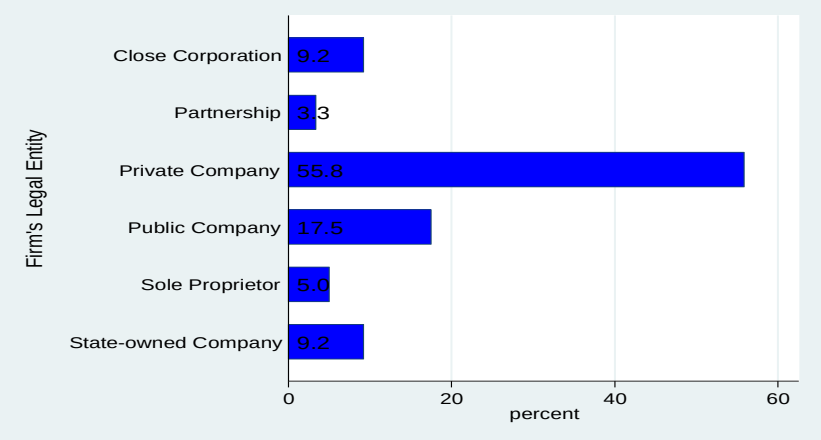

Figure 10: Firm characteristics: Legal entity of the firm

4.2.2.2 Firm age

Just over three quarters (76.7%) of the respondents indicated that their firms were established at least 11 years ago. Only 6.7% of the firms have been in operation for 3-6 years, and 16.7% having been operational for 3 years and less.

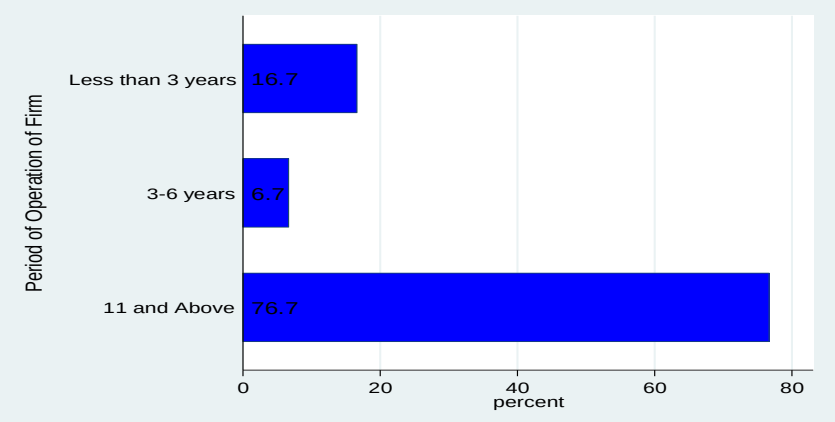

Figure 11: Firm characteristics: Age as measured by number of years in operation

4.2.2.3 Firm's main activity

Close to twenty-nine percent (28.6%) of the respondents were involved in product related businesses, while 71.4% indicated that they were involved in a service oriented business in the ICT industry. Of these, 21.8% listed telecommunications services as their main activity. Infrastructure activities are ranked second highest at 13.4% with the next highest activity being electronic and hardware manufacturer (11.8%).

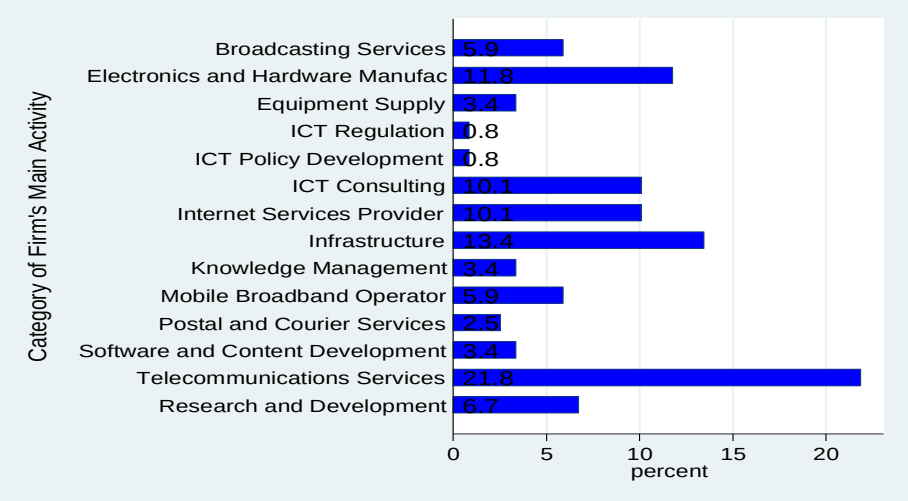

Figure 12: Firm characteristics: Main activity of the firm

4.2.2.4 Firm technological intensity

The majority (58%) of the respondents classified their firm's level of technological intensity as high-tech, with 25% indicating that they were medium-high technological intensity firms, and 13% were medium technological intensity firms. Only 5% of the respondents indicated that their firm had low technological intensity.

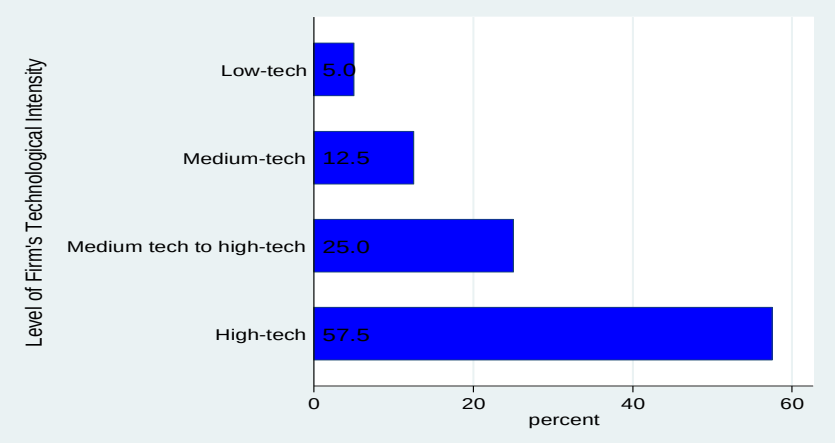

Figure 13: Firm characteristics: Technological intensity of firm

4.2.2.5 Firm industry network membership

Most of the respondents (68.9%) as shown in Figure 14 indicated that they belonged to an industry business network/association. A few of the members (29.2%) were not members of a formal network. Interestingly, of the firms that are members of a formal network, 26.7% of them were members of the SACF, followed by Wi-Fi Forum SA with 10.8%. The last twenty-five percent (24.5%) of the membership is distributed among seven industry networks with 10.8% of firms indicating that they belong to other networks.

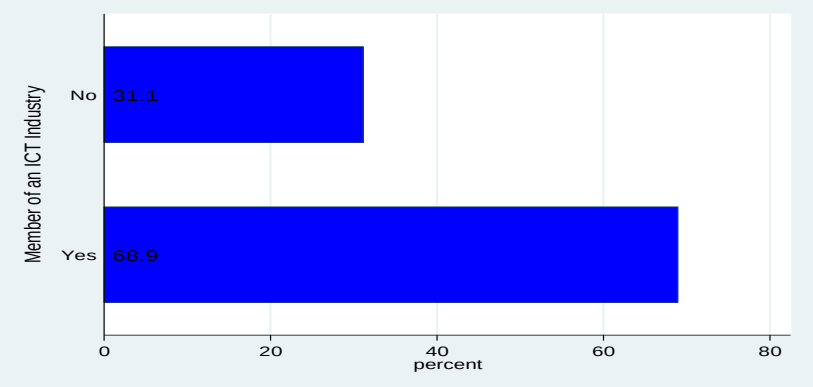

Figure 14: Firm characteristics: Firm industry network membership

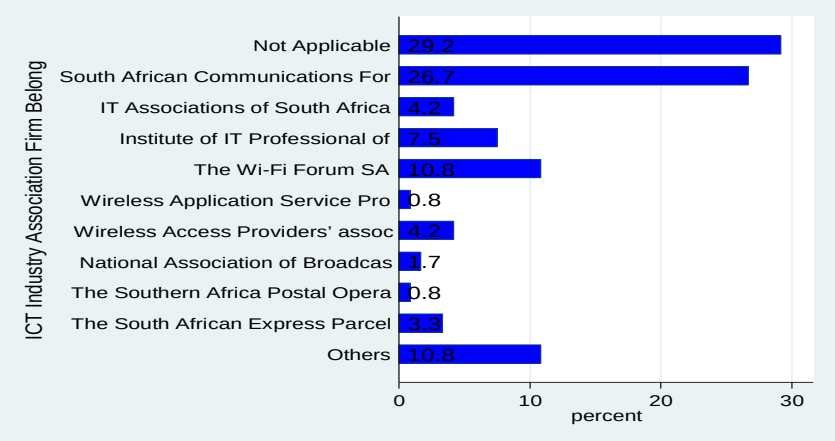

Figure 15: Firm characteristics: Firm industry network member association

4.2.2.6 Firm relationship strength in relation to network association

Thirty-two percent (31.7%) of the firms in the sample indicated a good relationship with its member association, with 21% indicating a strong relationship and 14% indicating very strong relations with their member association. These results indicate that over a third of the firms surveyed had relations that are more than good.

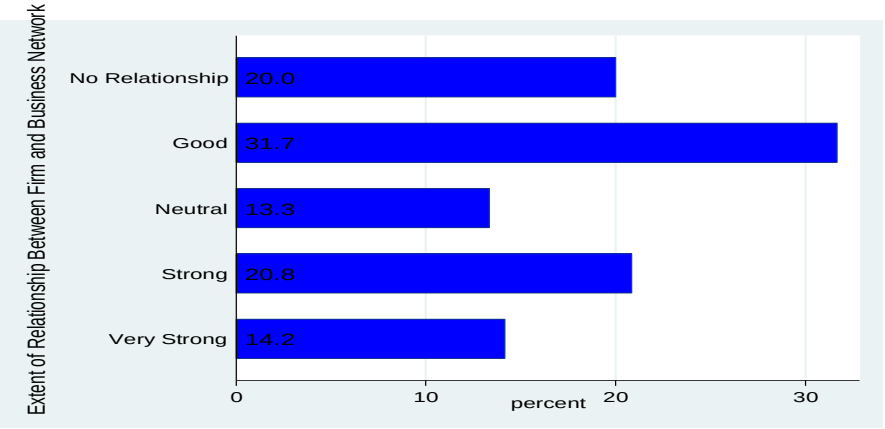

Figure 16: Firm characteristics: Firm relationship strength in relation to network association

4.2.2.7 Frequency of business network meetings

Over a third (35%) of the firms indicated that their network association meets quarterly. Figure 17 indicates that 29% of respondents indicated non-applicability. This figure is in line with the number of firms who indicated that they are not members of a formal business network as shown in Figure 14 above. Nineteen percent (19%) of the respondents indicated that their network meet monthly, and 10.8% meet twice a year. Only 6% meet annually.

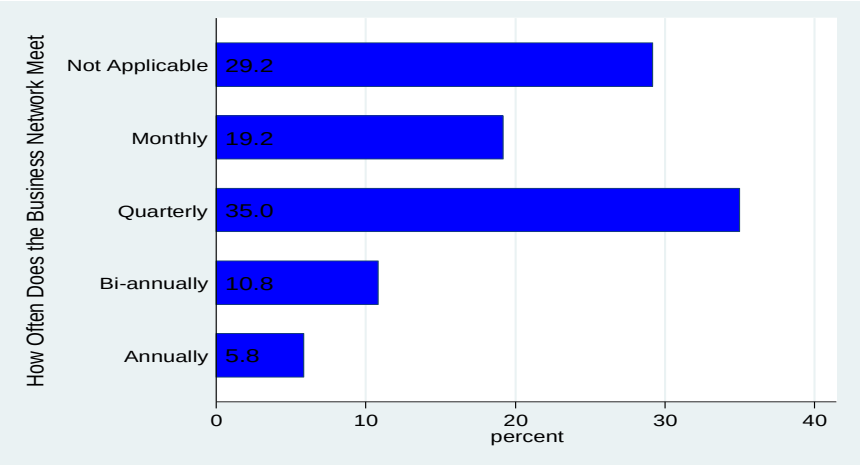

Figure 17: Firm characteristics: Frequency of business network meetings

4.2.2.8 Firm level of participation in business network

More than a third (37%) of the firms were not active members of their business networks. Figure 18 shows that 29% of the respondents indicated limited involvement in their business network. The remaining 34%, indicated that they were highly involved in the business network.

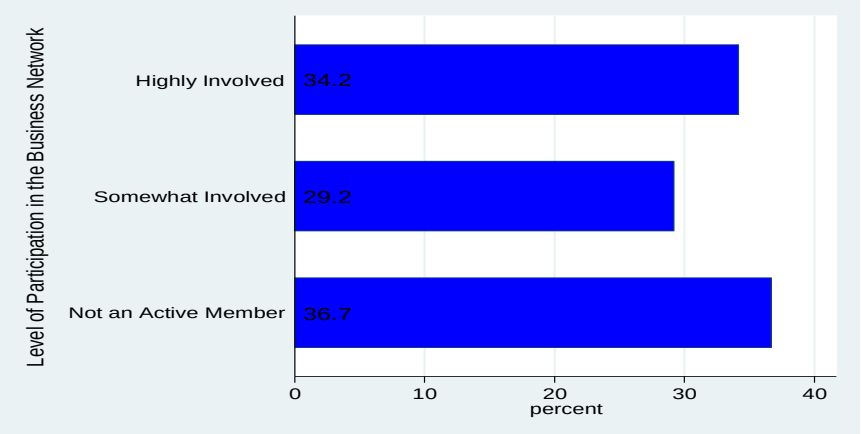

Figure 18: Firm characteristics: Firm level of participation in business network

4.2.2.9 Firm level ex officio position held in the ICT business network

Almost two thirds (65%) of the firm indicated that they held no official position in the business network of which they are members. 35% of the firm respondents indicated

holding ex officio positions in their member organisation. Almost twice as many respondents were not ex officio members of their business networks.

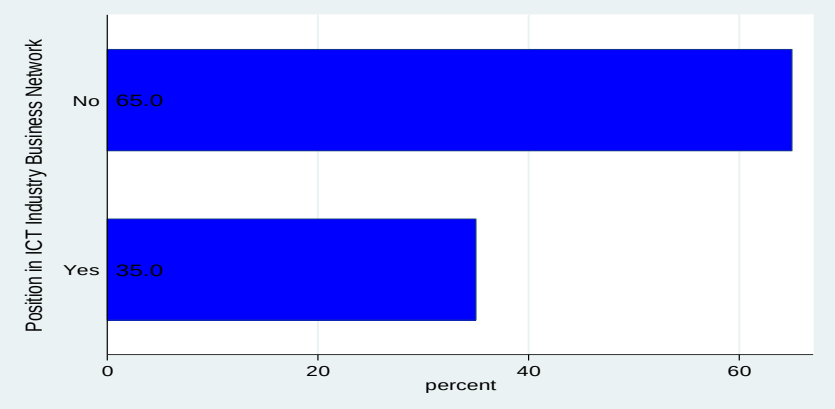

Figure 19: Firm characteristics: Firm level ex officio position held in the ICT business network

4.2.2.10 Firm positioning in the ICT business network

The majority, 56% of the firms considered themselves to be positioned in the middle of their network. 28% of the firm respondents believed they were centrally located in the business network with control and management influence. Only 16.7% indicated that they were passive network members

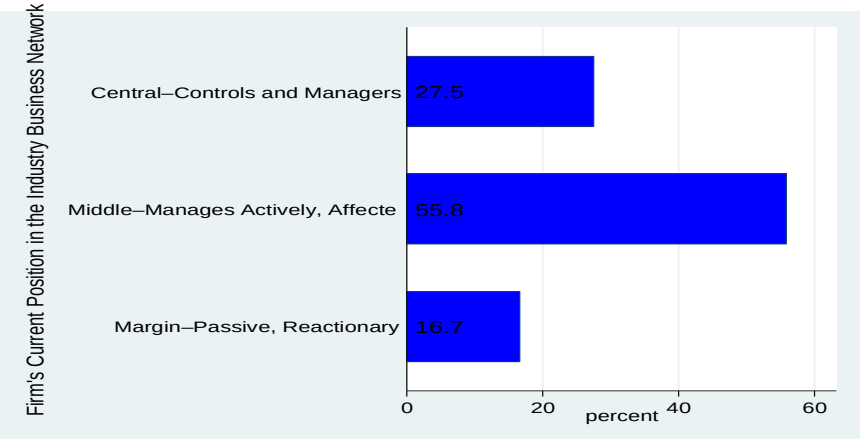

Figure 20: Firm characteristics: Firm positioning in the ICT business network

4.3 Measurements of variables

This section examines the properties of the scales of the independent variables and dependent variables in terms of reliability and validity. This step is essential prior to

performing any examination of the hypothesised model. For completeness, the structure of the constructs and their scales are presented in Table 4.

Table 4: Variables

Variable type	Level 1 Construct	Level 2 Construct	Level 3 Construct
Independent variable (IV)	Social Capital	Formal Networking	Relational quality and nature Network tie strength
Dependent Variable (DV)	Firm Entrepreneurial Performance	Financial performance	Growth in Sales Growth in Market Share Profitability
Moderator (MV)	Environment	Environmental Dynamism	
		Environmental Hostility	
Control	Firm Age	At least 3 years of operations	
	Industry	Industry type (ICT firms only)	

4.3.1 Reliability of the measurement scale

To assess the reliabilities of the scales and sub-scales, Cronbach's alpha and average inter-item correlations of each of the scales were examined. The internal consistency reliability measures are summarised in Table 5 below. The standardised Cronbach's alpha has not been shown because the scaling of the items was the same (i.e. 5-point Likert) for the scales considered.

Table 5: Reliability measures of the scales and subscales

Main construct/scale	Sub-construct/scale	Variable type	Variable level	Number of items	Cronbach alpha	Average inter-item correlation
Firm Entrepreneurial Performance		DV	1	10	0.9489	0.6862
	Growth in Sales	DV	3	4	0.9230	0.7274
	Growth in Market Share	DV	3	4	0.8466	0.5574
	Profitability	DV	3	2	0.7859	0.9147
Formal Networking		IV	1	30	0.9451	0.4516
	Relational quality and nature	IV	3	18	0.8781	0.3230
	Network tie strength	IV	3	12	0.9169	0.6721
Environment		MV	1	21	0.7254	0.1136
	Environmental Dynamism	MV	2	15	0.6685	0.1271
	Environmental Hostility	MV	2	6	0.6015	0.1872

Cronbach's alpha is a test used to establish the scale reliability of a construct, based on how closely related a set of items are. Cronbach's alpha lies between 0 and 1 with values closer to 1 considered desirable. However, in most social science research, a Cronbach alpha of 0.7 or above is considered acceptable.

4.3.1.1 Independent variables

4.3.1.1.1 Formal Networking

Formal networking is measured as a level 2 construct. As formal networking comprises relational and structural dimensions of social capital, these constructs are measured at level 3. Formal networking indicates high internal consistency reliability of the summated scaled, the value of Cronbach's alpha is at 0.94 and average inter-item correlation at 0.45.

At level 3, the relational and structural (network tie strength) subscales show high internal consistency reliability. For the relational dimension, the Cronbach's alpha was 0.88 and average inter-item correlation was 0.32. The value of Cronbach's alpha for the structural scale (network tie strength) was 0.92 and the average inter-item correlation was 0.67. The above results confirm that the individual items of Formal Networking with a minimum Cronbach's alpha of 0.88, exceeds 0.7 which is considered to be an acceptable Cronbach's alpha result. The average inter-item correlations exceeding the guideline score for adequate internal consistency reliability of 0.3. This result implied a very high level of reliability, indicating that each of the scale items could be combined to form a summated scale for the construct. The variable 'Other (please specify)' was added to the formal networking construct scale on industry membership to reflect the heterogeneity of the ICT industry and cater for multinationals who may belong to one of their home country industry associations.

4.3.1.2 Moderating variables

The hypothesised environment construct is a level 1 composite abstract comprising two separate distinct dimensions, namely: environmental hostility and environmental dynamism. Environmental Hostility and Environmental Dynamism are thus assessed separately at level 2.

4.3.1.2.1 Dynamism

At level 2, the environmental dynamism scale scored 0.67 on Cronbach's alpha, and 0.13 on the average inter-item correlation. The calculated Cronbach's alpha of 0.67 is lower than the acceptable minimum score of 0.7. The calculated average inter-item correlation value is below the minimum recommended 0.3. Thus, the internal consistency reliability of the environmental dynamism scale is considered weak.

4.3.1.2.2 Hostility

At level 2, the value of Cronbach's alpha for the environmental hostility scale was 0.6, and 0.19 on average inter-item correlation. The calculated Cronbach's alpha of 0.6 is lower than the acceptable value of 0.7. The calculated average inter-item

correlation of 0.19 is lower than the minimum recommended 0.3. This scale thus does not meet the conditions of satisfactory reliability.

4.3.1.3 Dependent variable

4.3.1.3.1 Firm Entrepreneurial Performance

Firm entrepreneurial performance, a level 1 measure consists of level 2 financial performance indicators. Financial performance consists of growth measures. At level 1 the subscale firm entrepreneurial performance measured 0.95 on Cronbach's alpha, and 0.69 on average inter-item correlation. At level 3, the firm entrepreneurial performance variables - namely growth in sales, growth in market share and profitability each measured 0.92, 0.85 and 0.79 on Cronbach's alpha, and 0.73, 0.56 and 0.91 on average inter-item correlations, respectively. This scale as well as its subscales meets the conditions of high internal consistency reliability.

4.3.2 Validity

Exploratory factor analysis (EFA) was conducted to confirm the perceived structure of the individual theoretically derived scales. The EFA was carried out using Varimax rotation for the extraction of factors, and regression analysis was used to assess the impact of the decision to participate in a formal network. The primary goal of factor analysis is to determine the underlying structure among the variables in order to explain the patterns of interrelationships (correlations) among the variables. Sets of variables that are highly interrelated are known as factors.

For the purposes of this study, in cases where variables designed to reflect the same construct loaded on different factors from those defined in the theory, the researcher noted these results but continued to work with the combinations of items derived from theory. The research was not designed to attempt to create new scales but rather to confirm the reliability of the existing theoretical scales. Thus, the discussion is limited to the number of factors that provide the highest level of interpretability in line with theoretical constructs. The research aimed to search for, or define the fundamental constructs or dimensions assumed to underlie the variables, and the

purpose of the research was to retain the nature and character of the original variables with minimal addition of new information.

4.3.2.1 Independent variables

4.3.2.1.1 Formal Networking

The sufficiency of the inter correlations among the 30 Network Relationship Quality and Nature and Network Tie Strength items designed to measure Formal Networking at level 2, were examined using the Kaiser-Meyer-Olkin (KMO) Measure of Sampling Adequacy and Bartlett's test of sphericity. As the KMO value was high at 0.81 and Bartlett's test of sphericity was significant ($p<0.001$), the factor analysis was allowed to proceed (Table 6).

Table 6: Tests of assumptions of factor analysis of Formal Networking (Firm's Relationship Quality and Nature and Network Tie Strength) items

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy	0.812	
Bartlett's Test of Sphericity	**Approx. Chi-Square**	**P-value**
	3311.382	0.000

Table 7: Eigenvalues Principal Components Extraction

Factor	**Eigenvalue**	**% Total - variance**	**Cumulative Eigenvalue**	**Cumulative - %**
Network Relationship Quality and Nature	12.32158	0.5329	12.32158	0.5329
Network Tie Strength	2.54395	0.1100	14.86553	0.6429

The eigenvalue summary for the formal networking scale (Table 7) indicates that a two factor solution is suitable for determining the factor structure of the scale. This

number of factors is in line with the theoretically derived scale. These factors all have eigenvalues greater than 1.0; and the factors explain 64% of the variance which is marginally above the recommended 60%

Table 8: Factor Loadings for Formal Networking

Question	Network Relationship Quality & Nature	Network Tie Strength
Q23_1 Most people in the ICT industry are honest and trustworthy	0.3424	0.0031
Q23_2 ICT industry players are only interested in their own welfare	-0.1018	0.4625
Q23_3 Members of ICT industry business networks are more trustworthy than non-	0.4209	-0.0359
Q23_4 Members of ICT industry networks readily share information, resources and	0.3987	0.5086
Q23_5 Firms maintain close relationships with the leaders of industry business	0.6413	-0.0978
Q23_6 Members regularly engage the government and the industry regulator through	0.5526	0.1349
Q23_7 Members avoid making demands that can seriously damage the interests of	0.3668	0.5864
Q23_8 Members do not take advantage of each other, even if the opportunity arises	0.2462	0.5095
Q23_9 Firms have to be alert and informed or other industry actors may take	-0.0954	0.2595
Q23_10 Suppliers and customers share information for the benefit of the industry	0.4391	0.4656
Q23_11 During technical exchanges with other firms, we sometimes suspect the	0.0514	0.1633
Q23_12 We trust our key business network to act in the best interest of the industry as	0.5671	0.047
Q23_13 Firm membership to ICT industry business networks have been beneficial to	0.7295	-0.1526

Q23_14 Through its business network membership, the firm has moved into new	0.8198	-0.0309
Q23_15 The position of the firm has improved due to its membership in the business	0.8355	-0.2072
Q23_16 Members have gained new knowledge from other members in the business	0.8492	-0.1058
Q23_17 Membership in the business network has made the firm more competitive	0.9076	-0.1138
Q23_18 Membership in the business network has made the firm more profitable	0.9103	-0.0519
Q23_19 Membership in the business network has given the firm access to adequate	0.8753	-0.1389
Q23_20 The entrepreneur and the firm's opinions are taken into account when the	0.8427	-0.2797
Q23_21 Through its membership, the firm has established new contacts that have	0.8253	-0.1931
Q23_22 The key business network has 'opened doors' for the firm	0.8414	-0.321
Q23_23 Growth in sales over the past financial year can be attributed to the firm's	0.7408	-0.2914
Q23_24 Growth in market share over the past financial year can be attributed to the	0.7451	-0.2762
Q23_25 The firm maintains close contact with key industry regulator contacts	0.7713	0.2879
Q23_26 The firm trusts its suppliers to maintain confidentiality about its plans	0.5245	0.3743
Q23_27 The firm regularly meets with its suppliers and/or customers to share their	0.2626	0.1433
Q23_28 Competitors are aware of firm relations with key suppliers	0.4836	0.4562
Q23_29 The firm is able to collaborate with its competitors in the best interest of the	0.6751	0.4034
Q23_30 Firms collaborate to lobby policy and regulatory stakeholders	0.739	0.1361

Highlighted values represent factor loadings above 0.3

By examining the pattern of high factor loadings, the factors were named as shown in Table 8. An examination of these factor loadings (Table 8) shows factor loadings of 0.3 or greater which are interpreted as practically significant (i.e. would sufficiently correlate with the particular factor). The factor analysis show that network relationship quality correlates highly on their own factors, but correlates low with the other factors.

Nine of the items on the network relationship quality dimension sufficiently loaded on the factor with factor loadings of 0.82 and above. The items that had adequate factor loadings related to the levels of trust, competiveness and frequency of inter-firm interaction. The eighteenth item of the scale, rating whether belonging to the business network has made the firm more profitable scored 0.91 on the factor loadings, which is very acceptable. The eigenvalue on this factor was 12.32. Eigenvalues > 1.7 are indicative of a well-defined structure.

Nine of the items on the network tie strength dimension loaded moderately on the factor with factor loadings of 0.321 (question 22) and 0.586 (question 7). The eigenvalue on this factor was 2.54395 which is also indicative of a well-defined structure. The above results confirm both the uni-dimensionality and multi-dimensionality of the Formal Networking and Network Quality and Nature as well as the Network Tie Strength subscale. This analysis confirms the validity of the factor structure of the formal networking scale (level 2) and subscales (level 3).

4.3.2.2 Moderating variables

4.3.2.2.1 Environment

The scales for environmental hostility and environmental dynamism were assessed separately at level 2 rather than at the level 1 for this construct (i.e. environment). The data matrix of the 21 items designed to measure the environmental construct showed sufficient correlations for the researcher to proceed with the application of factor analysis as the sampling adequacy measure of The Kaiser-Meyer-Olkin (KMO) Measure of Sampling Adequacy was satisfactory at 0.57, although Bartlett's test of sphericity was significant ($p<0.001$) (Table 9).

Table 9: Tests of assumptions of factor analysis of the Environmental Construct items (Dynamism and Hostility)

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy	0.572	
Bartlett's Test of Sphericity	**Approx. Chi-Square**	**P-value**
	1318.911	0.000

Furthermore, the factor loadings of the items designed to reflect the two theoretical dimensions of environment did not all load on the factors as expected (Table 10) with only 14 factors loading for environmental dynamism and 11 factors loading for environmental hostility. This suggests that the factor structure of the Level 1 Environmental scale is adequate.

Table 10: Eigenvalues extraction for the Environmental Hostility and Environmental Dynamism scales (2 factors)

Factor	**Eigenvalue**	**% Total - variance**	**Cumulative Eigenvalue**	**Cumulative - %**
Dynamism	3.55559	0.2662	3.55559	0.2662
Hostility	3.05591	0.2288	6.6115	0.4950

The analysis suggested the presence of two factors – namely dynamism and hostility. The eigenvalues extraction for the factors is shown in Table 10. The eigenvalue summary for the Environmental scale (Table 11) indicates that a two factor solution is suitable for determining the factor structure of the scale which is in line with theory. The factors all have eigenvalues greater than 1; and factors cumulatively explain 50% of the variance which is below the recommended 60%. The reliability of the factors was low at a 50% explained variance.

By examining the pattern of high factor loadings, the factors were named as shown in Table 11.

Table 11: Factor Loadings for Environment

Question	Dynamism	Hostility
Q24_1 The failure rate of firms in the ICT industry is very high	0.3695	0.5783
Q24_2 The ICT industry is very risky; one bad decision could easily threaten the viability of the firm	0.1373	0.6552
Q24_3 The ICT industry has prospered in the last 5 years	0.0146	0.0364
Q24_4 Competition is high in the ICT industry	-0.3197	0.5376
Q24_5 Price wares are characteristic of the ICT industry	0.3282	0.5193
Q24_6 Low profit margins are characteristic of the ICT industry	0.3956	0.2698
Q24_7 Actions of competitors are easy to predict	0.4905	0.2116
Q24_8 The set to competitors in the ICT industry remains constant	-0.0716	0.6334
Q24_9 Product demand forecasting is easy to do	-0.5057	0.4373
Q24_10 Customer demand forecasting is easy to do	-0.5925	0.4328
Q24_11 The ICT industry is very stable	0.0313	-0.1719
Q24_12 The ICT industry is corrupt	0.5818	0.4333

Q24_13 Dominant players in the ICT industry use anti-competitive tactics to keep competition out of the market	0.65	0.1471
Q24_14 The rate of technological change in the ICT industry is very high	-0.5194	0.4744
Q24_15 South African ICT firms are competitive in a highly dynamic industry	-0.756	0.332
Q24_16 Regulation is necessary to ensure industry growth and fair competition	0.4169	0.1402
Q24_17 The ICT industry is over regulated	0.0804	0.039
Q24_18 More regulation and policy direction is required to ensure the growth of the ICT industry	0.31	0.1585
Q24_19 The ICT industry is known as a significant contributor to economic development	-0.2533	0.2306
Q24_20 The level of disagreements or tension between competitors is high	0.2692	0.4017
Q24_21 The level of cooperation displayed between competitors is high	0.4059	0.0103

Highlighted values represent factor loadings above 0.3

4.3.2.2.2 Environmental Dynamism

The data matrix of the 13 items designed to measure the environmental dimension of dynamism showed insufficient correlations to proceed with the application of factor analysis.

4.3.2.2.3 Environmental Hostility

The data matrix of the eight items designed to measure the environmental dimension of hostility showed sufficient correlations to proceed with the application of factor analysis.

4.3.2.3 Dependent variable

4.3.2.3.1 Firm Entrepreneurial Performance

The data matrix of the 11 items designed to measure Firm Entrepreneurial Performance showed sufficient correlations to proceed with the application of factor analysis as the sampling adequacy measure of the Kaiser-Meyer-Olkin (KMO) Measure of Sampling Adequacy was very high at 0.921, with Bartlett's test of sphericity significant ($p<0.001$) (Table 12).

Table 12: Tests of assumptions of factor analysis of the Firm Entrepreneurial Performance items

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy	0.920	
Bartlett's Test of Sphericity	**Approx. Chi-Square**	**P-value**
	1080.883	0.000

Table 13: Eigenvalues extraction for the Firm Entrepreneurial Performance

Factor	Eigenvalue	% Total - variance	Cumulative Eigenvalue	Cumulative - %
Firm Performance	6.73664	0.9439	6.73664	0.9439

The eigenvalue summary for the firm entrepreneurial performance scale (Table 13) indicates that a one factor solution is a suitable factor structure of the scale. This factor has an eigenvalue of 6.74 indicating a satisfactorily defined construct; and the factor explains 0.94% of the variance which is significantly above the recommended 60%.

Table 14: Factor loadings for Firm Entrepreneurial Performance

Question	Firms Performance
Q10_1 Sale/Turnover	0.8755
Q10_2 Profit	0.8605
Q10_3 Sales growth compared to competitors	0.9051
Q10_4 Percentage of sales from new products compared to major competitors	0.8694
Q10_5 Percentage of sales from new markets compared to major competitors	0.7840
Q10_6 Market value compared to major competitors	0.8504
Q10_7 Market share compared to major competitors	0.8173
Q10_8 Customer satisfaction rate compared to major competitors	0.6126
Q10_9 Rate of entry into new markets compared to major competitors	0.8069
Q10_10 Brand recognition and brand value compared to major competitors	0.7889

Factor analysis on all 11 items on the economic performance dimension yielded a single factor. The correlation of the items with the factor was high and positive, with factor loadings ranging from 0.61 to 0.91. A strong positive variable-factor correlation indicates a strong positive association between the variable and the factor.

4.3.2.3.2 Firm entrepreneurial performance

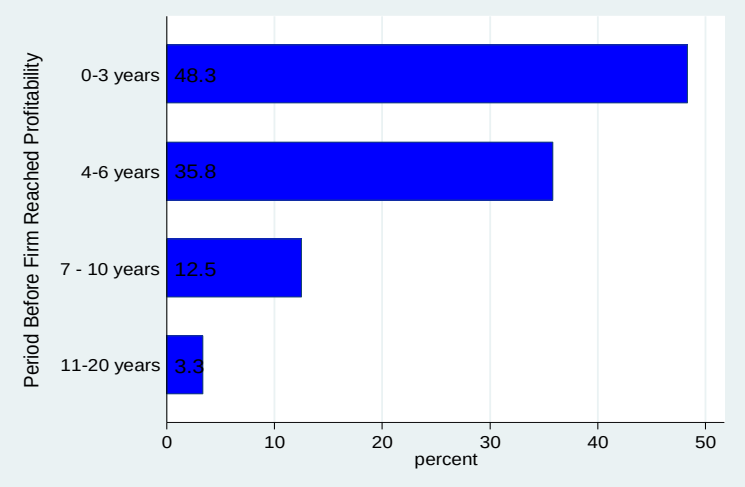

Figure 21: Firm characteristics: Time taken to reach profitability

The survey included a single question on the time taken from inception for the firm to reach profitability. 48% of firm respondents indicated that it took them between zero and three years to become profitable and only 3.3% indicated that it took them over 10 years to reach profitability. The remaining 48% of firms took between four and 10 years to reach profitability.

4.3.3 Descriptive statistics

Descriptive statistics display characteristics of the location, spread, and shape of the variables under study. The measures of central location (mean and median) of all the variables were interpreted relative to the neutral value of three or the midpoint of the 5-point Likert scales. Variability in the distribution of the variable is represented by the standard deviation (std. dev. column). Skewness measures the variables distributions' deviation from symmetry, whereas Kurtosis is a measure of its peakedness or flatness when plotted on a graph. The Skewness and Kurtosis indices were also calculated.

Table 15 contains information that is useful in understanding the descriptive qualities of the data. All the means of the scales and subscales were higher than the Likert scale midpoint of 3 (neutral) indicating agreeability with the scales and subscales. The Skewness index (SI) and the Kurtosis index (KI) were not severe.

Table 15: Descriptive Statistics

Variable	Mean	Standard deviation	Skewness	Kurtosis
Firm Entrepreneurial Performance	3.6752	0.8494	-0.5160	2.5239
Network Relationship Quality & Nature	3.5529	0.5982	-0.4835	2.4765
Network Tie Strength	3.3458	1.1501	-0.6585	2.4887
Environmental Dynamism	3.3978	0.3692	0.7750	4.9246
Environmental Hostility	3.5292	0.5528	-0.0016	2.3753
Age of Firm	3.3667	1.1735	-1.3691	2.9949
Type of Industry	8.2101	4.2063	-0.2362	1.8340

4.3.3.1 Frequency distributions

An analysis of the distributions showed that a few variable distributions namely Firm Entrepreneurial Performance, Network Relationship Quality and Nature, Network Tie Strength, Hostility, Firm Age and Type of Industry - were negatively skewed with skew indices more negative than -1. Only Dynamism had a positive result (0.775).

Respondents agreed the most with the Type of Industry scale (mean = 8.21), then with the Firm Entrepreneurial Performance scale (mean = 3.6752), then Network Relationship Quality and Nature (mean = 3.5529) and so on. A range of variable transformation techniques were explored to test whether the transformed variables might result in normal distributions, but the skewness indices and shapes of the distributions were not substantially improved; the researcher preferred to use the untransformed variables consistent with the approach of maintaining the original scale measures as far as possible. Thus the original untransformed measurement variables were considered in subsequent model testing.

4.3.4 Control variables

Tests were performed for the statistical significance of the effect of firm age, and industry as possible factors to control when examining the relationship between the predictor variables and performance.

Firm Age was operationalised as age of firm since founding year (year of inception), and firm industry operationalised as industry type. As shown in Table 16, age of firm and type of industry are correlated with firm entrepreneurial performance, therefore, they are included in the model as control variables.

Table 16: Control Variables: ANOVAs

Firm Entrepreneurial Performance			
	df – Effect	F	P
Age of Firm	2	6.39	0.0024
Type of Industry	13	3.81	0.0001

The above results show that age of firm and type of industry are correlated with firm entrepreneurial performance so they are included in the model as control variables.

4.3.1 Conclusions on the measurements adequacy of the variables

With the exception of the moderator variables, there was support for construct validity of scales based upon theoretical expectation. The eigenvalues of all the factors exceeded the recommended minimum of 1.0, indicating well-defined factor structure. All factor structures, except for hostility and dynamism, accounted for over 60% of the variance. In general, there is evidence of convergent and discriminant validity of the scales, but caution should be exercised when interpreting the hypothesised moderators.

Although there was evidence of some negative skewness in the distributions of some level measures, the original (untransformed) variables were retained, consistent with the research approach adopted throughout the study to use theoretical measures as far as possible. Examination of residual regression plots was thus necessary to check whether the assumptions of the regression were satisfied despite a degree of non-normality in the score distributions.

4.4 Correlation analysis

Correlations refer to mechanisms to measure the strength of a linear association between variables (Cooper & Schindler, 2014). The correlations are measured to vary between minus one and one. Cohen (1988) explains that negative correlations are inverse and result when an increase in one variable results in a reduction in the other. The reverse is true for positive relationships where the strength is determined by its closeness to one (Cooper & Schindler, 2014). Correlations greater than .80 reflect a stronger association and conversely, those closer to zero indicate a weak relationship or no relationship at all.

Table 17: Correlation Matrix

Variable	1	2	3	4	5	6	7
1. Firm Entrepreneurial Performance	1.0000						
2. Network Relationship Quality and Nature	0.3346*	1.0000					
3. Network Tie Strength	0.3504*	0.8848*	1.0000				
4. Dynamism	0.0195	0.2236	0.0648	1.0000			
5. Hostility	-0.1290	0.2140	0.1531	0.6737*	1.0000		
6. Age of Firm	0.2854*	0.0200	0.0843	-0.1895	-0.308*	1.0000	
7. Type of Industry	0.1113	0.0740	0.0963	0.0684	0.1044	-0.0864	1.0000

* Correlation is significant at 0.05 level

The results show that Network Relationship Quality and Nature ($r=0.33$, $p<0.05$), Network Tie Strength ($r=0.35$, $p<0.05$), and Age of Firm ($r=0.29$, p 0.05) have a positively significant and moderate relationship with Firm Entrepreneurial Performance. The relationship between Environmental Dynamism, Type of Industry and Firm Entrepreneurial Performance was found to be positively weak and insignificant. Environmental Hostility has a weak negative relationship with Firm Entrepreneurial Performance, which indicates that as Environmental Hostility increases, Firm Entrepreneurial Performance decreases.

4.4.1 Graphical presentation of Correlation Results

The scatterplots of the significant relations among Formal Networking variables and Firm Entrepreneurial Performance are presented in Figure 22 and 23.

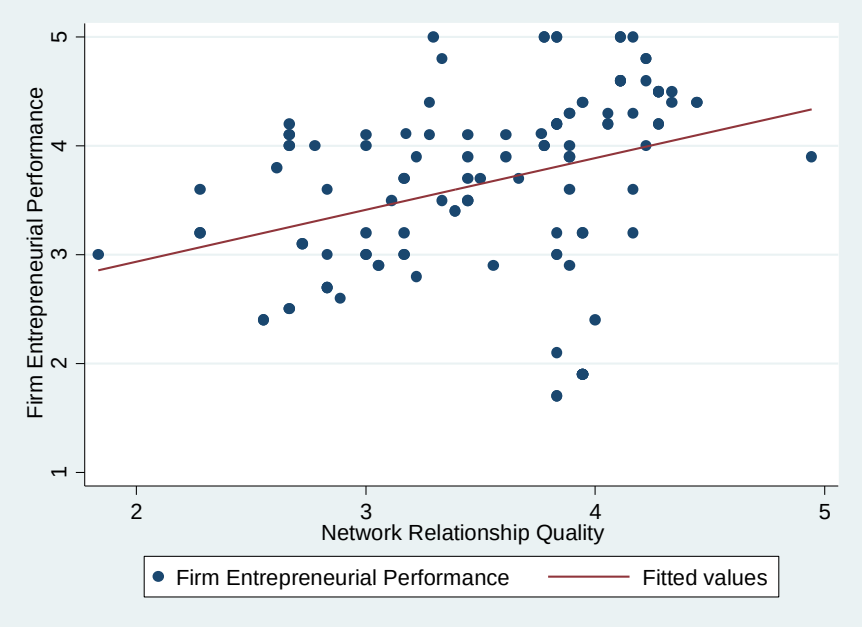

Figure 22: Scatterplot of Firm Entrepreneurial Performance against Network Relationship Quality and Nature

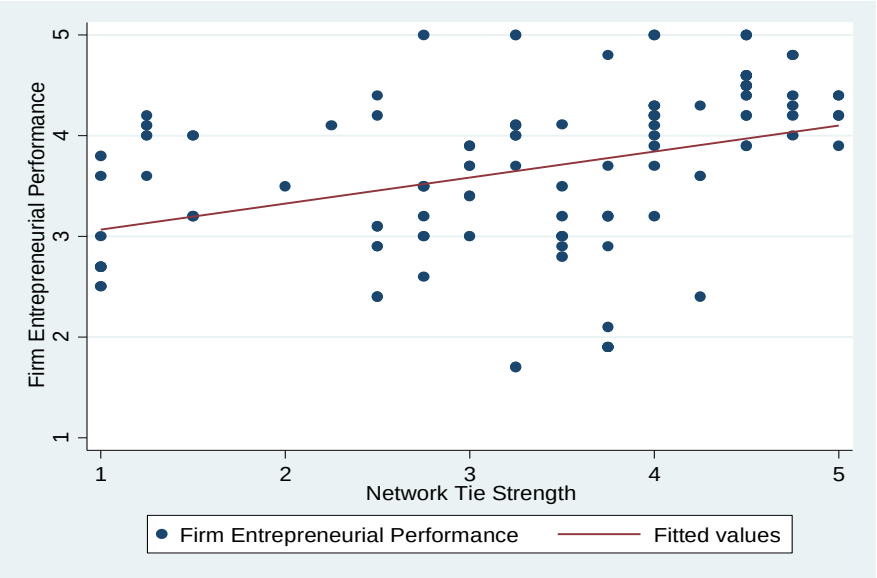

Figure 23: Scatterplot of Firm Entrepreneurial Performance against Network Tie Strength

The scatterplots of the significant relations among Environmental moderating variables and Firm Entrepreneurial Performance are presented in Figure 24 and 25.

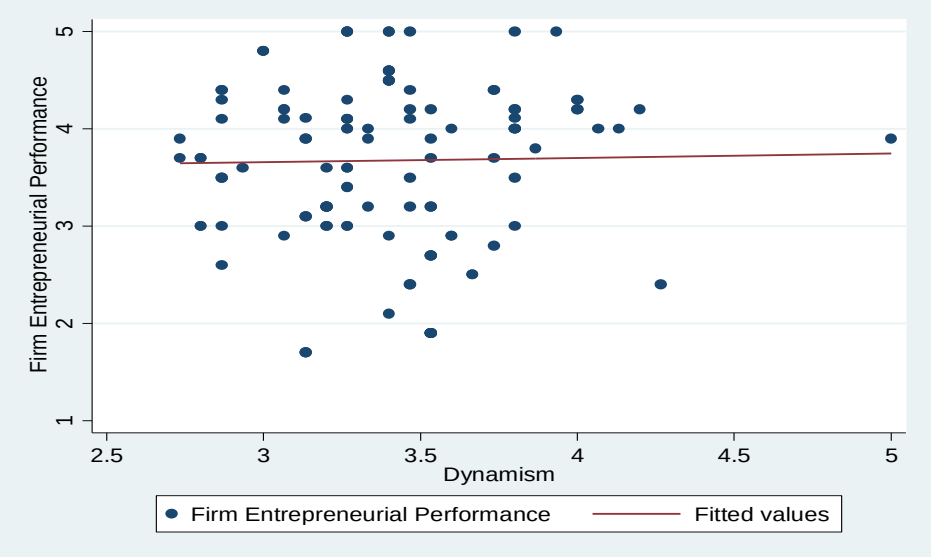

Figure 24: Scatterplot of Firm Entrepreneurial Performance against Environmental Dynamism

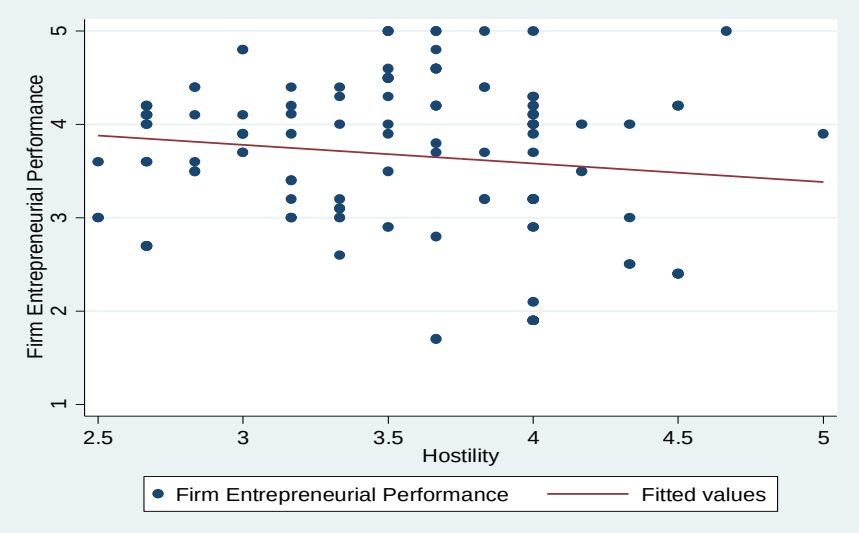

Figure 25: Scatterplot of Firm Entrepreneurial Performance against Environmental Hostility

The scatterplots of the significant relations among control variables and Firm Entrepreneurial Performance are presented in Figure 26 and 27.

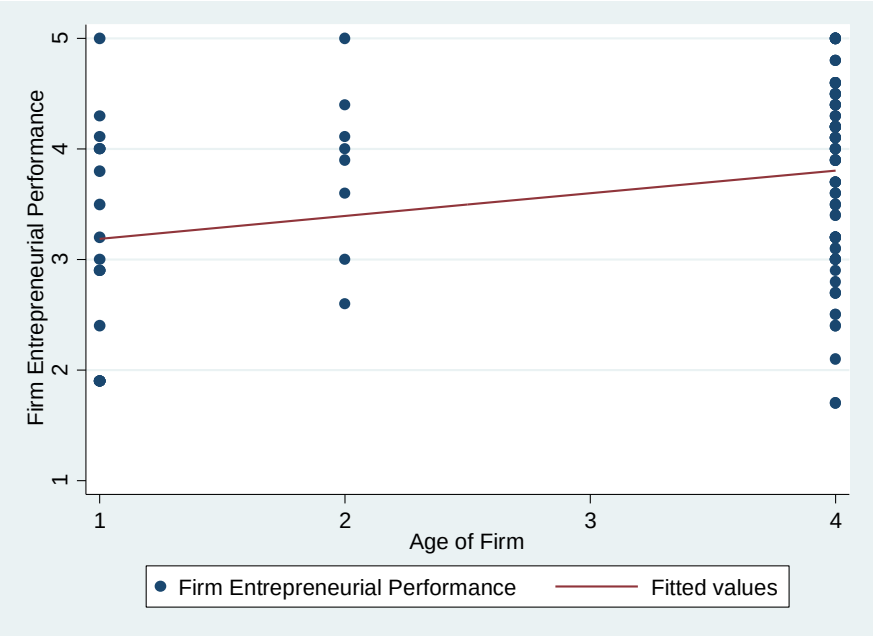

Figure 26: Scatterplot of Firm Entrepreneurial Performance against Age of Firm

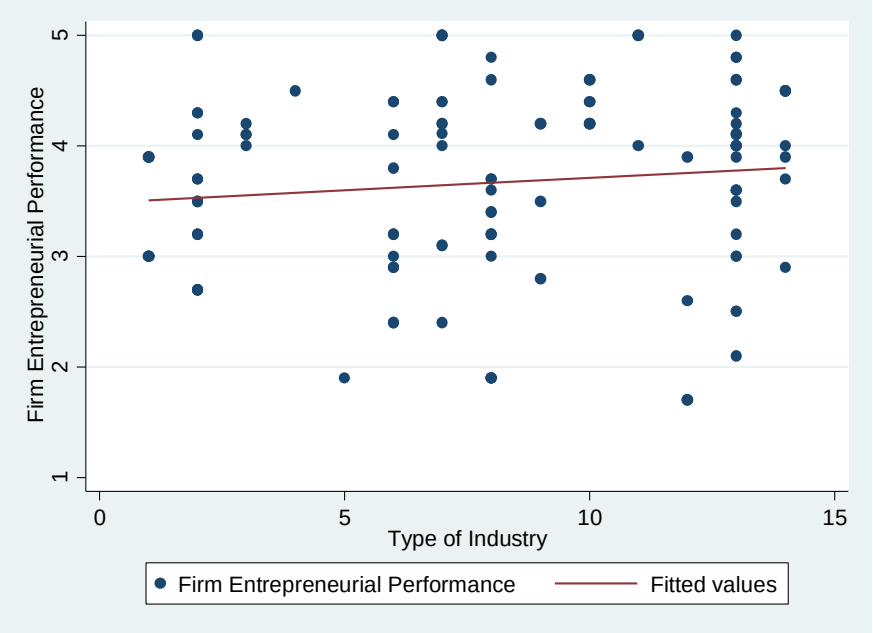

Figure 27: Scatterplot of Firm Entrepreneurial Performance against Type of Industry

4.5 Tests of the theoretical model

The previous sections have largely confirmed the measurement adequacy of the scales, and provided satisfactory evidence of their construct validity. The next step was to test hypotheses, with the primary aim to analyse the predictive power of the independent variables as represented in the model. The dependent variable, firm entrepreneurial performance was measured on an equal interval scale. While parametric statistics assume that the variables are measured on at least an interval scale, the parametric linear regression analysis was adopted.

Two models were formulated to test the impact of the independent variables and the moderating variables on the dependent variable. The conceptual model, with firm entrepreneurial performance as the dependent is shown in Figure 21.

4.5.1 Theoretical framework

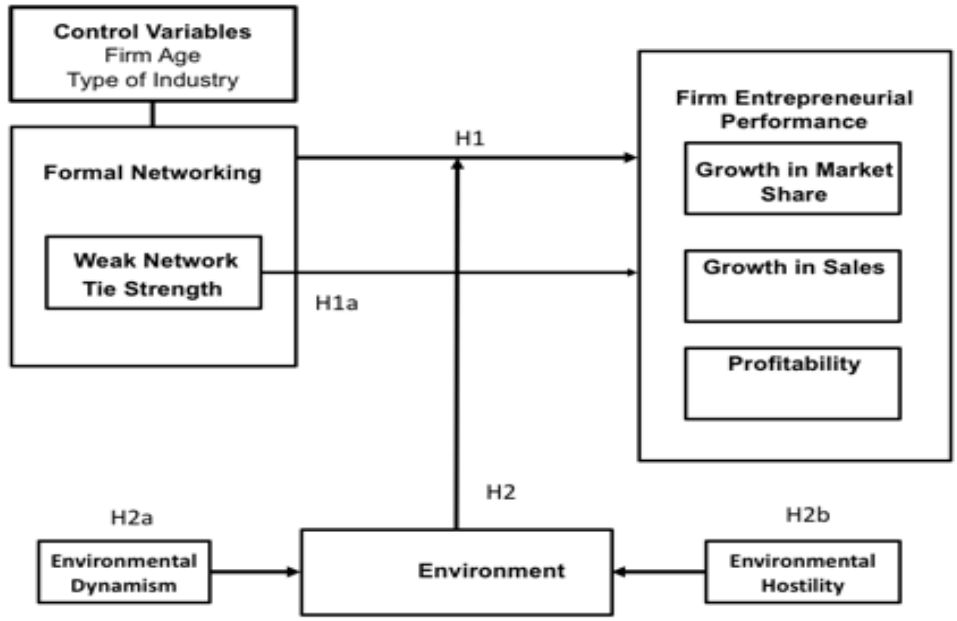

Figure 28: Theoretical Model

Dependent Variables: Firm Entrepreneurial Performance: Growth in Sales; Profitability; Growth in Market Share

Independent Variables: Formal Networking: Weak Network Tie Strength

Moderating Variables: Environmental: Dynamism; Hostility

In this study, formal networking is measured using constructs of network relationship quality and nature, and network tie strength. The environment on the other hand, is measured using constructs of dynamism and hostility. Three subjective measures (growth in sales, growth in market share, profitability) of firm entrepreneurial performance were used to generate a subjective index/measure of firm performance. Age of firm and type of industry were used as control variables for the study.

Table 17 represents regression results for the impact of formal networking on firm entrepreneurial performance for a model with and without moderators. In both models, firm related attributes such as age of firm and type of industry are used as control variables.

Table 18: Regression Results

Model 1	Base Model		Model 2	Base with Moderator	
	Beta(β)	P-value		Beta(β)	P-value
Constant	2.7622	0.000***	Constant	2.8044	0.000***
Network Relationship Quality and Nature	0.1590	0.299	Network Relationship Quality and Nature	-0.0160	0.931
Network Tie Strength	0.1207	0.433	Network Tie Strength	0.3216	0.092*
Age of Firm	0.2151	0.001***	Age of Firm	0.1907	0.005**
Type of Industry	0.0221	0.197	Type of Industry	0.0233	0.179
			Dynamism	0.1941	0.082*
			Hostility	-0.2164	0.072*
Model Statistics			Moderator 1 (dynamism and quality)	0.2006	0.251
R^2	0.2124		Moderator 2 (dynamism and ties)	-0.3292	0.106
Adjusted R^2	0.1848		Moderator 3 (hostility and quality)	0.0298	0.880
F(4,114)	7.69***		Moderator 4 (hostility and ties)	-0.0109	0.950
			Model Statistics		
			R^2	0.2782	
			Adjusted R^2	0.2114	
			F(10,108)	4.16***	

Note: Dependent variable: Firm Entrepreneurial Performance. *, **, ***, indicates significance at 10, 5, and 1% level respectively.

4.6 Results pertaining to hypothesis 1

H1: Formal networking has a positive impact on firm entrepreneurial performance of ICT firms in South Africa. SUPPORTED

H1a: Weak network ties have a positive impact on firm entrepreneurial performance of ICT firms in South Africa. SUPPORTED

Model 1 shows that the network relationship quality and nature, and weak network tie strength constructs have a positively insignificant effect on firm entrepreneurial performance. The firm-related attribute: age of firm, has a positively significant effect on firm entrepreneurial performance whilst the second firm-related attribute: type of industry to which a firm belongs has a positive but insignificant effect. Thus, Model 1 supports hypotheses 1 and 1a of a positive impact of formal networking and weak network ties on firm entrepreneurial performance. However, this positive impact can be due to chance since the variables were statistically insignificant. Model 1 (Adjusted R2=0.1848) can explain 18.5% of the variance in firm entrepreneurial performance caused by the formal networking construct of network relationship quality and nature and network tie strength after controlling for age of firm and industry type.

4.7 Results pertaining to hypothesis 2

H2: The relationship between formal networking and firm entrepreneurial performance of ICT firms in South Africa is moderated by the environment. NOT SUPPORTED

H2a: The relationship between formal networking and firm entrepreneurial performance of ICT firms in South Africa is moderated by the environmental characteristic of dynamism. NOT SUPPORTED

H2b: The relationship between formal networking and firm entrepreneurial performance ICT firms in South Africa is moderated by the environmental characteristic of hostility. NOT SUPPORTED

Model 2 shows that age of firm, network tie strength, and environmental dynamism have a positively significant effect on firm entrepreneurial performance.

Environmental hostility has a negative effect on firm entrepreneurial performance which is significant at 10% level. The result also indicates that the relationship between formal networking and firm entrepreneurial performance is not moderated by the environmental characteristics of dynamism and hostility, that is the moderator variables were found to be insignificant. This implies that the relationship between firm entrepreneurial performance and formal networking do not depend on the environment. Model 2 (Adjusted R^2=0.2114) can explain 21.1% of the variance in firm entrepreneurial performance caused by the social constructs of network relationship quality and nature, weak network tie strength and environment (as captured by dynamism and hostility) after controlling for age of firm and industry type. Therefore, this model does not show that moderation is underway, and so fails to support Hypotheses 2, 2a and 2b.

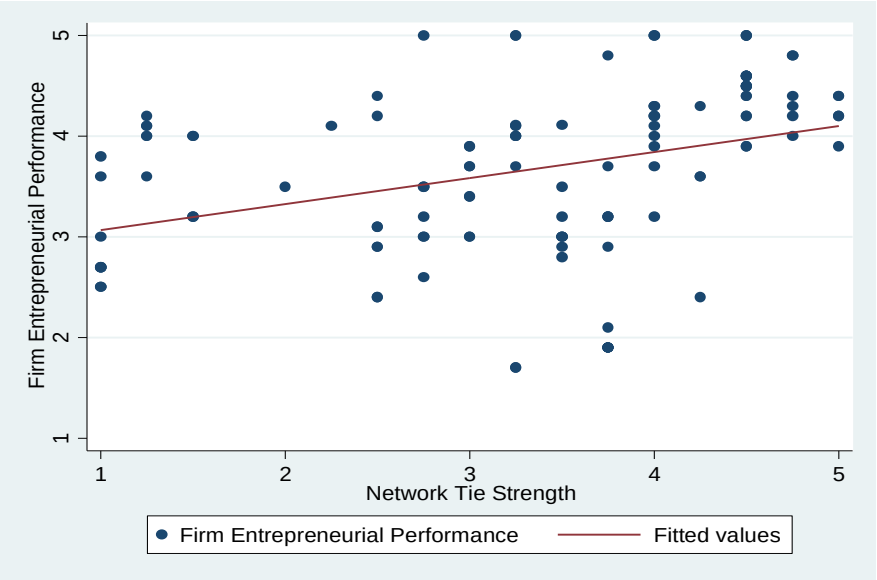

Figure 29: Scatterplot of Firm Entrepreneurial Performance against Network

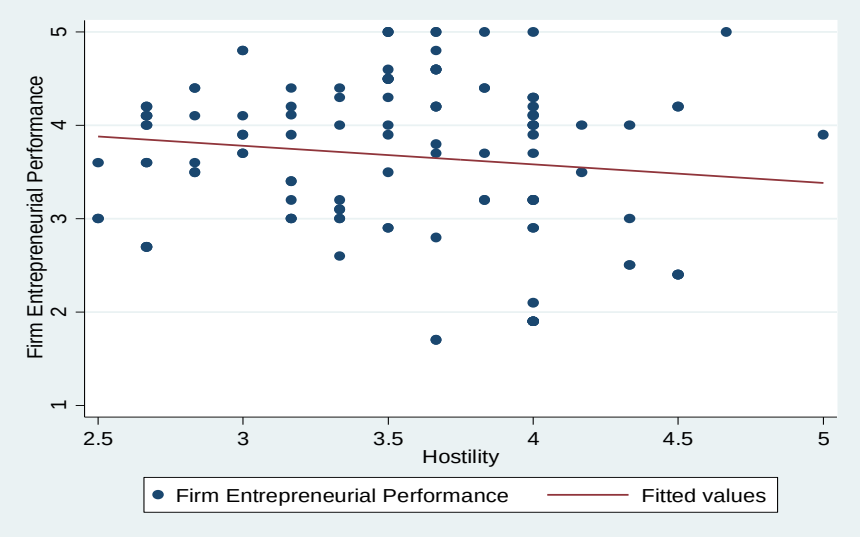

Figure 30: Scatterplot of Firm Entrepreneurial Performance against Environmental



Figure 31: Scatterplot of Firm Entrepreneurial Performance against Type of Industry

4.8 Conclusion

In this chapter the results of the data collected from the sample of 120 firms were presented. Tests to determine the validity and reliability of the research instrument used to measure the perceived impact of formal networking on entrepreneurial

performance of firms in South Africa's ICT industry, as well as the moderating effect of the environment on the formal networking–firm entrepreneurial performance relationship, were conducted. To measure the relationship between firm entrepreneurial performance (in terms of growth in sales, growth in market share and profitability) as the dependent variable and membership in formal networks as the independent variable, regression analysis was performed. Firm-related attributes of firm age and industry type were included in the regression tables as control variables.

There was a modest variance between the dependent and independent variables, as well as negative effects, which implied that formal networking partly explains firm entrepreneurial performance in South Africa's ICT industry. The relationship between the weak network ties of formal relations and firm entrepreneurial performance were found to be positive. Environmental characteristics of hostility and dynamism were found to have no moderating effect on the formal networking-firm entrepreneurial performance relationship.

The correlation model results confirm hypothesis 1 and hypothesis 2, respectively. The relationship between the level 2 construct of Environmental Dynamism and the level 1 construct: Firm Entrepreneurial Performance was found to be positively weak and insignificant. Environmental Hostility has a weak negative relationship with Firm Entrepreneurial Performance, which indicates that as Environmental Hostility increases, Firm Entrepreneurial Performance decreases. The results pertaining to the sub-problems and hypotheses can be summarised as follows:

Sub-problem 1: Formal networking and weak ties impact on firm entrepreneurial performance

- H1: Formal networking has a positive impact on firm entrepreneurial performance of ICT firms in South Africa. SUPPORTED
- H1a: Weak network ties have a positive impact on firm entrepreneurial performance of ICT firms in South Africa. SUPPORTED

Sub-problem 2: The moderating role of the environment on the dependent and independent variables:

- H2: The relationship between formal networking and firm entrepreneurial performance of ICT firms in South Africa is moderated by the environment. NOT SUPPORTED

5 CHAPTER 5: DISCUSSION OF THE RESULTS

5.1 Introduction

The purpose of this chapter is to discuss and explain the research results as presented in Chapter 4 in detail. These results are compared to the theoretical foundation established from extant literature as discussed in the literature review (Chapter 2) of this study. This chapter begins with a discussion and comparison of the demographic profile of the respondents at the individual and firm level in Section 5.2. The empirical results reported in Chapter 4 pertaining to the conceptual model of this study are then discussed, dealing with each hypothesis in turn. Section 5.3 discusses the perceived impact of formal networking on firm entrepreneurial performance of firms in South Africa's ICT industry. Section 5.4 discusses the results pertaining to the moderating effect of the environment on the formal networking-firm entrepreneurial performance relationship. The final section of this chapter, Section 5.5, provides a summary of the results discussion.

The value of networking to entrepreneurial success is widely researched (Elfring & Hulsink, 2003). However, few studies test the perceived impact of strategically motivated formal networking on firm entrepreneurial performance of high technology firms in South Africa's ICT sector. Furthermore, few studies test the moderating effect of contextual environmental factors on the relationship between formal networking and firm entrepreneurial performance in South Africa's ICT industry.

5.2 Demographic profile of respondents

The results pertaining to the demographic profile of individual respondents is discussed below, followed by a discussion on the profile of firm respondents.

5.2.1 Individual respondents

Formal networking is considered to be a strategic management decision aimed at bridging the internal resource gaps of the firm so as to meet its mission and vision goals (Eisenhardt, 2013; Barreira et al., 2015). As such, managers of ICT firms

operating in South Africa who were strategic decision-makers, i.e. firm owners and strategic managers, were specifically targeted as respondents to the survey.

The results reveal that 57% of respondents were firm owner and strategic managers (executives and directors), with an additional 21.7% of the respondents being senior managers. Eighty-five percent (85%) of the respondents indicated that they participated in strategic management decision-making, leaving only 15% of the respondents outside of the target sample frame. Almost three quarters (70%) of the respondents have been involved in the ICT industry for seven years or more, and 64.5% have a post-graduate qualification. Long tenure and high human capital enhances the ability of respondents to: build relationships of trust with other network actors, provide strategic direction, position the firm, and direct operational resources to improve firm entrepreneurial performance (Duneas, 2013; Eisenhardt, 2013). Altogether, these results are indicative of an experienced and knowledgeable cohort of strategic managers in the ICT industry. High levels of human capital of the founder and strategic managers of technology firms have been found to positively impact on performance. The results also indicate that the majority of the respondents are indeed ICT industry strategic managers who generally possess sufficient knowledge about the internal resource and capability assets and constraints of their firms. Furthermore, one can assume that these respondents have developed personal and business relationships with external actors (industry peers, customers, suppliers, regulatory and government stakeholders, and competitors) whose resources could be used to bridge the firm's resource gaps (Eisenhardt, 2013). These findings point to a maturing industry with expectedly high human and social capital levels.

The results reveal a marginal difference between male (50.8%) and female respondents (49.2%). From an industry perspective, the difference between males and females who responded to the survey is in line with empirical evidence which shows a higher ratio of males to females in the ICT industry (Chen, 2004; Hafkin & Huyer, 2008). It also aligns with industry reports relating to male and female employment numbers in South Africa's ICT industry (ICASA, 2016).

5.2.2 Demographic profile of firms

Below is a discussion of the results related to the demographic profile of firm respondents.

5.2.2.1 Firm Industry

The online questionnaire was only disseminated to ICT firms with operations in South Africa. In line with the characteristics of samples observed in research on entrepreneurial networking (Maurer et al., 2011; Schoonjans et al., 2013), it was expected that the profile of respondents would be reflective of the high technology nature of the ICT industry. The results revealed that the majority of the firms engaged in high technology intensive operations (57.5%) in telecommunications services related businesses (41.2%) composed of: telecommunications: 21.8%; mobile broadband operations: 5.9%; internet service providers: 10.1%; and software and content development: 3.4%. These results were anticipated as the telecommunications sector employs more than half (53%) of the workers in the ICT industry (ICASA, 2016). Furthermore, the database used for this study had a high concentration of telecommunications related businesses as these are most impacted by policy and regulation in the ICT sector, and therefore stand to benefit more from collaboration with other industry actors.

The high number of firms that indicated high and medium to high technological intensity, 57.5% and 25%, respectively, are indicative of high levels of innovation necessitated by having to remain competitive in a fast-developing industry with many established firms.

5.2.2.2 Firm legal entity, size and age

As was expected, most of the firms sampled were private companies. Almost ten per cent of respondents (9.2%) indicated that they were state-owned enterprises. Eighteen percent (18%) of the respondents were listed on the Johannesburg Stock Exchange.

The majority of the firms are mature (76.7%) having been in operation for more than eleven years, with 16.7% in the start-up stages of development. While it has been

found that the liability of newness of start-ups correlates weakly with performance (Zhang & White, 2016), this liability has also been found to play a crucial role in the development of relationships, which in turn, is significant for the attainment and maintenance of competitive advantage (Allen et al., 2007). Start-up firms that occupy key positions in sparse networks of weak ties are able to bridge these networks and are considered to have the greatest chances for success (Burt, 1992). As firms age, their resource requirements change (Hite & Hesterly, 2001). Accordingly, Hite and Hesterly (2001) suggested that weak tie firm networks are more useful to providing growing and maturing firms with their resource needs. This view is supported by Sirec and Bradac's (2009) study on the impact of networking on SME growth which indicated that firm growth aspirations and age are negatively correlated; thus as the firm ages, its growth aspirations decline.

5.2.2.3 Firm business network membership

The results show that the majority (70%) of firms surveyed belong to a formal industry association. It also shows that there are different types of networks, such as technology based, market and service based networks. The technology based networks seem to be focused on lobbying and technology diffusion. The literature indicates an appreciation across the ICT industry for the valuable contribution that building and participating in alliances and formal networks makes to realising the mission and vision goals of the firm (Fuller-Love & Thomas, 2004). Following the literature and experience, it may be inferred that membership in formal networks affects growth. Although not within the scope of this study, it may be that given the age of the firms, investment in technology that quickly becomes antiquated as a result of innovation, and the high level of regulation and policy-making that characterises the ICT industry, forces ICT firms to engage in formal networking activities. As such, it can be assumed that older firms may have benefited more from industry lobby through associations such as the SACF for government and ICASA to develop policy and regulations that provide a more favourable operating environment (Gillwald et al., 2013).

Twenty-seven percent (26.7%) of the respondents are members of the South African Communications Forum (SACF), making this association the strongest industry network in terms of representation. It was expected that in general, most of the

SACF members have telecommunications related businesses as this area constitutes a significant share of the ICT market in terms of contribution to GDP and employment in the ICT industry. In general, it has also undergone more change in recent years in terms of regulation, legislation and competition in comparison to the broadcasting and postal services sectors.

Only 20% of the firms indicated having no relationship with its business network, whilst an overwhelming cumulative 83% indicated considering themselves holding middle or central positions in their network. Firm positioning seems to be uncorrelated to the level of participation of respondents in the business network as only 63% of the firms indicated involvement, with 37% indicating no active involvement.

5.3 Discussion pertaining to Hypothesis 1

H1: Formal networking has a positive impact on firm entrepreneurial performance of ICT firms in South Africa (SUPPORTED)

H1a: Weak network ties have a positive impact on firm entrepreneurial performance of ICT firms in South Africa (SUPPORTED)

The study presupposes that high technology entrepreneurial firms in the ICT industry are embedded in ongoing social and economic relations which impacts firm performance (Elfring & Hulsink, 2007). Questions relevant to firm participation in networking activities included: *Are you a member of an ICT industry association? Which ICT industry association does your company belong to? How often does the business network meet? and, Rate your level of participation in the business network.* As more than two thirds of the firms (68.5%) belonged to an industry network, and were active participants in these networks (63%), it indicates that these firms understand the strategic value and benefits of networking.

Obrecht (2004) identified human capital, social capital and technological capital capabilities as important for entrepreneurial performance. Respondents in this study displayed high human capital as demonstrated by questions related to: the length of

years in their current position (above 65% having had over three years' experience, of which 36% have over 11 years' experience in their current position), years of experience in the ICT industry (more than 68% have at least seven years' experience), and 65% have post-graduate degrees. In addition to the high human capital, the majority of the firms indicated medium to high-tech technological intensity, which coupled with the high human capital, and strategic decision to network, play an important role in enhancing economic performance.

The findings reveal significant correlation between formal networking and firm entrepreneurial performance. Over two thirds (68%) of the firms surveyed are members of a formal industry network. A positive impact of formal networking and weak network ties on firm entrepreneurial performance is found. In line with literature on strategic alliances, the study found that the quality of relationships as determined by trust and the type of information secured by the firm, has a positive correlation to firm entrepreneurial performance (Partanen & Moller, 2012). Factor loadings for questions directly related to trust within the formal network: *Q23_11 During technical exchanges with other firms, we sometimes suspect the accuracy of the information provided, and Q12. We trust our key business network to act in the best interest of the industry as a whole,* indicate significant levels of trust between network member firms.

Elfring & Hulsink (2007) proposed that ICT firms require multiple weak ties and diverse networks rich in structural holes to innovate and thrive. Previous research indicates that firms enter into network relationships for strategic reasons (Fuller-Love & Thomas, 2004; Witt et al., 2008). Networking provides information, creates opportunities and enables resource mobilisation (Shree & Urban, 2012) required for the firm to perform. Furthermore, regulated industries with rapid changes in technology, shorter product life cycles and high interdependence between firms such as the South African ICT industry, may by its nature force firms to collaborate and form strategic alliances to promote fairness, competition and growth (Sefalafala, 2012). Two thirds of the respondents indicated that they have a good to strong relationship with their industry network.

Weak network ties are arms-length connections characterised by infrequent meetings, contractual arrangements and a common objective (Uzzi, 1999; Partanen & Moller, 2012). Furthermore, Elfring and Hulsink (2007) argued that ICT firms require multiple weak ties and diverse networks rich in structural holes to innovate and thrive. The questions pertaining to frequency of attendance of business network meetings and level of participation were used to understand inter-firm network tie strength. Frequency of contact and cooperation among network actors is influenced by the nature of businesses of these actors (Sirec & Bradac, 2000). Nineteen percent (19%) of firms indicated that they meet on a monthly basis, with more than half indicating that they meet less frequently. As such, the bridging role of formal networks and strategic alliances (Fuller-Love & Thomas (2004) is confirmed. Arms-length relations enable firms to bridge resource, informational and capability gaps of the firm, offering the highest possible returns to firms by linking them to diverse pools of market information and resources (Uzzi, 1999; Partanen & Moller, 2012). On all factors measuring the quality and nature of network relationships, the results indicated reliability and validity.

The dependent variable, firm entrepreneurial performance was measured using financial indicators: growth in sales, growth in market share and profitability. High factor loadings for all firm entrepreneurial performance constructs, positively insignificant regression results pertaining to the quality and nature of network relations as well weak network tie strength, and correlation results reflecting a positively significant and moderate relationship between the above mentioned construct, all point to a significant correlation between the dependent and independent variables, formal networking and firm entrepreneurial performance. Furthermore, the control variables showed positively significant effects on firm entrepreneurial performance, with firm industry having a positive but insignificant effect.

Respondents were asked to provide a subjective view of their firm performance in relation to its networking involvement, over the past 3 years. The survey included a single question on the time taken from inception for the firm to reach profitability. 48% of firm respondents indicated that it took them between zero and three years to become profitable and only 3.3% indicated that it took them longer than 10 years to

reach profitability. The remaining 48% of firms took between 4 and 10 years to reach profitability. Profitability has been shown to be a precursor to growth (Davidsson, Achtenhagen & Naldi, 2010).

The degree of technological intensity, may be a contingent factor that affects the benefits (Elfring & Hulsink, 2007) firms derive from networking. Additionally, research indicates that technological capital and capabilities can result in improved efficiency in the production process, reducing costs and improving quality consistency, and therefore, competitiveness (Day, 1994; Lumpkin & Dess, 1996; Slater & Narver, 2000). Furthermore, high technology firm technological capability is usually based on the prior knowledge and experience (Leiblein & Miller, 2003; Haussier et al., 2010). Therefore, a combination of high technological capability, business networking activities aimed at achieve firm objectives, an entrepreneurial orientation, and regulatory and legislative support to harness the socio-economic benefits of ICTs, it was expected that firms achieve profitability with speed.

As successful technology innovation and entrepreneurship require that firms adapt to change by building their complementary assets through collaboration and strategic alliances with actors external to the firm (Teece, 1996; Teng, 2007). Accordingly, the firm would be able to access beneficial knowledge, capabilities and resources required to achieve the firms' strategic objectives (Gulati, 1995a; Teng, 2007). These strategic alliances or relational networks are regarded by some scholars as strategic management tools that support organisational efforts to achieve its mission and vision (Dyer & Singh, 1998; Schoonjans et al., 2013; Jafri, Ismail, Khurram & Soehod, 2014). Thus, the study concluded that weak network ties found in the formal networks of ICT firms in South Africa, positively impacts firm entrepreneurial performance of ICT firms in South Africa.

5.4 Discussion pertaining to Hypothesis 2

H2: The relationship between formal networking and firm entrepreneurial performance of ICT firms in South Africa is moderated by the environment (NOT SUPPORTED)

Networking occurs within the context of the social environment within which the firm operates, thus the environment plays both a facilitating and constraining role (Adler & Kwon, 2002; Kwon & Arenius, 2008; Tzanakis, 2013) on the relationship between formal networking and firm entrepreneurial performance. The results show no evidence of either a positive or negative effect of the environment on the relationship between the independent variable (formal networking) and the dependent variable (firm entrepreneurial performance).

> H2a: The relationship between formal networking and firm entrepreneurial performance of ICT firms in South Africa is moderated by the environmental characteristic of dynamism (NOT SUPPORTED).

The results show evidence that environmental dynamism does not moderate the relationship between formal networking and firm entrepreneurial performance. However, environmental dynamism showed a positive significant effect on the formal networking-firm entrepreneurial performance relationship. Consequently, the results reflect that the performance increases with increasing levels of dynamism. The findings reveal that in an environment characterised by unpredictable and persistent changes in its external arena, such as the entry or exit of competitors, changes in customers' needs, and shifts in technological conditions (Lumpkin & Dess, 2001; Scheepers et al., 2007), formal networking is not associated with firm entrepreneurial performance.

> H2b: The relationship between formal networking and firm entrepreneurial performance ICT firms in South Africa is moderated by the environmental characteristic of hostility (NOT SUPPORTED).

The results showed evidence that environmental hostility does not moderate the relationship between formal networking and firm entrepreneurial performance. Environmental hostility was also shown to have a negative effect on firm entrepreneurial performance. There was an insignificant correlation between formal networking and environment hostility. The findings reveal that in an environment characterised by hostility, formal networking is not associated with firm entrepreneurial performance. As the level of hostility characterised by regulation and

competition (Zahra & Bogner, 2000) increases, the relationship between formal networking and firm entrepreneurial performance tends to become weaker.

5.5 Conclusion

This chapter discussed the results pertaining to the hypotheses that were formulated and tested in order to determine the relationships between constructs as stated in sub-problems 1 and 2 in Chapter 1. The results were discussed in order of the demographics of the individual, followed by the demographics of the firm, and thereafter the hypotheses were discussed in order. In summary, the study found the following:

The results indicate that the objective of targeting strategic managers and owners was achieved. Close to two thirds had post-graduate qualifications and have been working in the industry for over seven years. These results indicate high human capital and social capital which previous scholars have found correlates positively to firm performance. Furthermore, the control variable of firm age indicated a positively significant effect on firm entrepreneurial performance, with firm industry having a positive but insignificant effect. Most firm respondents indicated that their firm engaged in high technology intensive operations in the telecommunications sector. The majority of the firms were in operations for more than a decade. These firms may benefit more from weak network ties to satisfy their resource needs.

Firm entrepreneurial performance was measured using three perceptual financial measurements of growth in sales, growth in market share and profitability. Based on the single question pertaining to the time taken from inception to reach profitability, the results indicate that a combination of high technological capability, entrepreneurial orientation and networking capability impacts the speed with which firms achieve profitability.

5.5.1 Summary discussion regarding Hypothesis 1:

H1: Formal networking has a positive impact on firm entrepreneurial performance of ICT firms in South Africa (SUPPORTED)

H1a: Weak network ties have a positive impact on firm entrepreneurial performance of ICT firms in South Africa (SUPPORTED)

This empirical study revealed that formal networking was positively related to firm entrepreneurial performance. With regards to relationship nature and quality, the results showed that ICT firms rely on their industry peers to fill informational, resource and capabilities gaps identified in the firm. Firms with weak arms-length relations were better able to bridge resource gaps and build competitive advantage to grow. This suggests that there is high interdependency between firms which may be a result of the regulated environment of the firm.

5.5.2 Summary discussion regarding Hypothesis 2:

H2: The relationship between formal networking and firm entrepreneurial performance of ICT firms in South Africa is moderated by the environment (NOT SUPPORTED).

H2a: The relationship between formal networking and firm entrepreneurial performance of ICT firms in South Africa is moderated by the environmental characteristic of dynamism (NOT SUPPORTED).

H2b: The relationship between formal networking and firm entrepreneurial performance ICT firms in South Africa is moderated by the environmental characteristic of hostility (NOT SUPPORTED).

The results show no evidence of either a positive or negative effect of the environment on the relationship between the independent variable (formal networking) and the dependent variable (firm entrepreneurial performance). This finding may suggest that firm entrepreneurial performance is contingent on the firm strategy, and not hostile or dynamic environmental factors. Environmental dynamism showed a positive significant effect on the formal networking-firm entrepreneurial performance relationship. The results showed that environmental hostility does not have a moderating impact on the relationship between formal networking and firm entrepreneurial performance. Environmental hostility was also shown to have a negative effect on firm entrepreneurial performance.

A closer look at the relationship shows that network ties are the important attributes of formal networking in this relationship. Further investigation into the moderation effect revealed that it is close social interaction (strong ties) that weakens the relationship; Network ties (weak ties) remained a positive contributor to economic performance. Model 2 (Adjusted R^2=0.2114) can explain only 21.1% of the variance in firm entrepreneurial performance caused by the social construct of network relationship quality and nature, network tie strength and environment (as captured by dynamism and hostility) after controlling for age of firm and industry type. Therefore, this model does not show that moderation is underway, and so fails to support Hypotheses 2, 2a and 2b.

6 CHAPTER 6: CONCLUSIONS, IMPLICATIONS AND RECOMMENDATIONS

6.1 Introduction

This study explored the perceived impact of formal networking on the performance of entrepreneurial firms in South Africa's ICT industry. It specifically examined the impact of weak ties on firm entrepreneurial performance as well as the moderating effect of the environment, considering both environmental dynamism and hostility. This study explored the perceived impact of formal networking on the performance of entrepreneurial firms in South Africa's ICT industry.

The purpose of this chapter is to summarise the findings, provide recommendations as well as conclusions that can be reached, based on the literature and survey results in terms of testing the relationships between the main constructs: 1. formal networking 2. firm entrepreneurial performance and 3. the environment. This is followed by a section that outlines the limitations of this study and suggests areas for further research.

6.1.1 Main Problem

In light of the main problem statement discussed in Chapter 1, this study explored the following: the perceived impact of formal networking on firm entrepreneurial performance of ICT firms in the ICT industry, in a developing country context, such as South Africa. It specifically addresses two sub-problems, the first one focusing on weak ties and the second one on the moderating role of the environment. The sub-problems and their accompanying hypothesis are stated briefly in order to position the findings, recommendations, limitations and areas for future research.

6.1.2 Sub-problems

The results pertaining to the sub-problems and hypotheses can be summarised as follows:

Sub-problem 1: Formal networking and weak ties impact on firm entrepreneurial performance

- H1: Formal networking has a positive impact on firm entrepreneurial performance of ICT firms in South Africa. SUPPORTED
- H1a: Weak network ties have a positive impact on firm entrepreneurial performance of ICT firms in South Africa. SUPPORTED

Sub-problem 2: The moderating role of the environment on the dependent and independent variables:

- H2: The relationship between formal networking and firm entrepreneurial performance of ICT firms in South Africa is moderated by the environment. NOT SUPPORTED
- H2a: The relationship between formal networking and firm entrepreneurial performance of ICT firms in South Africa is moderated by the environmental characteristic of dynamism. NOT SUPPORTED
- H2b: The relationship between formal networking and firm entrepreneurial performance ICT firms in South Africa is moderated by the environmental characteristic of hostility. NOT SUPPORTED

As discussed in Chapter 3, an on-line questionnaire was used to survey 120 strategic level managers of ICT firms operating in South Africa. In Chapter 4, the results were presented and the analysis in relation to the literature review was done in Chapter 5. In the next subsection, the findings of the study are summarised.

6.2 Conclusions

The findings reveal significant correlation between formal networking and firm entrepreneurial performance. Accordingly, the corporate entrepreneurship and strategic management decision to engage in formal networking impacts the performance of ICT firms in terms of growth in sales, growth in market share and profitability. Formal networks are purposefully established alliances comprising a specific set of organisations, its members, who each have agreed upon roles and tasks that aim to benefit the network and its members (Jack et al., 2010; Moller,

2013). Along with opportunity recognition and exploitation, firms use strategic alliances to gain access to extend firm operational boundaries in search of knowledge, resources and capabilities (Antoncic & Prodan, 2008, Haeussler, Patzelt & Zahra, 2012) lacking within the firm. Formal business networks comprising weak network ties characterised by infrequent contact and arms-length interaction with multiple actors with diverse resources, and who the firm trusts, have been found to be the best relationship configuration to close the resource gaps of high technology firms in South Africa's ICT industry.

The results pertaining to formal networking, weak network tie strength and firm entrepreneurial performance can be summarised as follows:

> H1: Formal networking has a positive impact on firm entrepreneurial performance of ICT firms in South Africa (SUPPORTED).
>
> H1a: Weak network ties have a positive impact on firm entrepreneurial performance of ICT firms in South Africa (SUPPORTED).

While literature on programmes that foster the development of entrepreneurial capabilities among executives of ICT firms, and thus promote corporate technological entrepreneurship alludes to the importance of the environment as a moderating factor, the findings show that this is not conclusive. It seems the environment is more of a contingent factor and a lot depends with the firms' strategies, which may vary from firm to firm. ICT firms rely on different strategies and actions to achieve growth in hostile market environments. The result showed that the pursuit of strategic alliances and cooperative arrangements in environments with higher levels of hostility is not essential in order to achieve greater economic performance. The research also found that among the ICT firms surveyed, the level of environmental dynamism in the market did not moderate the relationship between formal networking and firm entrepreneurial performance. This may be because it may take some time for firms to realise the benefits of investments in relationship building activities when the firms respond to technological changes, or policy, regulatory and legislative changes. The South African ICT sector is highly dynamic and hostile, with high levels of regulatory intervention, competition and rapid technological change. Given the high concentration of the firms in high technology firms within our sample, these firms naturally innovate and adapt to change regardless of environmental conditions. These findings suggest that even though ICT

firms are prone to networking due to the need to collectively influence the policy and legislative landscape, operating in a highly competitive and regulated environmental may not affect the benefits the firm can derive from formal networking. The results pertaining to the moderating effect of the environment and environmental characteristics of dynamism and hostility on the formal networking-firm entrepreneurial performance relationship can be summarised as follows:

H2: The relationship between formal networking and firm entrepreneurial performance of ICT firms in South Africa is moderated by the environment (NOT SUPPORTED).

H2a: The relationship between formal networking and firm entrepreneurial performance of ICT firms in South Africa is moderated by the environmental characteristic of dynamism (NOT SUPPORTED).

H2b: The relationship between formal networking and firm entrepreneurial performance ICT firms in South Africa is moderated by the environmental characteristic of hostility (NOT SUPPORTED).

This study contributes to the social capital entrepreneurship literature by analysing the relationship between the relational and structural dimensions of formal networking, taken as the independent variable, and their effect on firm entrepreneurial performance, taken as a multi-item dependent variable. The study utilises a sample of ICT firms operating in South Africa of any size, and having a firm age of at least three years. Furthermore, dynamic and hostile environmental conditions within which these firms operate are measured in terms of their impact on the relationship between the independent variable and firm entrepreneurial performance. With reference to the context of the study, the findings of this study are important for the following reasons:

- The findings may have implications to ICT firms in South Africa as well as for other developing countries.
- Firm level formal networking has not been studied within the context of a high technology sector, specifically the ICT industry, in a developing economy.
- As far as the researcher is aware, the moderating effects of environmental factors that can lead to dynamism and hostility have not been applied to

the study of the effect of formal networking on the performance of entrepreneurial firms.

- The study advances literature in terms of fostering corporate entrepreneurial behavior of networking and strategic collaboration of ICT firms under hostile and/or dynamic environments.

In conclusion, the findings indicate that formal networking strategies of ICT firms are perceived to positively impact the ability of the firm to secure resources and build competitive advantage. In particular, weak network ties of strategic alliances with other socially distant network actors provide ICT firms with the ability to acquire resources and capabilities for firm growth.

6.3 Implications and recommendations

The findings discussed above have implications for entrepreneurial high technology ICT firms in South Africa, entrepreneurial firm owners, strategic managers, and interested stakeholders: industry regulators, government, industry business associations such as the SACF and the Wi-Fi Forum SA, who desire to promote networking in the South Africa's ICT industry. In light of the above, the following recommendations are made:

6.3.1 Recommendations for entrepreneurial high technology firms in South Africa's ICT industry

ICT firm owners and strategic managers who desire to participate in formal business networks should consider:

- **Identifying the resource gaps that such entrepreneurial behaviour will seek to address.** This will involve a strategic review of their entrepreneurial capabilities, in particular social capital and investment in formal networks to ensure that internal organisational resources are used optimally.
- **Leveraging the relationships of strategic managers, particularly those involving other industry network actors.** This will ensure that the firm gains legitimacy and trust from other network actors, making it easier for the firm to access the resources it requires.

- **Increase the level of participation in formal industry networks** by actively getting involved in the management and programme of its network association**.** In so doing, the firm will become a more central actor in the decision-making processes of the network and thus better able to proactively influence decisions that impact the firm and the industry.
- **Implementing strategies that allow top-level managers to build a culture of corporate entrepreneurship with their firms.**

6.3.2 Recommendations for interested stakeholders

Interested stakeholders including industry regulators, government, industry business associations such as the SACF and the Wi-Fi Forum SA wishing to promote formal networking in the ICT industry should consider:

- **Increasing the support for networking to smaller ICT firms** The government and networking organisations including business chambers could support these firms by organising free networks events and encouraging large firms to subsidise small firms' participation as part of enterprise development support score card. This will enable firms to build the necessary linkages, network more effectively, and gain access to information, knowledge and other resources (legal advice, technology, etc.) outside their traditional closed networks.
- **Designing marketing plans and strategies for formal networking**. Thus formal networking organisation need **to** communicate, improve accessibility and visibility of business networks

6.3.3 Recommendations for both entrepreneurial firms in high technology ICT firms in South Africa and interested stakeholders

All stakeholders should consider dialogue on the following:

- **Classification and consolidation of disparate business networks in the all-encompassing description of the information communication industry.** This may enable all stakeholders to take a more holistic view of the

industry and collaborate to improve universal access goals quicker. It will also increase visibility and legitimacy of the formal networks.

- **Developing entrepreneurial educational support programmes for the ICT industry** in order to ensure that ethical interaction takes place under the auspices of credible industry networking structures.
- **Adopting an entrepreneurial orientation to the ICT industry.** The ICT industry is viewed as a critical component in driving growth within South Africa. More emphasis should be placed on programmes that foster the development of entrepreneurial orientation and social capital among firms in the ICT industry.
- **Continual engagement and definition of the formal networking discourse** so as to ensure that ethical interaction takes place under the auspices of credible industry networking structures.

6.4 Limitations of this study

This study has several limitations which open up opportunities for future research. These limitations of the study are indicated as follows:

- The research was cross-sectional, looking at firms one point in time and will not necessarily reflect the long-term impact of entrepreneurial behavior.
- The research was also correlational preventing any causal relationships among variables to be tested.
- It was limited to firms on a database and therefore may not be generalisable to the ICT industry as a whole.
- Data collection was limited to senior management and excluded other employees who may have an impact on the effectiveness of these strategies, given that professional workers join formal networks such as engineering bodies.
- The study did not include questions pertaining to firm size making it difficult to make inferences to SMEs, which are the most vibrant firm as in ICT and are of policy relevance given their potential for job creation to stimulating economic growth.

- The study did not include the effect of regulation on the ICT industry. Yet, it is an environmental factor with implications for firm strategies including networking.

6.5 Suggestions for further research

Several opportunities for future research have been identified and are listed below:

- A longitudinal study design would enable the assertion of hypothesised links as it incorporates the long term impact of entrepreneurial behaviour.
- Future research may include firm size as a control variable to enable not only industry but more firm specific relevance of the research.
- The notion that the firm's performance ambitions may affect its propensity and the level of networking it engages in could be explored in future research.
- The impact of regulation on corporate entrepreneurship within the ICT industry should be explored further and its impact on formal networks in the industry

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APPENDIX A: RESEARCH INSTRUMENT

Assessing the relationship between Formal Networking and Performance in South Africa's ICT industry.

INFORMATION SHEET AND CONSENT FORM

Hello, I am Rizelle Sampson. I am conducting research for the purpose of completing my Masters in Management in Entrepreneurship and New Venture Creation (MMENVC) at Wits Business School.

What I am doing

I am conducting research on the topic entitled "**Formal Networking and Performance in South Africa's ICT industry"**. The aim of the study is to research the perceived benefit in terms of improved firm performance derived from firm participation in ICT industry formal business network/s, and the impact of the South African environment on the performance of networked firms.

Your participation

I hereby request that you complete an online self-administered survey which will take approximately 10-15 minutes to complete.

Please understand that your participation is voluntary and confidential and you are not being forced to take part in this study. If you choose not to participate, you will not be affected in any way and there will also be no penalties and you will NOT be prejudiced in ANY way. At the present time, I do not see any risks in your participation.

Who to contact if you have been harmed or have any concerns.

This research has been approved by the Wits Business School. If you have any complaints about ethical aspects of the research or feel that you have been harmed in any way by participating in this study, please contact the Research

Office Manager at the Wits Business School, Mmabatho Leeuw at Mmabatho.leeuw@wits.ac.za. Thank you very much for your cooperation and contribution.

CONSENT I hereby agree to participate in research on **Formal Networking and Performance in South Africa's ICT industry**. I understand that this is a research project whose purpose is not necessarily to benefit me personally in the immediate or short term. I understand that my participation will remain confidential.

❍ I accept (1)

SECTION ONE: INTRODUCTORY & DEMOGRAPHIC INFORMATION

Q2 Please indicate your designation in the firm

- ❍ Director (11)
- ❍ Executive Manager (12)
- ❍ Senior Manager (13)
- ❍ Manager (14)
- ❍ Communications /media liaison (15)
- ❍ Stakeholder relations manager (16)

Q3 How long have you worked in your current position?

- ❍ Less than 3 years (4)
- ❍ 3-6 years (5)
- ❍ 7-10 (6)
- ❍ 11 and above (7)

Q4 How long has your firm been in operation?

- ❍ Less than 3 years (4)
- ❍ 3-6 years (5)
- ❍ 7-10 (6)
- ❍ 11 and above (7)

Q5 Please indicate your firm's legal entity

- ❍ Sole Proprietor (4)
- ❍ Close corporation (5)
- ❍ Private company (6)
- ❍ Public company (7)
- ❍ Partnership (8)
- ❍ State-owned Company (9)

Q6 Which category best describes your company's main activity?

- ❍ Infrastructure (4)
- ❍ Telecommunications services (5)
- ❍ Broadcasting services (6)
- ❍ Mobile Broadband operator (7)
- ❍ Internet services provider (8)
- ❍ Software and content development (9)
- ❍ Postal and courier services (10)
- ❍ Knowledge Management (11)
- ❍ Electronics and hardware manufacturing (12)
- ❍ ICT Consulting (13)
- ❍ Research and development (14)
- ❍ Equipment supply (15)
- ❍ ICT Regulation (16)
- ❍ ICT Policy development (17)

Q7 How would you classify your company's level of operational technological intensity?

- ❍ Low-tech (4)
- ❍ Medium-tech (5)
- ❍ Medium tech to high-tech (6)
- ❍ High-tech (7)

Q8 Please indicate how long you have worked in the ICT industry:

- ❍ Less than3 years (4)
- ❍ 3 - 6 years (5)
- ❍ 7 - 10 years (6)
- ❍ Above 11 years (7)

Q9 Gender

- ❍ Male (4)
- ❍ Female (5)

Q10 Do you have an equity stake of at least 10% in the company you work for?

- ❍ Yes (4)
- ❍ No (5)

Q11 Do you partake in strategic management decisions?

- ❍ Yes (4)
- ❍ No (5)

Q12 What is the highest level of education you have completed?

- ❍ Below matric (4)
- ❍ Matric (5)
- ❍ Certificate/Diploma (6)
- ❍ Undergraduate (7)
- ❍ Post Graduate (8)

SECTION TWO – FIRM ENTREPRENEURIAL PERFORMANCE

Q13 On a scale of 1 to 5, how would you describe your company's development over the last 3 years in the following areas?

	Significant decline (1)	Decline (2)	Remained the same (3)	Increase (4)	Significant increase (5)
13.1 Sales / Turnover (1)	❍	❍	❍	❍	❍
13.2 Profit (2)	❍	❍	❍	❍	❍
13.3 Sales growth compared to competitors (3)	❍	❍	❍	❍	❍
13.4 Percentage of sales from new products compared to major competitors (4)	❍	❍	❍	❍	❍
13.5 Percentage of sales from new markets compared to major competitors (5)	❍	❍	❍	❍	❍

13.6 Market value compared to major competitors (6)	❍	❍	❍	❍	❍
13.7 Market share compared to major competitors (7)	❍	❍	❍	❍	❍
13.8 Customer satisfaction rate compared to major competitors (8)	❍	❍	❍	❍	❍
13.9 Rate of entry into new markets compared to major competitors (9)	❍	❍	❍	❍	❍
13.10 Brand recognition and brand value compared to major competitors (13)	❍	❍	❍	❍	❍

Q14 How many years from inception did it take for your company to reach profitability?

- ❍ 0 - 3 years (4)
- ❍ 4 - 6 years (5)
- ❍ 7 - 10 years (6)
- ❍ 11- 20 years (7)
- ❍ Over 20 years (8)

SECTION THREE – FORMAL NETWORKING

Q15 Are you a member of an ICT industry association/business network or member organisation?

- ❍ Yes (23)
- ❍ No (24)

Q16 Which ICT industry association/business network does your company belong to?

- ❍ South African Communications Forum (4)
- ❍ The Information Society Association of South Africa (5)
- ❍ IT Associations of South Africa (ITASA) (6)
- ❍ Institute of IT Professional of South Africa (7)
- ❍ The Wi-Fi Forum SA (8)
- ❍ Internet Society – SA Chapter (9)
- ❍ Wireless Application Service Providers' Association (10)
- ❍ Wireless Access Providers' association (11)
- ❍ National Association of Broadcasters of South African (12)
- ❍ The Southern Africa Postal Operators Association (13)
- ❍ The South African Express Parcel Association (SAEPA) (14)
- ❍ Other (please specify) (15) _____
- ❍ Not applicable (16)

Q17 How would you rate the extent of the relationship (strength of relationship) between your firm and the business network/association(s) it is a member of?

- ❍ No relationship (4)
- ❍ Good (5)
- ❍ Neutral (6)
- ❍ Strong (7)
- ❍ Very Strong (8)

Q18 How often does the business network meet?

- ❍ Monthly (4)
- ❍ Quarterly (5)
- ❍ Bi-annually (6)
- ❍ Annually (7)
- ❍ Not applicable (8)

Q19 Rate your level of participation in the business network

- ❍ Highly involved (4)
- ❍ Somewhat involved (5)
- ❍ Not an active member (6)

Q20 Do you hold any official or ex officio position in any ICT industry business network or member organization?

- ❍ Yes (4)
- ❍ No (5)

Q21 What are the problems and barriers of your company that have impeded collaboration with similar businesses and other companies for the past 3 years?

Please indicate the extent of the problems by putting a coded number in the appropriate box.

	Highly serious problem (4)	Moderately serious problem (5)	Somewhat serious problem (6)	Not a problem (7)
21.1 Lack of finance and cooperation problem among ICT firms (4)	❍	❍	❍	❍
21.2 Lack of getting the required support from concerned bodies (5)	❍	❍	❍	❍
21.3 Awareness about networking benefit is low (6)	❍	❍	❍	❍
21.4 Problem of getting component, equipment and services supply as per the firm needs (7)	❍	❍	❍	❍
21.5 Partners search and selection (8)	❍	❍	❍	❍

21.6 Lack of skills of human resources (9)	❍	❍	❍	❍
21.7 Lack of trusted relationship when working with others (10)	❍	❍	❍	❍
21.8 Lack of favorable grounds for promoting our products through trade fairs and exhibition (11)	❍	❍	❍	❍
21.9 Lack of knowledge and information about markets (3)	❍	❍	❍	❍

Q22 If you were to locate your firm's current position in the industry business network, where would you place yourself?

- ❍ Central – controls and managers (3)
- ❍ Middle – manages actively, affected and reactive (4)
- ❍ Margin – passive, reactionary (5)

Q23 On a scale of 1 to 5, please indicate the extent to which you agree or disagree with each statement as it applies to your firm.

	Strongly agree (15)	Somewhat agree (16)	Neither agree nor disagree (17)	Somewhat disagree (18)	Strongly disagree (19)
23.1 Most people in the ICT industry are basically honest and can be trusted (1)	❍	❍	❍	❍	❍
23.2 ICT industry players are only interested in the welfare of their own firm (2)	❍	❍	❍	❍	❍
23.3 Members of industry business networks are more trustworthy that non-members (3)	❍	❍	❍	❍	❍
23.4 Members of industry business networks readily share information, resources and collaborate for the benefit of the ICT industry (5)	❍	❍	❍	❍	❍

23.5 We maintain close relationships with leaders of industry business networks that our firm is a member of (6)	❍	❍	❍	❍	❍
23.6 We regularly engage the government and the industry regulator through our business network associations (7)	❍	❍	❍	❍	❍
23.7 When our company has technical exchanges and collaborations with other member companies, members avoid making demands that can seriously damage the interests of their peers (8)	❍	❍	❍	❍	❍
23.8 In these relationships, members do not take advantage of each other, even if the opportunity arises	❍	❍	❍	❍	❍

(9) 23.9 In this industry, one has to be alert and informed or someone is likely to take advantage of you (10)	❍	❍	❍	❍	❍
23.10 Suppliers and customers in the ICT industry share information for the benefit of the industry (17)	❍	❍	❍	❍	❍
23.11 When our company has technical exchanges with other industry players, we sometimes suspect the accuracy of information these entities provide (14)	❍	❍	❍	❍	❍
23.12 We trust our key member association to act in the best interest of the industry as whole (16)	❍	❍	❍	❍	❍

23.13 Our membership to ICT business network associations has been beneficial to the firm (13)	❍	❍	❍	❍	❍
23.14 We have moved into new markets through our business network (12)	❍	❍	❍	❍	❍
23.15 My firm's position in the market has improved as a result of our business network (23)	❍	❍	❍	❍	❍
23.16 We have gained new knowledge from other members in the business network (24)	❍	❍	❍	❍	❍
23.17 Belonging to the business network has made my firm more competitive (25)	❍	❍	❍	❍	❍

23.18 Belonging to the business network has made my firm more profitable (26)	❍	❍	❍	❍	❍
23.19 Generally, we have gained adequate resources from our business network (27)	❍	❍	❍	❍	❍
23.20 My opinion and that of my firm is taken into account when our key industry business network association asks for member contributions to policy formulation that will benefit the industry (28)	❍	❍	❍	❍	❍
23.21 We have established new contacts that have benefitted our company through our business network (29)	❍	❍	❍	❍	❍

23.22 Our key business network association has 'opened doors' for us (30)	❍	❍	❍	❍	❍
23.23 Our firm attributes the growth in sales over the past financial year to our membership to an ICT industry association (31)	❍	❍	❍	❍	❍
23.24 Our firm attributes the growth in market share over the past financial year to our membership to an ICT industry association (32)	❍	❍	❍	❍	❍
23.25 We maintain close relations with key industry regulatory contacts (33)	❍	❍	❍	❍	❍
23.26 We trust our suppliers to maintain confidentiality about our plans (34)	❍	❍	❍	❍	❍

23.27 We regularly meet with our suppliers and/or customers to share our products and services plans with them (35)	❍	❍	❍	❍	❍
23.28 Our competitors are aware of our relations with key industry suppliers (36)	❍	❍	❍	❍	❍
23.29 We are able to collaborate with our competitors in the best interest of the ICT sector (37)	❍	❍	❍	❍	❍
23.30 Firms in our sector work together to lobby policy and regulatory stakeholders (38)	❍	❍	❍	❍	❍

SECTION 4 – ENVIRONMENT

Q24 On a scale of 1 to 5, please indicate the extent to which you agree or disagree with each statement as it applies to your firm

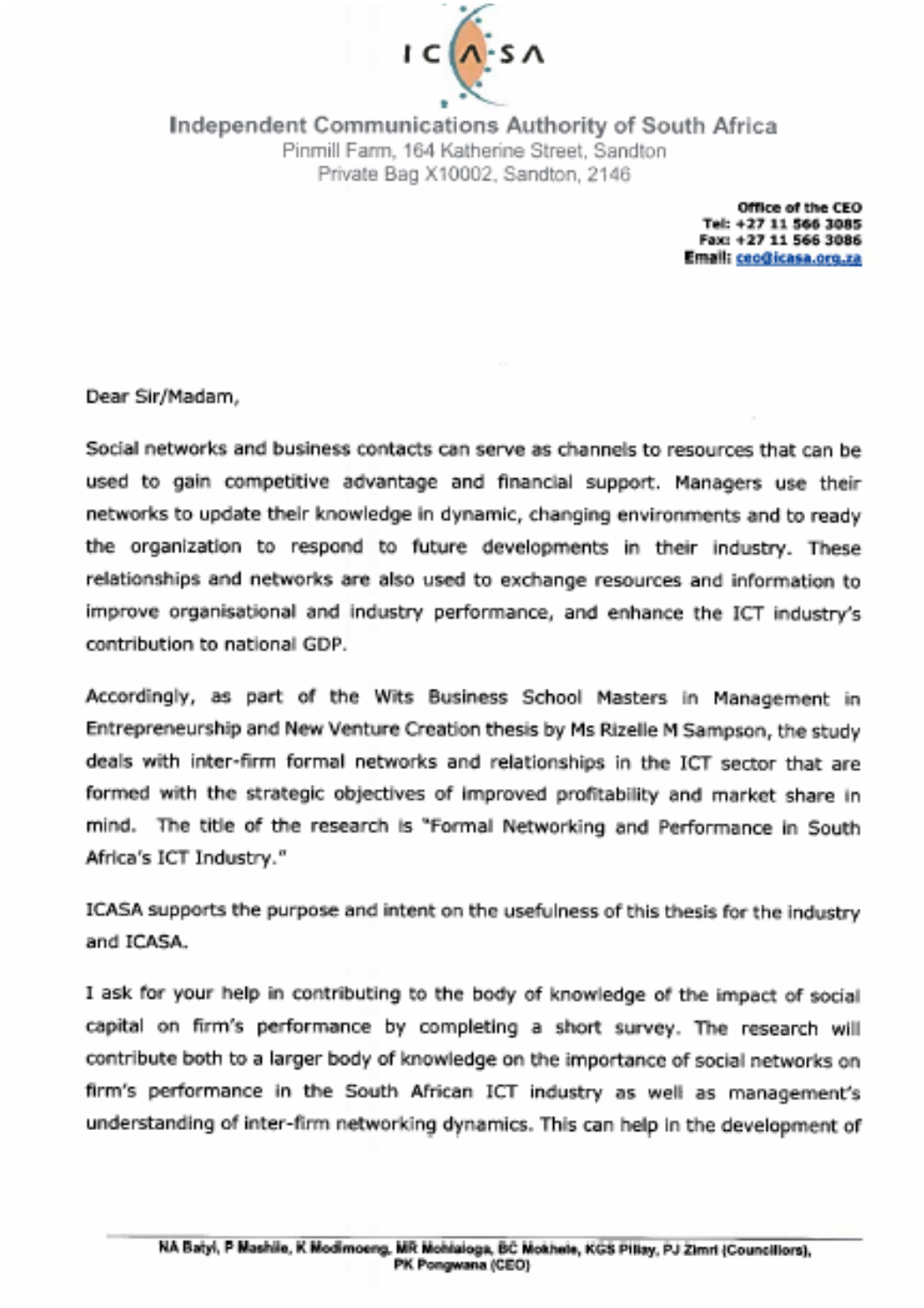
	Strongly agree (15)	Somewhat agree (16)	Neither agree nor disagree (17)	Somewhat disagree (18)	Strongly disagree (19)
24.1 The failure rate of firms in the ICT sector is very high (16)	❍	❍	❍	❍	❍
24.2 The ICT sector is very risky; one bad decision could easily threaten the viability of my company (17)	❍	❍	❍	❍	❍
24.3 The ICT industry has prospered in the last five years (18)	❍	❍	❍	❍	❍
24.4 Competition is high in the ICT sector (19)	❍	❍	❍	❍	❍

24.5 Price wars are characteristic of the ICT sector (20)	❍	❍	❍	❍	❍
24.6 Low profit margins are characteristic of the ICT sector (21)	❍	❍	❍	❍	❍
24.7 Actions of competitors are easy to predict (22)	❍	❍	❍	❍	❍
24.8 The set of competitors in the ICT industry remains relatively constant (23)	❍	❍	❍	❍	❍
24.9 Product demand forecasting is easy to do (24)	❍	❍	❍	❍	❍
24.10 Customer demand forecasting is easy to do (25)	❍	❍	❍	❍	❍
24.11 The ICT sector is very stable with very little change (26)	❍	❍	❍	❍	❍

24.12 The ICT sector is corrupt (27)	❍	❍	❍	❍	❍
24.13 Dominant players in the ICT industry use anti-competitive tactics to keep competition out of the market (28)	❍	❍	❍	❍	❍
24.14 The rate of technological change in the ICT sector is very high (29)	❍	❍	❍	❍	❍
24.15 South African ICT firms are competitive in a highly dynamic sector (30)	❍	❍	❍	❍	❍
24.16 Regulation is necessary to ensure industry growth and fair competition (31)	❍	❍	❍	❍	❍
24.17 The ICT industry is over regulated (32)	❍	❍	❍	❍	❍
24.18 More regulation and policy direction is required to ensure the	❍	❍	❍	❍	❍

growth of the ICT industry (33)					
24.19 The ICT industry is known as a significant contributor to economic development (34)	❍	❍	❍	❍	❍
24.20 The level of disagreements or tension between competitors is high (35)	❍	❍	❍	❍	❍
24.21 The level of cooperation displayed between competitors is high (36)	❍	❍	❍	❍	❍

APPENDIX B: ICASA LETTER OF SUPPORT



Independent Communications Authority of South Africa
Pinmill Farm, 164 Katherine Street, Sandton
Private Bag X10002, Sandton, 2146

Office of the CEO
Tel: +27 11 566 3085
Fax: +27 11 566 3086
Email: ceo@icasa.org.za

Dear Sir/Madam,

Social networks and business contacts can serve as channels to resources that can be used to gain competitive advantage and financial support. Managers use their networks to update their knowledge in dynamic, changing environments and to ready the organization to respond to future developments in their industry. These relationships and networks are also used to exchange resources and information to improve organisational and industry performance, and enhance the ICT industry's contribution to national GDP.

Accordingly, as part of the Wits Business School Masters in Management in Entrepreneurship and New Venture Creation thesis by Ms Rizelle M Sampson, the study deals with inter-firm formal networks and relationships in the ICT sector that are formed with the strategic objectives of improved profitability and market share in mind. The title of the research is "Formal Networking and Performance in South Africa's ICT Industry."

ICASA supports the purpose and intent on the usefulness of this thesis for the industry and ICASA.

I ask for your help in contributing to the body of knowledge of the impact of social capital on firm's performance by completing a short survey. The research will contribute both to a larger body of knowledge on the importance of social networks on firm's performance in the South African ICT industry as well as management's understanding of inter-firm networking dynamics. This can help in the development of

NA Batyi, P Mashile, K Modimoeng, MR Mohlaloga, BC Mokhele, KGS Pillay, PJ Zimri (Councillors), PK Pongwana (CEO)

improved formal networking practices and ensure strategic use of these networks for company growth.

Participation in the study is voluntary and your anonymity will be secured as all your information and responses will be kept confidential only to be seen by the researcher and her research supervisor. Your response will be looked at in relation to all other responses. If you choose to participate please fill out the attached consent form and complete the attached questionnaire as carefully and honestly. This will take approximately 10 minutes.

To respond to the questionnaire, please complete the online web-based survey by clicking on the link accompanying this letter.

Your participation in this study will be greatly appreciated.

Kind regards,



Pakamile Pongwana
Chief Executive Officer
Date: 2016/09/15
Cell: 0829971762