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Human capital investment and innovation success in the telecoms sector in South Africa

By

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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.

Wits Business School, University of the Witwatersrand, Johannesburg

(March 2017)

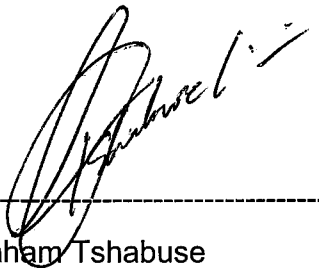
ABSTRACT

Innovation is one of the core and key characteristics of entrepreneurship, which stimulates operational and financial success of a firm. Innovation is ambidextrous in nature, characterised by exploration and exploitation. This report is concerned with exploitative innovation, which is characterised by new; products, services, and processes. This Research Report investigates how human capital investments (years of schooling and years of work experience of telecoms firms' senior managers and executives) relate to innovation performance. This paper uses the human capital theory and the resource base theory to understand the perceived impact of human capital investments on performance and also its perceived moderation effect on the nexus between innovation and performance.

Research findings from 81 senior management and executives of four major telecoms firms in South Africa indicate that innovation has a perceived direct impact on the perceived success of the firm. However, a counterintuitive relationship of human capital investments with performance is observed. Furthermore, human capital investments have a counterintuitive moderating effect on the nexus between innovation and performance. Therefore, this research report discusses human capital variable configurations that are more likely to have a perceived impact on a telecoms firm performance, and human capital variable configuration that are likely to have a moderating effect on the nexus between innovation and performance.

DECLARATION

I, Abraham, 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.



Abraham Tshabuse

Signed at Parktown

On the 20th day of June 2017

DEDICATION

To my wife Nozizwe Tshabuse, a tribute to an inspirational formidable supportive spouse. To Abigail my daughter with a great entrepreneurial future. My parents Lucas and Emily the first entrepreneurs I have known. Thina Tshabuse my sister you embody entrepreneurial sustainability.

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Dr. Jose Barreira my research report supervisor, your patience, encouragement, counsel and availability resulted to the completion of this research report, thank you sir.

The completion of this research report is a testament to Professor Boris Urban, you challenged me to leave my comfort zone and strive for excellence.

Dr. McEdward Murimbika my Global Entrepreneurship lecturer, an inspirational academic and entrepreneur, the cutting edge entrepreneurship conversation and encouragement are cherished.

Mr. Nteto Nyati former CEO of MTN-SA thank you.

To the wonderful professionals in the telecoms sector who took time to participate in data collection exercise for this research report.

Nozizwe Tshabuse, I am blessed to have you. I would not have completed this study without your support and encouragement.

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CHAPTER 1: INTRODUCTION

1.1 Purpose of the study, and research question

The purpose of this research is to contribute to the extensive entrepreneurial research studies particularly in the field of human capital and corporate entrepreneurship with specific focus on the linear relationship between innovation and performance. The evaluation of the perceived impact of Human Capital Investments on the nexus between market outcomes (exploitative) innovation and performance will be conducted in this research study. This research study does not adopt a rigid perspective of human capital, but instead it focusses and investigate the variable ways of attaining human capital and the conversion of human capital knowledge to entrepreneurial task (Unger, Rauch, Frese, & Rosenbusch, 2011).

Is the fit between the management team human capital characteristics and the innovation related to the financial performance of the telecoms firm in South Africa? Are human capital investments of the company related to the innovations of the telecoms firms? What is the perceived relationship between human capital and innovation performance in the telecoms sector?

1.2 Context and background of the study

The business operating environment have seen dramatic shifts in the last two to three decades and has evolved in an unprecedented manner. This is driven principally by globalisation in the business sector. Globalisation of business have left businesses with a challenge to continuously innovate in order to remain relevant and competitive. The traditional telecommunication sector of South Africa has also been affected by globalisation, and thus some of the telecommunication firms are losing relevance and their competitive edge.

In the last two decades the telecommunication sector of South Africa has experienced uninterrupted growth. However, in the past five years the South African Telecoms market is at the cross road due to slow economic growth, political uncertainty and increased competition from non-traditional telecoms players. In addition, the telecoms sector of South Africa has increasingly matured in comparison to the rest of the African telecoms market. Traditionally, telecoms firms focused on increasing their subscriber base, however, with the mature market these firms have started to focus on new products and service that is to boost their average revenue per user (Ford, 2016).

The headquarters of leading telecoms sector companies in South Africa are clustered mainly in Gauteng Province; Johannesburg, Midland, Centurion, and Pretoria. Gauteng is the economic hub of South Africa and the economic gateway into Africa. In the last few decades the country has experienced a surge in telecommunication service such as voice and short message services, inversely, the fixed telephone line service has been experiencing a decline particularly in the domestic client base. In the past few years there have been a strong surge in the adoption of data based services particularly those driven mostly by mobile device, as South Africa switches to digital signal (Thomas Reuters, 2016). Furthermore, recently a new immigration to fiber optics data service is being realised, and this is mostly driven by smart television offering and video on demand services. Clearly the telecommunication sector in South Africa is highly competitive. Firms that engage in innovative activities should remain in the competitive edge.

The leading non-traditional telecommunication (telecoms) player are the Over the Top (OTT) application companies. These non-traditional telecoms firms pose a leading challenge in the telecoms sector due to their disruptive competitive nature. These firms would generally have the potential to reshape demand for particular telecommunication service. Over the Top companies are multifaceted in their services offering, which in the process disrupt the traditional

telecommunication industry verticals.

One of the advantages that the OTT firms have over the traditional telecoms firms is that they make minimal to no infrastructure investments in the telecoms sector of South Africa, due to the fact that their service offering is based on applications. OTT simply refers to the delivery variable media from a third party to a person's device, thus relegating the telecoms firms to being transporters of bits and bytes (Heinrich, 2014). In essence they piggyback on the existing infrastructure of other telecoms firms without making any contribution to the telecoms firms infrastructure.

The Chief Executive Officer of one of the traditional telecoms firm in South Africa indicated in a general conversation that his firm will be making a ZAR 20 billion investments in the next five years, whilst the OTT firms make no investment in the infrastructure in South Africa (Nyati, 2016). OTT firms are also rarely affected by regulations that affects other telecoms firms (News24Wire, 2015). These OTT firms are able to focus on a niche, that is offering their service to the end user, while on the other hand, the traditional firm has to focus on; policy issues, infrastructure and service and still initiate ambidextrous innovation.

OTT firms are run and initiated by individuals with high human capital with regards to the technology solution offered in the telecoms space. However, they are characterised by minimum or no knowledge in service offering (Marvel & Lumpkin, 2007). Marvel & Lumpkin (2007), also indicated that lack off or minimum human capital regarding ways to serve the market tend to be associated with innovativeness and yielding better results compared to those who have the experience and knowledge to serve the market. In essence, entrepreneurs in the technology and telecoms sector who know less about ways to serve the market will have a much greater likelihood of creating breakthrough innovations in the sector (Marvel & Lumpkin, 2007).

General human capital is a measure or an indicator for success likelihood (Unger et.al, 2011). Singer (1995), indicated that the preceding entrepreneurial experience is also a common predictor for success in entrepreneurship. The author sought to make a contribution to the surging literature in corporate entrepreneurship by studying how Human Capital Investments impact and affect the firm's exploitative innovation success in the telecoms Sector of South Africa? Exploitative innovation is; critical, of central importance, and of key interest in lieu of the fact that it is a fundamental instrument of competition for various firms (Marvel & Lumpkin, 2007; Baumol, 2005).

Corporate entrepreneurship and Human Capital are key in the competitiveness of a firm because the discovery of entrepreneurial opportunity is deeply entrenched on the human capital investments of the individual (Corbett, 2007). The individuals involved in the entrepreneurial process in the firm also rely on their cognitive abilities that allow them to value and exploit the knowledge (Corbett, 2007). How the individuals existing human capital affects and impacts innovation success.

The entrepreneurial performance or success of a company at any given point and time is depicted in the entrepreneurial intensity score, which is characterised by innovativeness, risk-taking, and pro-activeness (Kuratko, Morris, & Covin, 2011). This study focuses on the innovativeness element of the entrepreneurial intensity.

The research report is organized as follows: the second chapter appraise and summarizes the relevant literature and thus explain the derivation of the research hypotheses. The methodology to the study sample of the major telecoms firms in South Africa are presented in chapter three, and subsequently chapter four is the presentation of the study findings. The second last chapter (five), will discuss the findings, followed by chapter six which entails the concluding remarks and recommendations for future research studies.

1.3 Theory and background

Innovation is the primary instrument to achieve competitive edge for various corporations (Varies & Littunen, 2010; Baumol, 2005). It is also the epicenter of entrepreneurship (Atalay et.al, 2013; Marvel & Lumpkin, 2007). Innovation can be regarded as the incremental improvements on; product, processes and services, and in some instances it could be simple discontinuous changes (Atalay et.al, 2013; Varis & Littunen, 2010; Baumol, 2005). Additionally, the successful implementation of new products, services, and process could be defined as innovation (Gundry, Muñoz-Fernandez, Ofstein, & Ortega-Egea, 2016). Furthermore, Innovation is simply perceived as the tangibilisation of creativity (Fillis & Rentschler, 2010). In addition, innovation is more about the adoption of new useful ideas and the exploitation thereof (Dorenbosch, van Engen, & Verhagen, 2005). In essence innovation is simply acting on new ideas in a novel way.

In the past two to three decades' human capital construct in entrepreneurship research has been accelerated (Unger et.al., 2011). In addition, the success of an entrepreneurial venture in a corporation or outside could be associated with human capital of the initiators (Unger et.al, 2011). Entrepreneurship could potentially be better understood through the lens of human capital construct. Human capital construct is fundamentally important in entrepreneurship research studies (Marvel, 2013). Through the human capital construct discovery and creation of opportunities is enhanced (Unger et al., 2011). The basis and advantage in new knowledge creation is in human capital (Marvel, 2013). Venture capitalist, when evaluating a potential investment performance tend to utilize human capital investments and outcome (Unger et al., 2011).

1.4 Problem statement

This study argues that outcomes of human capital investments impacts the nexus between innovation and performance. Companies characterised by the accumulation of higher quality of skill and knowledge have a sustained advantage over their competitor for example in (Shaw, Park, & Kim, 2013; Scott & Bruce, 1994). Exploitative innovation is essentially characterised by prior: business; functional; and industry experience (Shane, 2003). It is imperative to encourage corporate entrepreneurship activity in telecoms firms in South Africa for competitive advantage. Human capital investment is deemed to be necessary for sustainable competitive advantage. Through the mechanism of entrepreneurial activity, knowledge is transformed into innovative behaviour in which new venture, products, services, or processes are formed in a sector (Block, Thurik, & Zhou, 2013).

1.4.1 Main problem

In order for a South African telecoms firms to compete and realise growth, innovativeness and corporate entrepreneurship behaviour should be encouraged. The key and essential factor of economic growth is human capital (Greiner, 2012). It is therefore imperative to understand the impact of human capital investments on innovative success. Thus the main problem statement is as follows: How do investments in human capital impact the relationship between innovation and success in the telecoms sector?

1.4.2 Sub-problems

- The first sub-problem is to determine and measure the telecoms firm's innovation and success,
- The second sub-problem to examine the elements Human Capital Investments as antecedent to the success of the telecoms firms of South Africa, and
- The third sub-problem is to establish the top management human capital investments variables influencing the innovation of the firm.

1.5 Significance and contribution of the study

Drawing from the human capital theory and literature, the author analyses and evaluates the perceived impact of the human capital construct on the nexus between innovation and performance in the telecoms sector of South Africa. This study will not only contribute to the surging body of literature in human capital, and corporate entrepreneurship, but will also bring new insights to the practitioner in the telecoms field.

According to (Atalay, Anafarta & Sarvan, 2013), there is serious paucity of literature and studies on the nexus between innovation and firm performance. Despite the fact that innovation studies have gained traction after the innovation theory was coined by (Schumpeter, 1934). Firms need to innovate in order to remain competitive and relevant, innovation is the primary avenue for firms to improve performance (Varis & Littunen, 2010). Therefore, this study aims to fill the literature paucity by evaluating the nexus between innovation and performance in the telecoms sector of Johannesburg. It will also evaluate the impact of the human capital variable on the relationship between innovation success. Furthermore, it will also asses the influence of innovation on firm performance with specific reference to the telecoms sector of South Africa.

The research study will adopt a dynamic approach following on the suggestion of (Unger et.al, 2011), which focuses on transfer of human capital knowledge to entrepreneurial task and also the process of acquiring human capital. The study gives attention to learning from the multivariate nature of human capital to understand the subsequent impact on the nexus between innovation performance in telecoms sector. This research will then demonstrate the importance of the key variables of human capital investments as moderators for innovation success in the telecoms sector of South Africa. This study uses empirical survey methods to assess the relationship of human capital on innovation success in telecoms sector by focusing on large telecoms corporations in South Africa.

Lucas (1988), indicates that one of the fundamental source of economic growth is human capital. Unger et.al (2011), showed in their paper of meta-analysis that human capital is a fair predictor of success in entrepreneurship. This study fills the gap in research by depicting the perceived impact of human capital investments on innovation success in telecoms sector of South Africa. (Schumpeter, 1934), postulated that innovation gives a firm competitive advantage in turbulent economic environments. The theoretical gap this study fills is the actual perceived moderating impact human capital investment will have on the nexus between innovation and success in the telecoms sector of South Africa.

Corporations in South Africa at large are grappling with issues of human capital investments, and this study may potentially contribute to the solutions needed. Corporate entrepreneurship (Intrapreneurship) culture is imperative in corporate South Africa, this study can invoke intrapreneurship in firms that have been passive and also encourage the sustainability of a corporate entrepreneurship culture in firms that have embraced intrapreneurship. Finally, the findings of this study can provide reliable guidance with regards to corporate entrepreneurship

strategies particularly where human capital investments and entrepreneurial intensity of the firm is imperative.

1.6 Delimitations of the study

The research study is on the human capital investments and innovation success in the telecoms sector. The unit of analysis is the telecoms sector of South Africa. The study further focuses on the four major telecoms firms in South Africa, which are located in the Gauteng Province of the country. The respondents are the senior management and professional employees of the telecoms firms. The study is cross sectional and a survey instrument with forty-three questions is utilised to collect the data. The research focuses on the process, product, and service innovation relationship with success of the firm and human capital investments.

The main focus of this research study is on the mobile sector of the telecommunication industry of South Africa. Consequently, excluding the fixed line and satellite sectors of the telecoms industry of South Africa. This study further excludes the virtual firms in the telecoms sector of South Africa, also investment holdings firms with interest in the mobile telecommunication sector of South Africa. Lastly this study also excludes global and local OTT telecoms firms operating in South Africa. Thus narrowing the scope of the study to the four major mobile telecoms firms operating in South Africa.

1.7 Conceptualisation and theoretical definition of terms

The percentage of the company's revenue from new products, services, and process; or innovation could be defined as innovation performance (Garriga, Von Krogh, & Spaeth, 2013). According to (Atalay, Anafarta, & Sarvan, 2013), there is still no global consensus on the actual definition of innovation. However, the initial description of (Schumpeter, 1934), which is innovation is the driving force for development is still valid. Innovation is characterised by a firm's ability to

adapt to the prevailing business sphere as to enhance competitiveness (Varis & Littunen, 2010). Innovation is basically the basis for the life of the firm, regardless of the size or age of the company (Varis & Littunen, 2010).

Productive, efficient, and effective entrepreneurial activity is a result of increasing human capital, because developing the entrepreneurial individual's knowledge and experience would yield in efficiency and effectiveness in their cognitive abilities which are important for opportunity recognition and exploitation thereof (Barucic & Umihanic, 2016; Barreira, 2011; Becker S. G., 1964; Schultz, 1959). Human capital investments are prerequisite for idea identification and exploitation thereof in new venture creation and entrepreneurship (Barucic & Umihanic, 2016).

Companies have varying knowledge and skills that have economic value, and this gives them the competitive advantage. The concept of human capital initially had to do with the exploration of the varying income, in the field of economics (Becker, 1964). Human capital in general is characterised by investments and outcome (Unger et al., 2011). Human capital investments are education, and experience (Unger et al., 2011). The direct outcomes of human capital investments are knowledge, and skill which are essentially the transfer of human capital investments (Unger et al., 2011; Backer, 1962). Marvel and Lumpkin (2007), depicted that several studies provide evidence that opportunity recognition or development is linked to the entrepreneurial individual's aspects of human capital.

1.8 Assumptions

For the purpose of this research study it is assumed that the respondents have working proficiency of English language and have adequate understanding and knowledge of the area of research, thus they are able to complete the questionnaire. In the unlikely event the executive and managers in the telecoms

sector not having adequate proficiency in English will probably have a negligible effect. These assumptions are reasonable as the expected respondents would have fairly invested in their human capital, hence them meeting the criterion of professional or senior management in their respective firms.

CHAPTER 2: LITERATURE APPRAISAL

2.1 Introduction to literature appraisal

Firms are consistently facing the challenges of increasing their responsiveness to innovation, market demands and also finding the best ways to exploit the technology at their disposal (Dorenbosch, van Engen, & Verhagen, 2005). Thus, the innovation of products, processes, and services have been critical in meeting these demands (Atalay et al., 2013; Dorenbosch et al., 2005). Dorenbosch et al. (2005), further, indicate that innovation is no longer the role of specialists or engineers and scientists. Innovation should be fostered throughout the organisation, and tap into the innovative potential of all employees. Thus, enabling the possibility to get the best out of the employee's human capital and, subsequently, give the firm a competitive advantage (de Jong, Parker, Wennekers, & Wu, 2015; Scott & Bruce, 1994). Hence, innovation studies have provoked interest amongst academics and practitioners alike.

In entrepreneurship, the desirable outcomes are a result of more and higher quality human capital investments and outcomes for an individual (Marvel, Davis, & Sproul, 2016; Marvel & Lumpkin, 2007). Therefore, the question that arises is: what is the perceived impact of human capital investments on the nexus between innovation and perceived performance? Accordingly, this study is concerned with the variables of innovation and performance. Human capital is perceived to have an impact on the relationship between opportunities bearing successful innovation outcomes in the telecoms sector in Johannesburg.

Both start-up firms and solid corporate firms are characterised by new product innovation to some degree (Block, Thurik, & Zhou, 2013). In their paper, they used the knowledge spill-over theory of entrepreneurship and indicated that corporations generally tend to produce incremental innovation from the

knowledge flow (Block et al., 2013). On the other hand, (Block, Thurik & Zhou, 2013), further indicate that start-ups tend to exploit the knowledge spill-over in order to produce radical innovation. The telecoms sector of South Africa characterised by incumbent firms, which, according to the knowledge spill-over theory of entrepreneurship, will produce incremental innovations. Thus, consequently, their industry vertical can be threatened by OTT firms which will generally exploit the knowledge spill-over.

The variables and concepts of; Human Capital Investments, Innovation and Success are reviewed. Innovation is discussed and presented from theory as the independent variable and the moderating major variable of human capital investments is presented; the dependent variable performance is also discussed. The concept of success is defined and presented from an entrepreneurial and business context. The telecoms sector is reviewed with specific emphasis to South Africa.

2.2 Major concept appraisal and definition.

The three major constructs in this study are innovation, performance, and human capital. Below, the working definitions and concepts for this study are presented for the major construct supported by literature. Starting with innovation, then performance and finally human capital.

2.2.1 Innovation background and concept

No consensus has been reached amongst academics and the practitioner on the definition of innovation or its characteristics, despite the extensive empirical and scholarly research (Atalay et al., 2013). In the section we explore the exploitative dimension of innovation. The explorative dimension of innovation is concerned with research and development (R&D) is beyond the scope of this research study.

Basically innovation refers to the extent which a firm is doing things in a novel, unique way, as suggest by (Schumpeter, 1934), when he coined the term "creative destruction". Thus, innovation can render existing products absolute (Kuratko, Morris, & Covin, 2011). Innovation according to (Atalay et al., 2013; Varis & Littunen, 2010; Schumpeter, 1934) refers to new products, process or production method, and services. However, innovation is preceded by knowledge (de Jong et al., 2015; Atalay et al., 2013; Unger et al., 2011; Varis & Littunen, 2010). Consequently, prior knowledge might lead to "newness" (de Jong et al., 2015; Varis & Littunen, 2010; Scott & Bruce, 1994). In essence, innovation could be viewed as a multistage process as observed by (Scott & Bruce 1994). According to (Scott & Bruce, 1994), individuals or even teams can be involved in the innovation process at any point. This is because of the evidence that innovation is more of a discrete and discontinuous process (de Jong, et al., 2015; Scott & Bruce, 1994). Innovation is a process characterised by reliance on new knowledge or new combination of knowledge that are constituted in new products, production process, and services, in essence innovation is a by-product of education and experience.

Older literature for example (Scott & Bruce, 1994), noted that innovation and creativity are used interchangeably in some research studies. They further noted that the creativity and innovation difference is probably more of emphasis than substance. However, (De Jong et al., 2015), indicated that literature often will make a distinction between creativity and innovation. There are two fundamental elements to the definition of creativity; the uniqueness of the solution to a particular solution and the appositeness of the applicable new solution (Blauth, Mauer, & Brettel, 2014). Thus creativity is the production of unique, beneficial ideas (Blauth, Mauer, & Brettel, 2014). The successful implementation of new products, services, and process could be defined as innovation (Gundry, Muñoz-Fernandez, Ofstein, & Ortega-Egea, 2016). Innovation is simply perceived as the tangibilisation of creativity (Fillis & Rentschler, 2010). In addition, innovation is more about the adoption of new useful ideas and the exploitation thereof

(Dorenbosch et al, 2005). Therefore, innovation precede creativity (Blauth, Mauer, & Brettel, 2014; Fillis & Rentschler, 2010). As a result, organization can compete by identifying a unrecognised novel idea, by acting and meeting a need. Thus, creativity is the conception of new ideas and innovation is the corresponding action.

Corporate entrepreneurial innovation is characterised by the emergence of new opportunities (Garud, Gehman, & Giuliani, 2014). Substantial literature and research has emerged of over the years with respect to informing more on this topic of innovation (Garud, Gehman, & Giuliani, 2014). Other researchers have also indicated that no single theory can adequately explain the complexity of innovation particularly in a developing nation context (Hsu, Tan, Jayaram, & Laosirihongthong, 2014). Innovation could be induced by the individual entrepreneur or entrepreneurial team (Garud, Gehman, & Giuliani, 2014). With these perspectives in mind, opportunities are created by the entrepreneur or the entrepreneurial team. However, some scholars will indicate that opportunities pre-existed before the entrepreneurial team or the individual entrepreneur show up to exploit the opportunity (Scott & Bruce, 1994).

A working definition for Innovation in this research study could be defined after (Atalay et al., 2013; Rauch, Wiklund, Lumpkin, & Frese, 2009; Scott & Bruce, 1994; Schumpeter, 1934) as the tendency of the entrepreneurial individual to engage in creative process and introduce new products by experimenting. The propensity of a corporation to be nimble and dynamic by adopting cutting edge ideas that eventually result in the development of new products and service (Atalay et.al., 2013). Innovative employees in a company engage in risk, by proactively challenging the status quo (de Jong et al., 2015).

2.2.2 Performance background and concept

The firm's performance is the measurement of the firm's market position bundled together with its ability to create value for stakeholders (Lo, Wang, Justin, & Ramayah, 2016). In previous studies and according to literature, the notion of firm performance had to do so much with the notion of financial performance of the firm, referring to measures such as return on investments (ROI) (Lo, Wang, Justin, & Ramayah, 2016). However, recently a more equitable approach has been adopted, notably (Wang, Sharma, & Cao, 2016). The more equitable approach to firm performance considers both operation and financial performance of the firm (Wang, Sharma, & Cao, 2016; Lo, Wang, Justin, & Ramayah, 2016).

Therefore, firm performance is characterised by two essential components namely operational performance and financial performance (Wang, Sharma, & Cao, 2016). These components are not only essential but also critical because of their perceived impact on the firm's competitiveness and sustainability (Wang, Sharma, & Cao, 2016). In the context of this study the definition of performance also refers to success as a result of innovation.

2.2.3 Human capital background and concept

The notion of human capital throughout the years have been a core component of a variety of theories (Carmeli, 2004). One such theory is the Human Capital Theory (HCT). Human capital consists of three distinct but interrelated capitals; Intellectual Capital, Emotional Capital, and Social Capital (Gratton & Ghoshal, 2003). These capital are intangible, however, they cannot be separated from the human element (Becker, 1993). In this literature review we focus on the intellectual aspect of human capital.

Human capital was developed by economists to study the value of education (Marvell, 2013), and the exploration of the varying income (Becker, 1964; Becker, 1962). The theory postulates that individuals possess economically and variable skills set; knowledge, and experience (Marvel, 2013). The theory has subsequently in the last three decades been adopted by entrepreneurship researchers who have included human capital in their prediction models of entrepreneurial success (Marvel, Davis & Sproul, 2016; Unger et al., 2011). Schumpeter (1934), in his formative work initially indicated that for innovation to take effect, entrepreneurship is essential, particularly the entrepreneurial individual in entrepreneurship. Hence, the human capital of the entrepreneurial individual is essential.

Unger et al., (2011), indicates that there is a wide spectrum in which scholars of human capital have employed with regards to the variables, some of which include; education (both formal & informal and training), experience (entrepreneurial and employment), skills, knowledge, parents background, and many more. Becker (1964), indicates that the fundamental variables of human capital are; skills and knowledge, which are direct products of investments in human capital (experience and education). Thus, human capital can be conceptualised and differentiated along the following attributes:

- human capital investments,
- outcomes of human capital investments,
- task related human capital, and
- human capital not related to task (Unger et al., 2011).

The prerequisite for development and commercialisation for ambidextrous innovation is a knowledgeable and skilled workforce, particularly in the scientific and high technology fields (Tellis, Prabhu, & Chandy, 2009). Ambidextrous innovation is concerned with both exploratory and exploitative innovation. The success of exploratory and exploitative innovation lies in the commercialisation

of the innovation process (Mueller, Rosenbusch, & Bausch, 2013), because the workforce and management with a high human capital investments would generally have a better knowledge of the market. Subsequently, transfer the acquired human capital for commercialisation of both exploratory and exploitative innovation.

2.3 Entrepreneurship in Corporate Context

It has been noted that Corporate Entrepreneurship (CE) is a solid area of research study, it seems that it also has a perceived influence on emerging strategic management studies (Kuratko, Hornsby, & Hayton, 2015). Corporate entrepreneurship is characterised by three yet distinct elements: innovation, venturing, and strategic renewal (Zahra, 1993). Corporate entrepreneurship in an existing firm can take a formal or informal approach in creating new business in the existing firm through the agency of product, process and service innovation (Zahra, 1991).

Exploitative innovation is essentially characterised by prior; business, functional, and industry experience (Shane, 2003). This view is supported by the perception that companies characterised by higher quality of skill and knowledge have an advantage over their competitor (Scott & Bruce, 1994). It is imperative to encourage corporate entrepreneurship activity in telecoms firms in South Africa for competitive advantage. Human capital investment is deemed to be necessary for sustainable competitive advantage. Knowledge is transformed, through the mechanism of entrepreneurial activity, into innovative behaviour in which; new ventures, products, services or processes are formed in a sector (Block, Thurik, & Zhou, 2013).

The initiation of corporate entrepreneurship (CE) in a firm is for variable reasons including those of operational (OP) and financial performances (FP) (Kuratko, Hornsby, & Hayton, 2015). Thus, corporate entrepreneurship elements of

corporate venturing (CV), innovation, and corporate renewal (CR) have been strategies for many firms. They are utilised by firms in order to compete and remain relevant. Theoretical, and empirical knowledge on corporate entrepreneurship warrant a much robust understanding. However, this domain of research enquiry has been expanding in the past four decades (Kuratko, Hornsby, & Hayton, 2015).

2.3.1 Empirical Studies of corporate entrepreneurship

Scholars such as (Kuratko, Morris, & Covin 2011; Kuratko & Hodgetts 1998), postulates that entrepreneurship is a variable, in that it is not something the firm has or does not have. Literature further indicates that most firms are characterised by some degree of entrepreneurship, the difference is the degree and intensity (Kuratko, Morris, & Covin, 2011). Entrepreneurship, at its core, is characterised by three underlying dimension which are; innovativeness, risk-taking, and pro-activeness.

Over the last four decades' corporate entrepreneurship (CE) research has been growing steadily and being perceived to be more important in the process. It has also become a strategy that facilitate the corporation's efforts to create innovation and thus effectively handle the realities of today's dynamic and unpredictable competitive business environment. Kuratko, Hornsby, & Hayton, (2015), suggest that there is still a greater need for further research about corporate entrepreneurship in organisational settings even though the inherent value of entrepreneurial action organisations has been established.

The corporate entrepreneurship imperative is a reality to all organisation, and it requires innovation, courage, risk-taking, and entrepreneurial leadership (Kuratko, Hornsby, & Hayton, 2015). Zahra, Nielsen, & Bongner (1999), showed

the imperativeness of corporate entrepreneurship for competitive edge by further looking at the knowledge-creation processes within both formal and informal firms. In their paper the authors suggest that knowledge creation and organisational learning should be considered as outcomes of corporate entrepreneurship in the future (Zahra et.al, 1999). According to(Ireland, Covin, & Kuratko, 2009), current and future competitive edge characterised by innovation at its core, necessitates the firm to rely on corporate entrepreneurship strategies. According to literature corporate entrepreneurship and its element of innovation are strategic tools for strategic edge. However, successful implementation of innovation remains elusive for most corporation (Kuratko, Hornsby, & Hayton, 2015).

Corporate entrepreneurship elements (strategic renewal, corporate venturing, and innovation) positively influence overall, subjective and objective firm performance (Bierwerth, Schwens, Isidor, & Kabst, 2015). However, innovation has a stronger effect on performance particularly in high-tech firms such as telecoms, as opposed to low-tech industries. Bierwerth, Schwens, Isidor, & Kabst (2015), further indicate in their meta-analysis paper that despite substantial research and empirical findings of corporate entrepreneurship (strategic renewal, innovation, and corporate venturing) and performance nexus, it remains inconclusive.

2.3.2 Recent Corporate Entrepreneurship studies in South Africa

Innovation studies on firm level in an African context are valuable, owing to the fact that very few studies have been previously conducted with focus on innovation and technology (Urban & Barreria, 2010). The research paper further indicates that the majority of the scholarly research on innovation and technology has been carried out in the United States of America and Europe and thus generalisability of the finding is limited (Urban & Barreria, 2010). Furthermore,

they posit that studies on innovation technology from an emerging country context are important in international entrepreneurship as often samples from African countries are excluded in overseas studies (Urban & Barreria, 2010). Urban (2010), indicated that technology and firm innovation is imperative in a South African context were growth is of fundamental indispensable for the firm's competitive advantage and also its survival and profitability.

Other studies in corporate entrepreneurship focused mostly on entrepreneurial orientation and other elements of CE such as innovativeness, risk-taking and pro-activeness (McEdward & Urban, 2014; Molokwu, Barreria, & Urban, 2013; Urban, 2011; Urban & Barreria, 2010; Urban, 2010). These studies are significant because they have the potential to provide cutting edge useful insights to various role players in South Africa, a country grappling with issues of economic growth, corporate renewal, and corporate venturing.

2.4 Human capital in entrepreneurship context

2.4.1 The human capital imperative in entrepreneurship

The notion human capital throughout the years have been a core component of a variety of theories (Carmeli, 2004). Some of these theories are: Human Capital Theory (HCT) (Kessler & Lülfesmann, 2006), Upper Echelon Theory (UET) (Hambrick D. C., 2007), and Resource Based View (TBV) (Kellermanns, Walter, Crook, Kemmerer, & Narayanan, 2016). The human relation theory posits elegantly the central role and importance of human capital with relations to effectiveness and efficiency of an organisation (Carmeli, 2004).

The Human Capital Theory influences the Resources Based View (Zarutskie, 2008), and further supports, invokes the Upper Echelon Theory (Hambrick &

Mason, 1984). The Resources Based View is one of the most influential theory in organisational sciences (Carmeli, 2004; Hitt, Bierman, Shimizu, & Kochhar, 2001). The bundling of this two theories impact, influence and efficiency of human capital in firms is appreciated, in that the top management variable of human capital dictates the performance of the firm (Zarutskie, 2008; Hambrick & Mason, 1984).

Researchers suc as (Hitt, Bierman, Shimizu, & Kochhar, 2001; Barney & Zajac, 1994), illustrates the importance of the human capital to the firm's' outcomes. Thus, supporting the resource-based view of the firm (Hitt et al., 2001; Barney, 1991). The RBT theory in general posits that performance across variable firms is a result of the variability of the firm's resources and capabilities (Hitt et al., 2001). According to RBT, the more variable, unique and company specific the resources, there more difficult it is to imitate the company. Thus, the company is provided with a strong basis to compete. These research studies based on the RBT have indicated a positive relationship between human capital and firm performance. Consequently, firms' human capital interacting with innovation could potentially impact the performance of the firm. Greene, Brush, & Hart (1999), argued that the resources based view is important to the firm, because it is imperative for examining the role of corporate venture champion as a corporate resource. The firm context is also important in understanding corporate entrepreneurship activities.

Unger et al., (2011), indicated that the theory of human capital has been consistently associated to success in entrepreneurship. Human capital and its investments is a critical component in promoting efficiency, effectiveness, and performance in entrepreneurship. Studying the innovation performance of a corporate firm, will thus also require the understanding of the influence of human capital on the relationship. The core focus of this research study is however, the investment in human capital; measured in education and experience. The

interest is; firstly, does human capital investments variables positively influence telecoms firm performance? Secondly, is there any interacting effect between the variable?

2.4.2 Human Capital Investments: Experience and Education

This research report is concerned with current activities that influence the performance of the firm. Human Capital Investment is one such activity, which is basically investing on human capital (Becker, 1962). According to (Becker, 1962), the are many ways to invest in human capital. Some of the examples will include education and on the job training, work experience. However, these investments in human capital would differ in their perceived effects on future success, performance or returns.

Innovation and venturing activities are directly linked to prior marketing, management, and entrepreneurial experience (Marvel & Lumpkin, 2007). Prior business, and industry experience is also critical in the ambidextrous innovation process (Shane, 2003). The value of a new innovation is framed in context, its uncertainty reduced as the value and quality of the experience of human capital investment increases in a company.

Education is the direct human capital investment which is indirectly linked to innovation performance outcome. Education is a difficult variable to measure (Unger et al., 2011), investment in education might result in knowledge acquisition, for example, various factors such as the quality of the business school and the psychological makeup of the students come into play.

2.4.3 Human Capital Investments as antecedents to innovation

success

In order for a South African telecoms firms to compete and realise growth, innovativeness and corporate entrepreneurship behaviour should be encouraged. Lucas (1988), indicated that the fundamental source of economic growth is human capital and (Unger., 2011) indicated that human capital is a proxy for success. According to (Bosma, van Praag, Thurik, & de Wit, 2004), human capital improves employee's performance and consequently the firm's performance. Conversely, innovation tend to have a positive relationship with performance (Varis & Littunen, 2010). It is therefore imperative to understand the impact of human capital investments on innovation success.

2.4.4 Human Capital Outcomes: Knowledge and Skill

Companies and individuals with higher human capital have an advantage over their competitors in technological and knowledge intensive industries such as telecoms sector (Unger et al., 2011; Kirzner, 1997). Innovation is associated with uncertainty, the uncertainty can be minimised through knowledge and valid information (Unger et al., 2011; McMullen & Sherphered, 2006). Skill is the direct outcome of human capital investments and it can be associated with innovativeness, which potentially leads to better firm performance. It is interesting to note that some companies, due to the lack of innovation internally, will acquire knowledge in the form of human capital from external firms (Garriga, Von Krogh, & Spaeth, 2013).

2.4.5 Task relatedness of human capital and performance

Unger et al., (2011) have argued that the outcomes of human capital investments are more important and that the success relationship is much higher than that of human capital investments. Outcomes of human capital investments are direct indicators of human capital. Outcomes of human capital investments should

positively and directly influence innovation performance and the actions of the entrepreneurial employee (Unger et al., 2011.)

Unger et al., (2011), suggest that outcomes of human capital investments yield much better performance when they are successfully transferred to the current task to be performed. Task relatedness of outcome of human capital is essential for innovation success in the telecoms sector.

2.5 Hypotheses development

This section develops the conceptual research model that depicts and predicts the perceived influence of human capital investments (education and experience), on the firm innovation (product, process, service) and performance (operational and financial) relationship of the telecoms firm showed in Figure 1. According to leading scholars, the key outcome of innovation will be performance and also the fact that human capital has influence in firm performance. Therefore, the literature review influences this study to posit that human capital investments influences the entrepreneurial intensity of the firm and its core component of innovation.

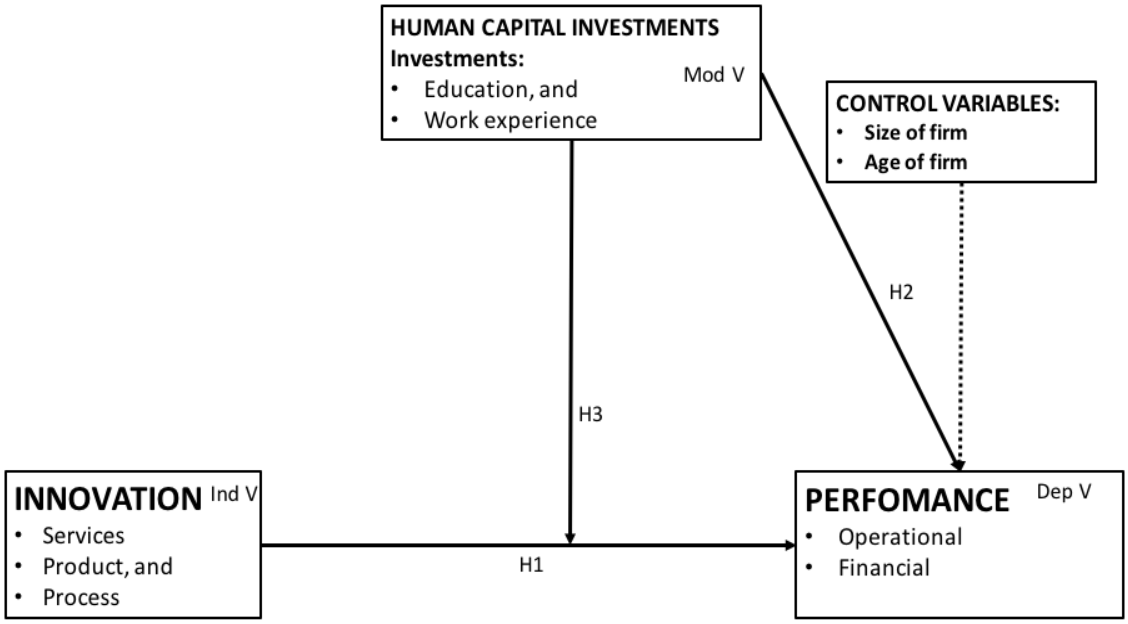


Figure 1: Human capital and innovation performance nexus research model

2.5.1 Hypothesis related to Innovation and performance

Atalay et al., (2013), indicated in their study of the relationship between innovation and firm's performance in the automotive sector of Turkey, that innovation is characterised by a positive relationship with the firm's performance. Furthermore, Varis & Littunen (2010), also indicate that most cross sectional studies depict a positive relationship between innovation and performance of the firm. It is, therefore, imperative for firms to innovate, since firms that innovate remain competitive (Atalay et al., 2013; Rubera & Kirca, 2012; Rosenbusch, Brinckmann, & Bausch, 2011; Schumpeter, 1934). The percentage of the company's revenue from new products, services, and process; or innovation could be defined as innovation performance (Garriga, Von Krogh, & Spaeth, 2013). In addition, the firm's performance considers both operation and financial performance of the firm (Wang, Sharma, & Cao, 2016; Lo, Wang, Justin, & Ramayah, 2016). Therefore, the innovation activities of the firm have a perceived influence on the operational and financial performance.

Hypothesis 1: *Innovation has a positive relationship with performance in the telecoms sector. H1a innovation has a positive relationship with operation performance in telecoms. H1b innovation has a positive relationship with financial performance in telecoms*.

2.5.2 Hypothesis related to human capital investments & performance

For a corporate firm to continue creating value for all its stakeholders, it needs to derive value from its assets. There is basically two classes of assets or

resources, namely tangible and intangible. Our interest in this hypothesis development are the intangible assets which are human capital (Carmeli & Tishler, 2004). However, this study is more concerned with the investments in human capital. Human capital investments are perceived to have influence in the success of the individual and the firm (Becker, 1993).

Carmeli (2004), posit that academics and scientist have for many years viewed and accepted human capital as a strategic asset which is suitable for effective organisational performance. Intangible resources have always been viewed as key in value creation for the firm and that in the future, they will even be more to the forefront of value creation (Carmeli & Tishler, 2004). Scholars such as (Barreira, 2011), further emphasises the point that currently intangible assets such as human capital are dominant drivers of value creation for most firms. Thus superior human capital investments contribute to the firm's competitive advantage and performance together with other tangible and intangible resource.

Human Capital is one of the intangible assets a firm can rely on as one of the driver for competitive advantage for telecoms firm. That is why scholars such as (Lawler, 2009) depicted that survey after survey executives in various firms agree and believe that finding and developing talent is their top priority. Executives know and understand that, their performance, and that of the firm are as good as the human capital investments of their executive team. As a result, human capital is of strategic importance for efficient performance for a firm (Carmeli, 2004).

Therefore, variable human capital investments quality is antecedent to the heterogeneity in the firm's performance (Barreira, 2011). The upper echelon theory indicates that human capital for senior teams will influence the performance of the firm (Hambrick & Mason, 1984). The resource based view theory postulates that the variable quality of human capital such as skill,

knowledge, and education will dictate superior performance for a firm (Zarutskie, 2008). Human capital is the primary source of economic growth and performance for a firm (Lucas, 1988; Becker; 1964; Schultz, 1959). In essence the human capital theory postulates that productivity and efficiency of entrepreneurial activity is largely influenced by the knowledge reserves of the firm (Becker, 1964; Schultz, 1959).

Exceptional superior cognitive abilities in entrepreneurial endeavours are as a result of human capital investments. It has been depicted by (Zarutskie, 2008), that specific human capital in the form of education in various academic fields is not a solid or robust predictor of the firm performance. However, (Zarutskie, 2008), further noted that general knowledge which is an outcome of the investment in education could be a better proxy to predict the firm performance. According to (Bosma, van Praag, Thurik, & de Wit 2004), human capital investments improves employee's performance and consequently firm's performance.

Hypothesis 2: *Higher quality human capital investments are positively related to firm's performance. H2a Higher quality human capital investments are positively related to the firm's operational performance. H2b Higher quality human capital investments are positively related to the firm's financial performance.*

2.5.3 Hypothesis related to HCI as proximal antecedent moderation of innovation performance nexus

Varis & Littunen (2010), indicated in their paper that in an economy were the only certainty is uncertainty, the one source for competitive and sustainable advantage is human capital investment in the form of knowledge. Likewise,

(Marvel, Davis, & Sproul, 2016; Kuratko, Hornsby, & Hayton, 2015; Marvel & Lumpkin, 2007) postulates that innovation is key to having competitive advantage for the firm, particularly in a dynamic environment. However, innovation causes both operational and financial performance of the firm (Kuratko, Hornsby, & Hayton, 2015; Bierwerth, Schwens, Isidor, & Kabst, 2015; Kuratko, Morris, & Covin, 2011). Then the question that arises is: what is the influence of human capital on the innovation performance nexus? It is further understood that knowledge is the basis for innovation and success. Since, human capital investments (knowledge) will be associated with various innovation of the firm, it is therefore imperative to understand the perceived impact of knowledge on the firm innovation performance nexus. According to (Block, Thurik, & Zhou, 2013), human capital investment (knowledge) in entrepreneurial activities is converted to innovation outcomes.

Hypothesis 3*: Greater human capital investments positively moderate the nexus between innovation and performance*

2.6 Conclusion of Literature Review

Innovation is one of the core and key characteristics of entrepreneurship, stimulating operational and financial success of a firm. Innovation is characterised by a positive relationship with the firm's performance according to most cross sectional studies. Therefore, innovation is imperative for firm's competitive advantage. The percentage of the company's revenue from new products, services, and process; or innovation is defined as innovation performance. Innovation activities of the firm have a perceived influence on the operational and financial performance.

In efforts of understanding the perceived impact of human capital investments on

performance and also its perceived moderation on the nexus between innovation and performance, the most two suitable are: Human capital theory and the resource base theory. Furthermore, human capital is one of the intangible assets a firm can rely on as one of the drivers for the competitive advantage for telecoms firm. Lawler (2009), depicted that survey after survey executives in various firms agree and believe that finding and developing talent is their top priority. Therefore, human capital investments are imperative in understanding innovation performance. Research has shown human capital investments to have a perceived influence on performance. On the other hand, others have argued that investments in human capital are not the best proxies of predicting firm performance.

On the basis of the literature review a proposed theoretical model is developed to depict the relationship of the variable and hypotheses. The theoretical framework depicts the relationship of the variables with one another shown in Figure 1. The hypotheses are summarised below:

2.6.1 Hypothesis 1:

Innovation has a positive relationship with general performance in the telecoms sector. H1a innovation has a positive relationship with operation performance in telecoms. H1b innovation has a positive relationship with financial performance in telecoms.

2.6.2 Hypothesis 2:

Higher quality human capital investments are positively related to the firm's general performance. H2a Higher quality human capital investments are positively related to the firm's operational performance. H2b Higher quality

human capital investments are positively related to the firm's financial performance.

2.6.3 Hypothesis 3:

Greater human capital investments positively moderate the nexus between innovation and general performance.

CHAPTER 3: RESEARCH METHODOLOGY

3.1 Introduction

Innovation success in firms is a corporate marvel that can be attributed to deliberate human capital investments. This research study has postulated that human capital investments moderate the relationship of innovation and success of the telecoms firms in South Africa. Consequently, to evaluate this perceived impact of human capital investments on innovation success, a survey instrument was compiled and an empirical survey carried out. True to the theoretical framework for this research study, this chapter discusses the research methods by first looking at the research paradigm and research design. Subsequently, the study will give a discussion of the population and sample together with the sampling and analysis procedure. The research instrument and the psychometric properties of the measuring scales are also discussed. The limitation of the study is depicted.

Moreover, this chapter also described in detail the methodology that has been adhered to in articulating the hypotheses together with the research question. The testing of the hypothesis model is depicted through the analytical techniques which then form the basis of chapter 4, which presents the empirical research study results.

3.2 Research methodology /paradigm

On the basis of the hypothesis the researcher has the propensity to adopt a positivistic paradigm which is also suitable for a quantitative, objectivist traditional research. This study is deductive and quantitative in form. The form is suitable for testing relationships between theory and research. With respect to the positivistic research approach, the research should be objective (epistemology)

characterised by the independence of the researcher in data collection and analysis process. The research seeks to study patterns of ordered events and behaviour (otology).

3.3 Research Design

The research study report is concerned with the perceived impact of human capital investments on the nexus between innovation and performance. Consequently, entrepreneurial orientation (EO) element of innovation and human capital theory concept of investments in human capital form the basis of this research study. Therefore, a deductive quantitative approach is utilised to test theory and the develop hypothesis. The research design is cross sectional, because it is more convenient and time effective to follow this design. The cross sectional design affords the researcher the opportunity to work with data that can be utilised in current business environment. The study is also characterised by multiple variables in the imperial plane. The advantage of this design affords the opportunity to also collect other data types where necessary.

3.4 Population and sample

The telecoms sector of South Africa is very competitive and thus information request is dealt with serious security and scrutiny. Consequently, telecoms firms are very strict with regards to sharing internal information even with academic institutions. Due to this fact, as well as the time constraints, the research study was denied the use of a national random sample of the telecoms sector. Rather, a convenience population sample-frame is employed for the purposes of this study.

The population for our study constitute companies in the telecoms sector in Johannesburg, South Africa. On the other hand, our sampling-frame constitute senior; professional, managers and executives with active LinkedIn profiles or

accounts, and they currently in the employ of one of the four prominent mobile telecoms firms based in South Africa (Table 1).

Two of the telecoms firms are major players in the industry; the one firm being a late entrant, and a catch up player in the industry, and the other one being new in the mobile telecoms sector. The sample is a convenience sample of a selection of 334 technical, scientific and management employees at each of the company in the sample frame shown in Table 1. The respondents for this study include: professional engineers, scientist, technicians, and middle to senior management in the strategic innovation and sales divisions of the telecoms firms. A pilot study of 10 respondents was carried out as to get an assurance of the quality of the research instrument prior to a fully-fledged research study.

The research instrument was submitted manually by the author to an appointed gate keeper in all the different firms. Despite the fact that survey questionnaires were manually submitted and contact with key gatekeepers at the telecoms firms were maintained, the response rate was poor being less than 1% and thus this type of survey method proved to be not suitable. According to the gatekeepers, the reason for this was that the respondents preferred an electronic survey instrument with an anonymous link. Therefore, the survey was eventually carried out electronically using an anonymous link. The link was sent directly to respondents.

The professionals social network LinkedIn was utilised in the actual data collection exercise, as it provided the researcher with direct access to the sample. The majority of telecoms employees are on LinkedIn, in particular executives and senior managers. People are more responsive to social network request, the data collection proved as compared to using a physical gatekeeper.

Table 1: Profile of sample respondents

Telecom Firms and respondents	Basic description of telecoms firm	Number to be sampled
Cell – C: engineering, technology, science, and management	Cell C is a mobile telecoms service provider based in Johannesburg. Some of the services on offer include voice, data, messaging and it has about it has approximately 2800 employees on LinkedIn. Cell C is not listed in the company's' security exchange in south Africa. However, it owned by a listed Company in The Johannesburg securities exchange. www.cellc.co.za	56
MTN – SA: engineering, technology, science, and management	MTN SA, is a subsidiary of the Global multinational MTN Group headquartered in South Africa. MTN is one of the companies that was formed in 1994 after the SA gained democracy. It is difficult to establish how many employees MTN SA will have on linked as some of the employees prefer to use the name of its parent company. However, tens of thousands of the MTN Group employee are on LinkedIn. MTN SA is not directly listed in the Johannesburg security exchange, but it is a subsidiary of MTN	101

	Group which is listed. www.mtn.co.za	
Telkom Mobile: engineering, technology, science, and management	Telkom SA is a telecoms service provider based in Gauteng South Africa. The company offers various services for; domestic, business, and government. Telkom has many subsidiaries and it difficult to quantify how many employees work for the mobile division are on LinkedIn. www.telkom.co.za	98
Vodacom: engineering, technology, science, and management	Vodacom is a South African based mobile telecoms service company providing voice, messaging, data and converged services. It has other operation mostly in the SADEC region and East Africa. A multifaceted company like Vodacom Group has over ten thousand employees on LinkedIn and however it is fairly difficult to quantify those Vodacom SA employees who are on LinkedIn. www.vodacom.co.za	79

3.5 Sample size in regression

Field (2013), suggests that the bigger the sample size the better. However, in reality as discovered in the data collection exercise for these research paper it is not always feasible to get the sample size you are looking for. A big sample is suitable for small effect, thus it requires time and possibly more financially resource. When the sample is executives and senior management of big firms in a niche sector, with tight time constraints, a big sample size that results with a small effect is not possible. For regression the rule of thumb is the size of effect you want to find and the number of predictor variable. For example, a large effect, a sample size of 77 will be suitable for a study with less than 20 predictors. For a medium effect a sample size of 55 with 6 predictors will suffice as (Field, 2013), suggests. The expected effect is the expected size of R^2 that is R^2= .26 (large effect), .13 (medium effect), and .02 (small effect) (Field, 2013). For the research study the expected effect is medium, due to sample size N= 81. Figure 2 below, depicts the graphs of the various effect sizes and the corresponding sample size.

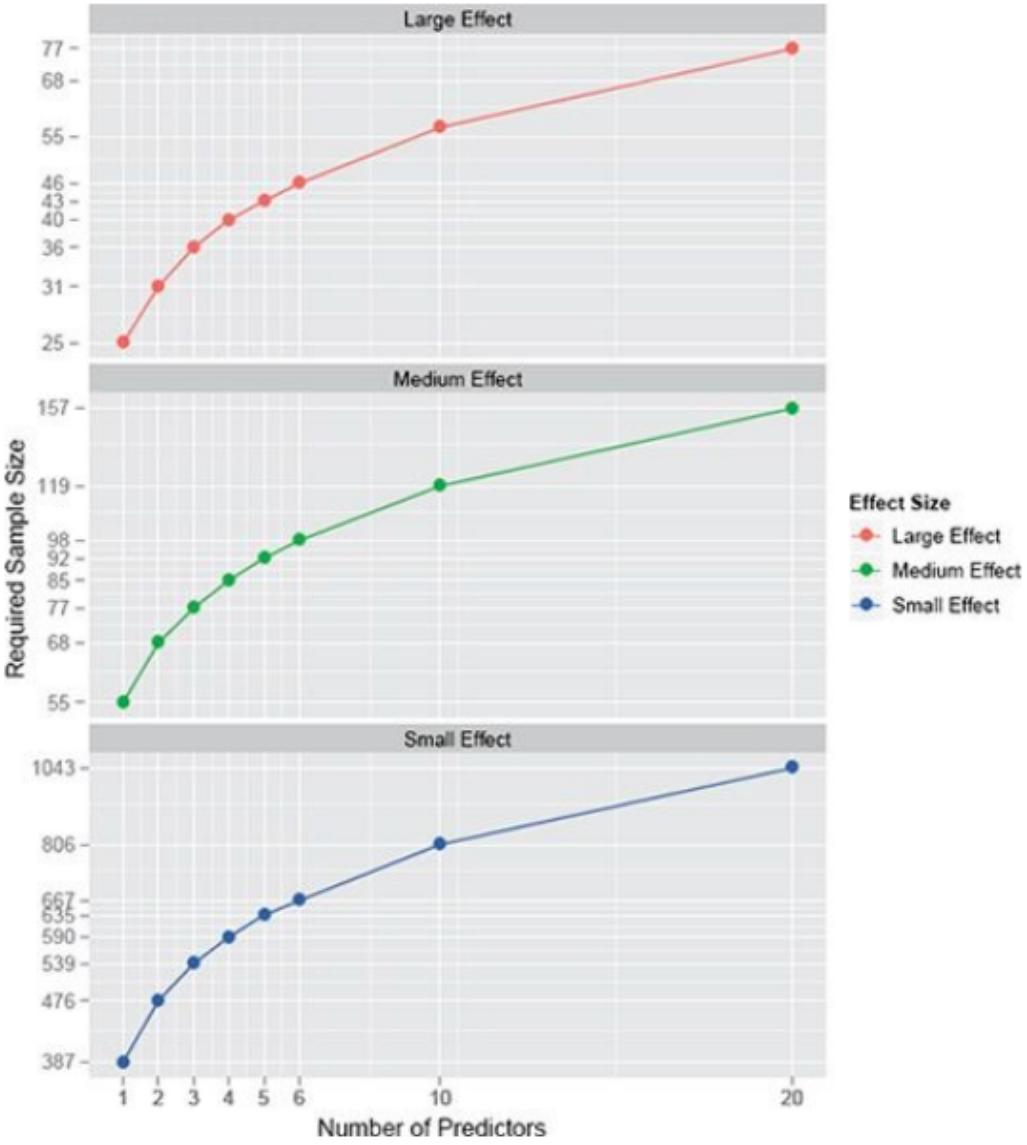


Figure 2: Sample size required to test the overall regression model depending on the number of predictors and the size of the expected effect (Field, 2013).

3.6 Scale development methodology and measurement

The major concern of this study is the perceived influence of human capital investments on innovation success. Thus, the research instrument was designed

to measure the attitude of the respondent, based on their cognition and comprehension of the companies' Entrepreneurial Orientation (EO) element of innovation. In essence, the compiled scale based on literature, are to determine the respondents' perception on innovation success in relation to their organisation. The scale compiled for this research study are mostly ordinal in and could be viewed to be less robust by researchers.

The reason for such a view could be that ordinal data depicts ranking and thus perceived to be less robust. The use of Likert scale was imperative to measure the senior employees' judgement and perception with regards to their corporations' innovation success. In other words, these scales attempted to depict the respondents' perception of reality. Most importantly, the respondents find the Likert scale a pleasure, as they offer convenience and simplicity.

3.7 The Independent Variable (IV): Innovation

Entrepreneurship and innovation are central to the global phenomena of new economic development (Kuratko, 2009). One major reason firms innovate is success (Varis & Littunen, 2010). Successful, firms are the ones that have made the basic discovery that innovation drives success (Kuratko, 2009). Thus, in this study, innovation drives and influence performance, therefore, it is the independent variable. In essence performance is dependent on innovation. Consequently, innovation forms part of the strategic orientation of most telecoms firms. Most firms will, in general, focus on one or two components of innovation in creating their strategies. An exploitative innovation in the context of this study could be a new product or new service, or new process or the combination of the three (Ireland & Webb, 2007; Kuratko, 2009; Kuratko, Morris, & Covin, 2011). The scale is a twenty-one item Likert-type survey response format (1=Strongly disagree and 7=strongly agree) measure. The degree and intensity of innovation is assessed by taking the mean score average across the items. Three further

question pertaining to the number of new service, new products, and processes were added to the scale in order to make the scale more robust.

3.8 Dependent Variable (DV): Performance

The performance of the firm is dependent on other variables; thus performance is the dependent variable. The performance scale is derived from the work of (McGuirk, Lenihan, & Hart, 2015; Wang, Sharma, & Cao, 2016; Wang, Wang, & Liang, 2014; Wang & Wang 2012). It is an eleven-item seven-point scale Likert-type measure. Two dimension of perceived performance are measured by the scale. The dimensions are: operational and financial performance.

3.9 Moderating Variable (MV): Human Capital Investments

The Human Capital Theory and investments in human capital have been associated with success in entrepreneurship and innovation (Unger et.al., 2011). Human Capital Investments are perceived to have a direct impact on success. However, the relationship between innovation and success is also moderated by human capital investments. Varis & Littunen (2010), posit that the basis and prerequisite for ambidextrous innovation is the either the creation of new knowledge or the generation thereof. Investments in human Capital are essentially years of Schooling (education), and Experience (Becker, 1993; Becker, 1962; Becker, 1964).

3.10 The research instrument

A research questionnaire was adapted from (Lenihan, & Hart 2015; Wang et.al., 2016; Wang et.al., 2014; Wang & Wang 2012; Kuratko et.al., 2011; Kuratko &

Hodgetts, 1998) specifically to measure the independent variable innovation and the dependent variable performance in the study. A selected amount of scales was used to assess the various constructs and the underlying multiple variables (APPENDIX A).

Furthermore, the sample frame used in this study is regarded to be fairly educated and proficient with the English language used in the survey questions. The major advantage of using an online survey instrument is that the response rate can be fairly desirable since the researcher is able to track the responses and thus is able to send reminders on time. The method proves to be effective as most people prefer digital communication and also that respondents can carry out the survey on their mobile devices such as cell phone and tablet computer in the leisure and comfort of their homes.

Table 2: Literature support for research instrument scales

Scale	Description	Literature Reference
Innovation (product, process, services) Scale {21 items}	The scale is in a Likert-type survey response format (1=Strongly disagree and 7=strongly agree). The degree and intensity of innovation is assessed by taking the mean score, average across the items. Three further question pertaining to the number of new service, new products, and processes were added to the scale in order to make the scale more robust.	Kuratko, Morris, & Covin, 2011; Kuratko & Hodgetts, 1998)
Performance/Success Scale (Operation and financial) {5 Items operational and 6 items financial}	The performance scales measure both operations and financial performance induced by the innovations and human capital of the firm. The scale is in a Likert-type survey response format (1=Strongly disagree and 7=strongly agree). The success resultant of the innovation is assessed by taking the mean score, average across the items.	McGuirk, Lenihan, & Hart, 2015; Wang, Sharma, & Cao, 2016; Wang, Wang, & Liang, 2014; Wang & Wang, 2012

3.11 Procedure for data collection

The data was collected and compiled electronically, using an online Qualtrics Survey Suite. This procedure and method proved to be effective and efficient. Three hundred and thirty-four (334) randomly selected employees in the four chosen companies constitute the sample. Liaison has been done with senior management of the companies to seek a hand of support during the survey process APPENDIX B. The researcher has electronically distributed the survey link directly to the respondents and then a reminder sent after 21 days before closing the survey. Ongoing communication was maintained with senior representatives of the companies as to expedite the survey process. The survey is designed to take a maximum of 15 minutes, however, in practice it took an average of nine minutes for the respondents to complete. Prior to the actual survey, a trial survey with 10 people from a different company has been carried out to test the survey instrument, and also to gauge the responded.

Saunders, Lewis, & Thornhill (2016), indicated that consent to conclude a survey questionnaire does not mean consent to using the information in a way that may prejudice the respondent. They suggest that the respondent be assured that the response will remain anonymous and the data collected to be utilised for the purpose it was originally intended for (Saunders, Lewis, & Thornhill, 2016).

Everybody who responded in the selected companies received a covering letter (Appendix B), indicating the independence, freedom to participate, and also that the study is anonymous. The letter further indicate that the potential respondents could withdraw from the study at any given time for any reason. Together with the letter a consent form will be completed (Appendix C).

3.12 Data analysis and interpretation

Bhattacherjee (2012), describes descriptive statics as, describing, aggregating, and presenting the construct of interest as well as in some instances the associations between the constructs. On the other hand, inferential statistics refers to procedures which are utilised to come or reach a conclusion about the associations between the variables (Bhattacherjee, 2012). Statistical software IBM SPSS Version 24 is used to analyse the data collected together with current resources on quantitative data analysis. Cronbach's alpha coefficients are used to test the reliability of the instrument scale (Cronbach, 1951). To be able to effectively compute factor analysis, the rule of thumb is a minimum sample size of N= 100 is required (Field, 2013). Due to the actual sample N= 81 factor analysis is not carried out to confirm if the manifest variable is related to a latent variable.

According to the theoretical framework proposed in Figure 1, multiple regression computation is deemed to be expedient to test the relationship of the variables. Procedures and consideration indicated by (Baron & Kenny, 1986), are utilised as this study is dealing with a moderating variable. The moderator function of the human capital variable basically partitions an independent variable in subgroups which eventually form domains of effectiveness as with respect to the dependent variable (Baron & Kenny, 1986).

3.13 Psychometric properties of measure scale, validity and reliability of research

In this section we look at reliability and validity which indicates the adequacy and accuracy of the measurement procedures that are evaluated in research studies (Saunders, Lewis, & Thornhill, 2016; Field, 2013; Bhattacherjee 2012).

3.13.1 Validity

In line with the positivist and quantitative approach of this research study, it necessitates the concept of Validity (Saunders, Lewis, & Thornhill, 2016). Validity concept in research is both external and internal (Saunders, Lewis, & Thornhill, 2016; Bhattacherjee 2012). Validity is the extent to which the measure accurately represents the underlying construct which is supposed to be measured (Saunders, Lewis, & Thornhill, 2016; Bhattacherjee 2012). In order to keep a certain degree of accuracy of the underlying construct, adherence to both theoretical and empirical approaches where adhered to. The pilot study in section 13.4 depict the results of the measures applied.

3.13.2 External Validity

External validity refers to how well the results can depict the reality in all relevant contexts(Saunders, Lewis, & Thornhill, 2016), in essence, the question that arises is: can the results be generalised in all relevant context? Logically, the more samples you have, the higher response rate, which should increase the level of confidence with respect findings and be generalizable to other context and similar groupings. The proposed study is based on four diverse telecoms firms in Johannesburg, South Africa, characterised by a fairly large sample size with an expected high response rate. The findings should be generalizable in a corporate context. However, the findings may have a limited generalisability on the telecoms start up space, OTTs' and also on virtual telecoms firms of South Africa.

3.13.3 Internal validity

The concept of internal validity in relation to survey questionnaires constitutes the potential of the research instrument to measure what it is intended to measure (Saunders, Lewis, & Thornhill, 2016). Does what you find on the questionnaire represent the reality of what is being measured? To make sure the instrument used for the survey measures the variable accurately without bias, it is therefore

expedient to use scales items that have been used before by others successfully.

The respondents of this research study are highly educated and they should not have any challenges with respect to cognitive abilities. Hence, method bias should not be a problem. The survey questions are short and the survey takes about 15 minutes to complete, this helps with respect bias, because the survey can be completed whilst the respondent is still focused and motivated.

3.13.4 Reliability

Cronbach's alpha coefficients are utilised to test the reliability of the instrument scale (Cronbach, 1951). A pilot study of 10 sample respondents has been utilised to measure reliability. The Pearson correlation coefficient was run on IBM SPSS in order establish the relationship between the variables.

3.14 Pilot study

The pilot study for this research is based on the survey questionnaire on appendix A, and was administered at one of the leading bank's retail division regional office in Johannesburg. The banks division utilised for the study is affiliated to one of the telecoms firms in this study to some degree. It was expedient to do the study at the division as the author already has access to gatekeepers and the caliber of the human capital at the division. This could potentially be similar to that of those at the telecoms firms in the research study. A different sector than the telecoms sector was deemed to be ok as the main intention of the pilot study was to test and validate the instrument. Despite knowing and having access to the gatekeepers, it proved to be fairly difficult to administer a pilot survey as most employees at senior and executive management level have fairly committed daily schedules.

Due to time constraints, a pilot study entailing 10 management employees at the banks division was carried out particularly to measure the internal validity and

reliability. Only eight of the 10 identified employees completed the pilot survey. The survey questionnaire was generally not completed on time. Despite consistent follow up with the gatekeeper was required. It is understood that most executive are busy. Also, they potentially surfer from survey respondent fatigue as they potentially get many request to complete surveys.

Literature indicates that Cronbach Alpha is a good measure of internal reliability, and the acceptable value are those over 0.7 (Lee, 2016; Cronbach, 1951). Cronbach alpha values higher than 0.8 which are deemed to be acceptable as depicted in Table 3, Table 4 and Table 5.

Table 3: Participative leadership Cronbach Value

Cronbach Coefficient Alpha	
Variables	**Alpha**
Raw	0.885917
Standardized	0.876543

From the pilot study it is clear that the instrument measures the variable quite adequately. These table depicts that the innovation scales and education scales are good measure for the variables.

Table 4: Innovative output Alpha Value

Cronbach Coefficient Alpha	
Variables	**Alpha**
Raw	0.483480
Standardized	0.852626

However, it should be noted that most of the respondents did not answer the section on experience. This is probably due to respondent fatigue. Even though the average time taken to complete the pilot survey was 13.5 minutes. The author would also like to think that time constraints in administering the pilot study were a contributing factor to the poor response rate, hence the last section of the survey was not fully completed.

Other biographical information questions are good and important, however, they do add to length of the questionnaire. Thus some biographical questions in the final survey questionnaire are omitted.

Table 5: Experience alpha value

Cronbach Coefficient Alpha	
Variables	**Alpha**
Raw	0.900883
Standardized	0.904101

The purpose of the pilot study was to establish if respondents will understand the questionnaire and also if there are any flaws on the instrument. Based on their feedback through the gatekeeper some minor adjustment has been made on the final instrument. The 5-point Likert scale proved to be good for data collection purposes. However, due to the profile and perceived cognitive abilities of the responded, a 7-point Likert scale was more expedient, and was utilised on the final instrument.

3.15 Reliability Cronbach's Alpha of the actual study

Table 6 shows the summaries for the reliability alpha values, the standardised values are all over 0.5. Thus, the data is fairly reliable. Similar studies have been done in South Africa were the Cronbach's Alpha were around 0.5 for example in the document by (Scheepers, 2007). However, alpha values of 0.7 to 0.8 are acceptable as a rule of thumb (Bland & Altman, 1997). The application of the research is also important in determining acceptable value, for instance, clinical alpha values will be a minimum of 0.9 (Bland & Altman, 1997). Therefore, for the scope of this research studies, 0.5 alpha value are acceptable as demonstrated by (Scheepers, 2007). As a consequence, in this study major and minor variables with alpha values above 0.5 were considered after confirmation that these values were all good in the pilot study. Single item scales were omitted in the computation of the Cronbach Alpha, the reason being, they are generally unreliable (Gliem & Gliem, 2003)

Table 6: Actual research study reliability summaries for major variables

Variable	Cronbach's Alpha	Cronbach's Alpha Based on Standardised Items	N of Items
Experience	.8	.8	5
Product	.5	.5	3
Service	.8	.8	3
OP	.9	.9	6
FP	.9	.9	5

3.16 Limitations and implication of study

This study's analysis is based on self-reported data from the completed survey

questionnaire by the telecoms firm respondents. The study is based on four diverse telecoms firms in Johannesburg, South Africa, characterised by a fairly small sample size with a low response rate. The findings will be ambiguous to generalize in a corporate context. However, the findings may have a limited generalisability on the telecoms start up space and also on virtual telecoms firms of South Africa:

- Corporate entrepreneurship studies have generally been carried out in the northern hemisphere, hence they are generally Western-centric in perspective. Consequently, most theories are bias to the Northern-centric context, this has a potential to complicate matters during interpretation of the results using theory.
- Telecoms firms with no interest in corporate entrepreneurship and also academics may intently opt out of participating in the survey. Consequently, non-response bias could potentially be heightened and thus the sample will under represent these respondents.
- Self-reporting methods amplify biases in quality of data and also both accuracy and reliability of the data.
- Only mobile telecoms firms were considered in this study due to time constraints, consequently these results will have to be treated with care in all efforts to practically apply it in other telecoms firms and also in generalisation. Moreover, this study is with specific focus to the South African context, therefore, care should be taken in all efforts to apply it in an African context at large and another context as well.
- Due to efforts to make the survey length suitable for respondents to complete, prior to an experience of fatigue, there have been limitations with respect to including mitigating tactic items not necessarily associated with the study. Consequently, the possibility of respondents inflating the scores and also providing normative responses are acknowledged as possible limitation.
- Due to the competitive nature of the Telecoms sector in South Africa, respondents exercised caution and possibly gave normative responses on

the various scale items. More meaningful data could potentially be acquired through longitudinal studies, however, these were beyond the scope of this study. In addition, this study is cross-sectional in nature due to the time constraints.

- The innovation and performance data is principally based on perception of the respondents about their firm. More robust measure and scale items are required for future studies.
- Human Capital Theory is fairly sufficient to be used as proxy for innovation performance, however, control variable which will be both situational and contextual will have to be accounted for.
- Many of the Telecom firms in South Africa are global in their nature, therefore, both global and local business environments have to be accounted for in assessing the innovation performance of the firm. This means a Telecoms firm is South Africa is able to acquire knowledge and innovation from its subsidiary in other regions and thus affecting its performance.
- This study is limited to the three elements of innovation: products, process, and service. Innovation in a technical sense is ambidextrous in nature that is exploitative and explorative. However, this study focuses on the exploitative aspect of innovation.
- A much finer grained scale for measuring innovation and performance is needed in order to fully establish the relationship between innovation and performance in the telecoms sector.

3.17 Conclusion

81 responses for the survey instrument were deemed to be useful for the research study. A medium effect was achieved because of the sample size and the number of predictor variables. The instrument was validated in the pilot study, and it proved to be measuring what it is supposed to measuring. However, the instrument was shortened by removing generic biographical questions in the final version that is to reduce the amount of time it takes to complete.

CHAPTER 4: PRESENTATION OF RESULTS

4.1 Introduction

This section of the research report is concerned with the depiction of the descriptive statistics, then followed by the results of Pearson correlation. Linear regression results are depicted in this section. The moderating effect of human capital on the innovation and performance relationship is also discussed. Moreover, these results form the basis for confirming or refuting the hypotheses 1, 2, and 3. Finally, the summary of the results is then presented.

4.2 Descriptive statistics and normality tests

Parametric statistical methods such as linear regression, Pearson correlation, and F-test require that the outcome variable be approximately and normally distributed for each category. Thus, tests for normality are carried out for this research study and the skewness data and kurtosis data is summarised in Table 7 together with the descriptive statistics (Shapiro & Wilk, 1965).

The skewness of 0.130 (SE = 0.267) and a kurtosis of -0.219 (SE = 0.529) for the human capital investments is used (Doane & Seward, 2011). Innovation data is characterised by the skewness of -0.177 (SE = 0.267) and Kurtosis of 0.361 (SE = 0.529). The skewness for the perceived performance is 0.383 (SE = 0.267) and its kurtosis is 0.361 (0.529).

Visual inspection of the histograms in Figure 3, 4 and 5**,** normal Q-Q Plots Figure 6 and 7**,** and Boxplots Figure 8 associated with the variables of HCI, Innovation, and Perceived performance depict that the scores are approximately normally

distributed, thus the data is suitable and sufficient for the multiple regression correlational analysis which this research report is concerned with (Field, 2013).

Table 7: Major variable descriptive statistics summary

	HCI	Innovation	Performance
N	81.00	81.00	81.00
Mean	14.86	21.10	31.93
Std. Deviation	3.40	4.68	13.92
Skewness	.130	-.177	.383
Std. Error of Skewness	.267	.267	.267
Kurtosis	-.219	.361	-.658
Std. Error of Kurtosis	.529	.529	.529

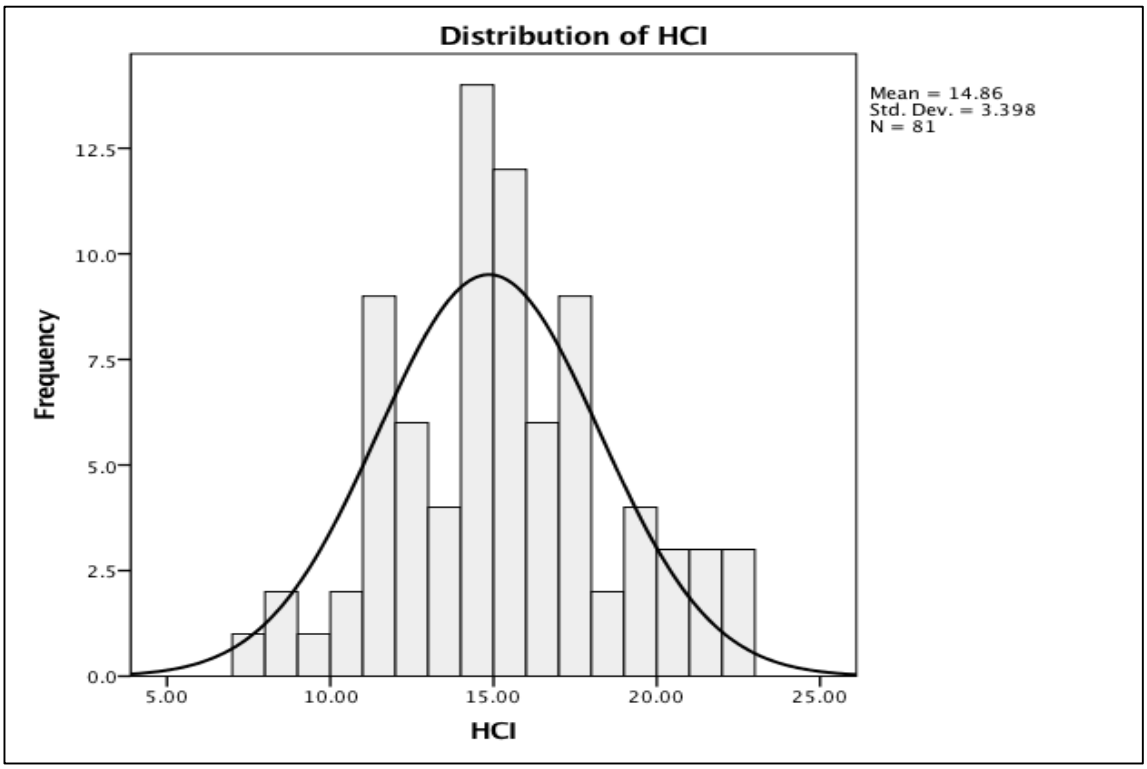


Figure 3: Histogram for Perceived Human Capital Investments

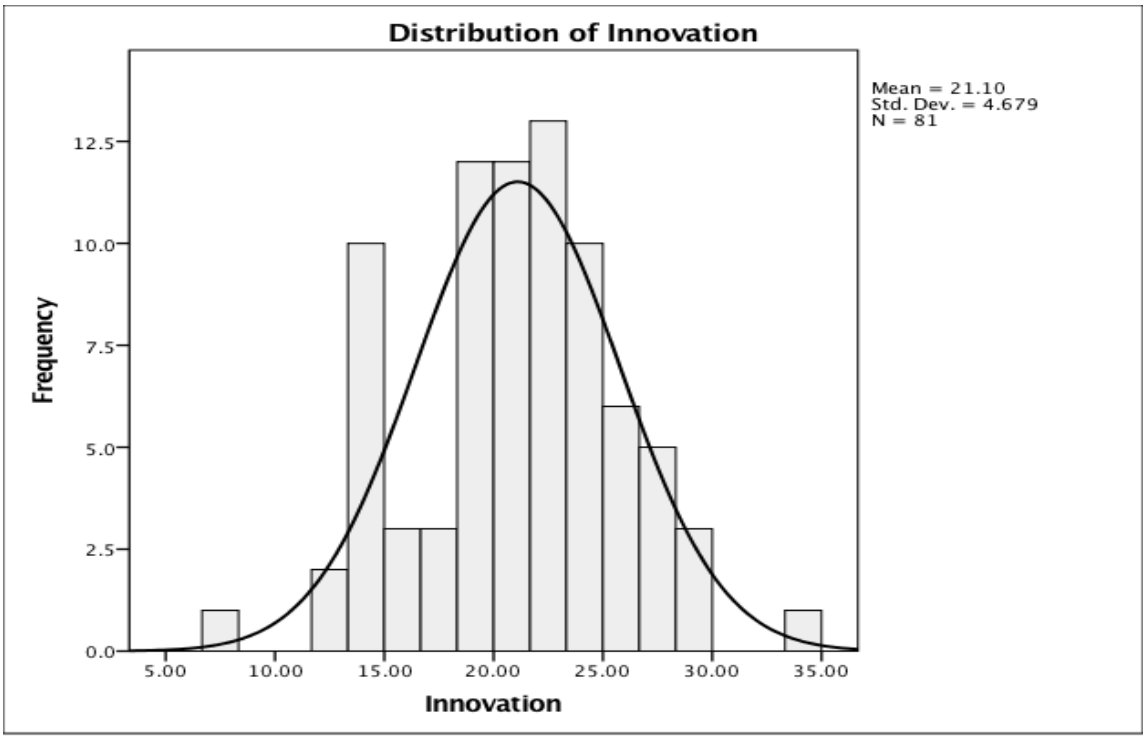


Figure 4: Histogram of Perceived Entrepreneurial Intensity

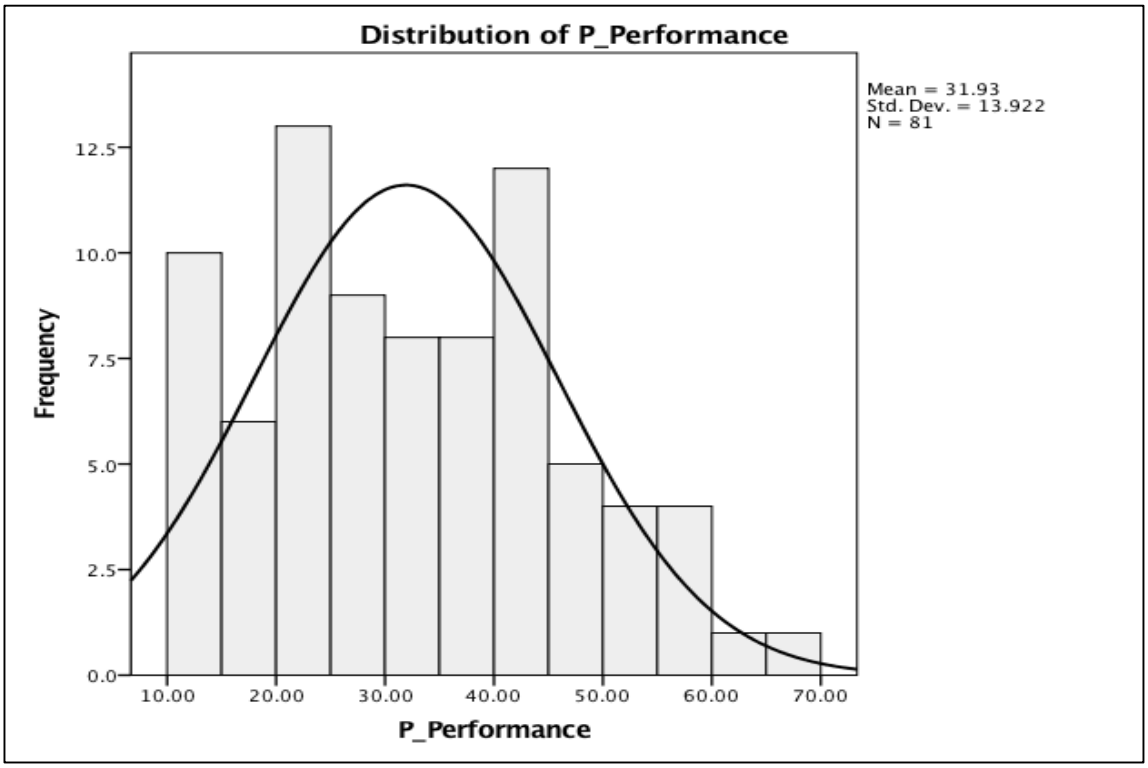


Figure 5: Histogram of Perceived Performance

Furthermore, the Shapiro-Wilk test is used to satisfy the assumption of normality in IBM SPSS, the results are shown below in Table 11(Razali & Wah, 2011; Shapiro & Wilk, 1972; Shapiro & Wilk, 1965). To carry out this test we assume that the null hypothesis for the normality test to be normally distributed. Therefore, the null hypothesis will be rejected if the p-value is below 0.05. Examining Table 11 the p-value is for HCI and Innovation is greater than 0.05 we can therefore keep the null hypothesis thus the data for HCI and Innovation is normally distributed. However, Performance p-value is below 0.05. We therefore look across the table at the Kolmogorov-Smirnov test for the p-value of performance and it is above 0.05 and therefore we accept the null hypothesis for normality test, thus the data for performance is normally distributed (Reschenhofer, 1998; Justel, Pena, & Zamar, 1997; Paramasamy, 1992; Massey, 1967). However, caution should be exercised when using the Kolmogorov-Smirnov test as others use it for historical purposes (Steinskog,

Tjostheim, & Kvansto, 2007). Consequently, the data for Human Capital Investment, Innovation, and Performance are approximately normally distributed, thus suitable for correlational and multiple regression analysis (Field, 2013; Fox, 1997).

Table 8: Kolmogorov-Smirnov and Shapiro-Wilk Test

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
HCI	.101	81	.040	.978	81	.178
Innovation	.084	81	.200*	.983	81	.379
Performance	.095	81	.066	.964	81	.022

**. This is a lower bound of the true significance.*

a. Lilliefors Significance Correction

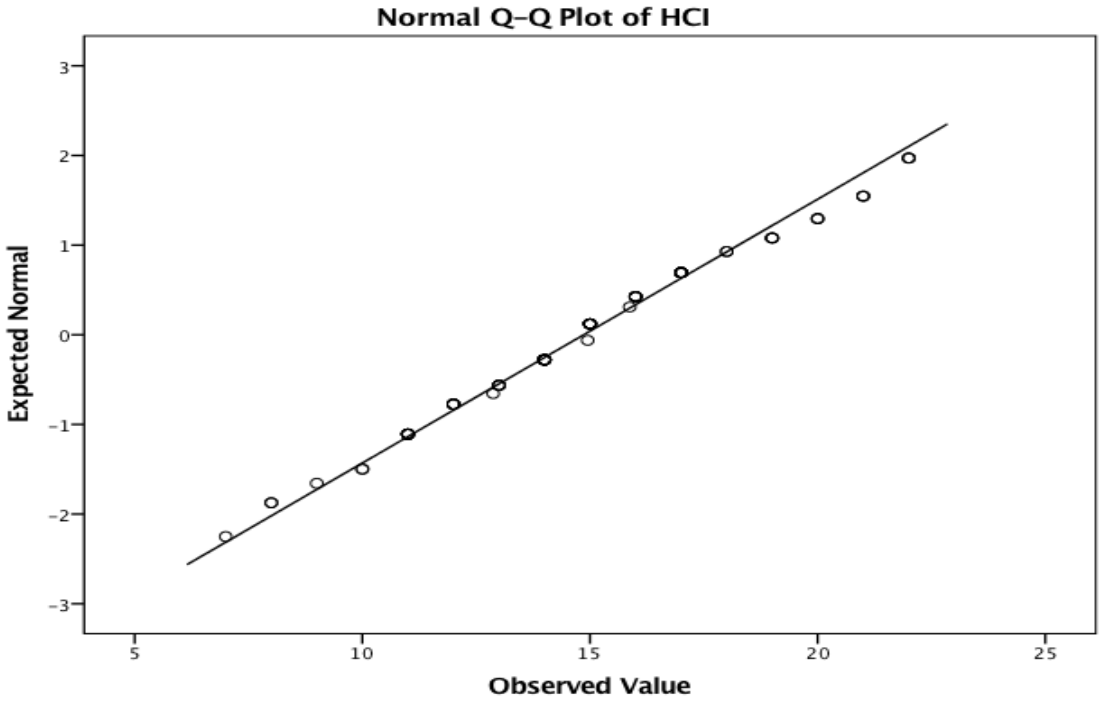


Figure 6: Normal Q-Q plot of Human Capital Investments

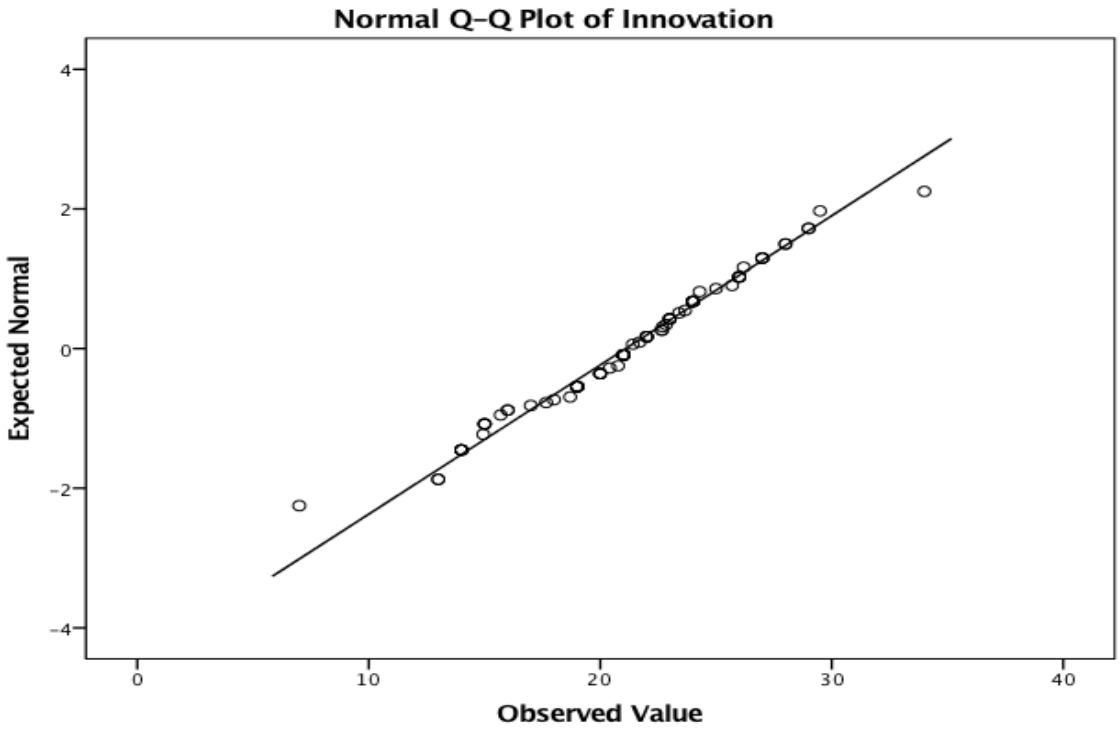


Figure 7: Normal Q-Q Plot of Innovation

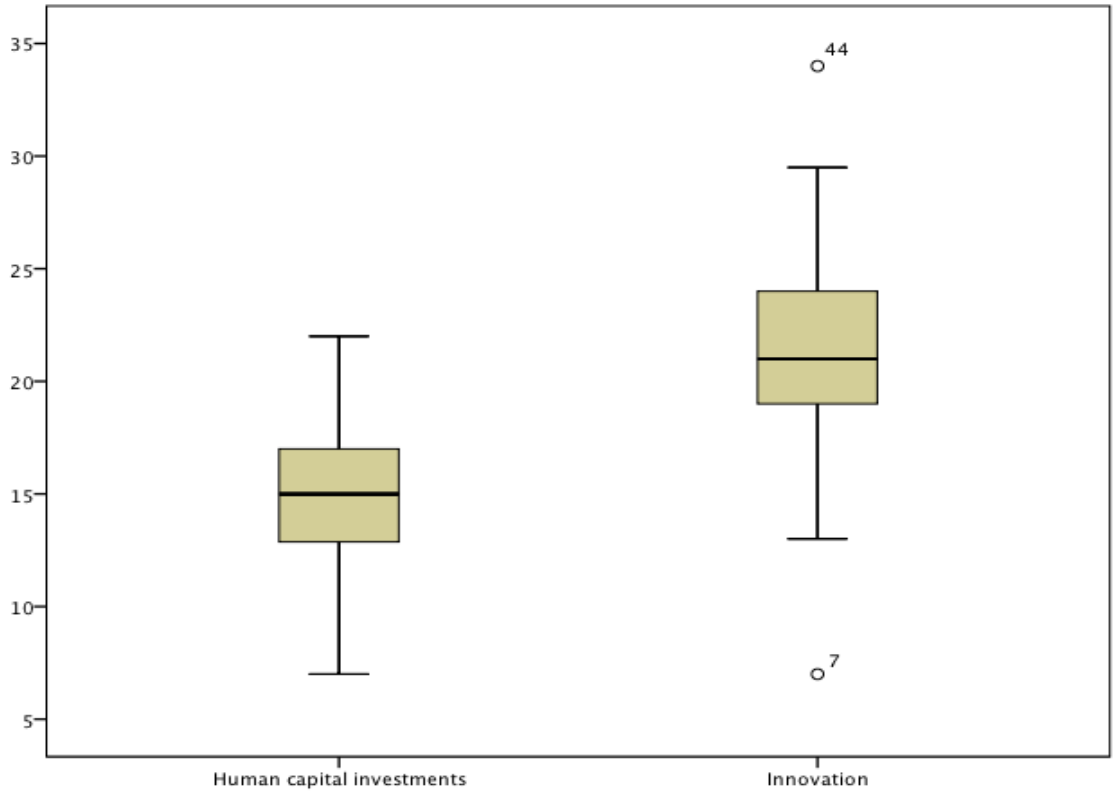


Figure 8: Boxplot of HCI, and Innovation

4.3 Results pertaining to Hypothesis 1

This section of the presentation of the results is concerned with presenting results associated with Hypothesis 1 which states; Innovation has a positive relationship with general performance in the telecoms sector. H1a innovation has a positive relationship with operation performance in telecoms. H1b innovation has a positive relationship with financial performance in telecoms. Essentially, the depiction of the correlational and linear regression tests results is associated with innovation and performance relationship. Table 9 below shows the Pearson correlation coefficient for the variable; innovation and perceived general performance, and the sub variables; operation performance, and financial performance.

Table 9: Pearson correlation matrix: innovation and perceived performance

	1	2	3	4
1 Innovation	1.00			
2 Operational Performance	**.5.75****	1.00		
3 Financial Performance	**.383****	.798**	1.00	
4 General Performance	**.507****	.950**	.946**	1.00

***. Correlation is significant at 0.01 level (2-tailed). N=81*

Innovation characterised by new products, service, and processes shows a positive and statistically significant correlations with; operational performance, financial performance, and general performance. The strongest correlation is between innovation and operational performance (.575, p <.01). However, financial performance shows a moderate association with innovation (.383 p <.01). Furthermore, the performance variables have a very strong correlation with each other.

Linear regression is utilised to create a model of predictors of performance (Fox, 1997; Gupta & Berger, 1986). In line with the hypothesis 1, the model is characterised by two similar models which depict predictors of operational/financial performances of the telecoms firm. The operational and financial performances have a correlation with general performance of .950 and .940 respectively. Thus, the model was based on the operational and financial

variable individually as to extract more meaning.

Table 10: Linear regression model of predictors of Operational Performance

Model		B	95% Confidence interval	SE B	β	ρ
1	**Constant**	-2.19	(-8.51, 4.14)	3.18		.494
	Innovation	0.92	(0.63, 1.21)	0.15	.58	.001
2	**Constant**	-7.90	(-15.54, 0.26)	3.84		0.043
	Innovation	0.80	(0.50, 1.10)	0.15	.50	.001
	EI Company	0.45	(0.09; 0.81)	0.18	.24	.015
3	**Constant**	-16.41	(-23.94, -8.88)	3.78		.001
	Innovation	0.67	(0.40, 0.44)	0.13	.42	.001
	EI Company	0.09	(-0.25, 0.44)	0.17	.05	.592
	EI Management	0.93	(0.55,1.30)	0.19	.45	.001

Note: R^2= .33 for model 1 (ρ=001) F=39.11; R^2= .38 for Model2 (ρ=.015) F= 6.218; R^2= .52 for Model 3 (ρ=001) F=24.37

Table 9 depicts the linear regression model focused on the predictors (innovation, management, entrepreneurial intensity, and company entrepreneurial intensity) on operational performance. The overall model fit is fairly good R^2= .52, adjusted

R^2= .511 and F= 24.37 ρ=0.001 which is statistically significant. Durbin Watson statistic of 2.06 showed a low autocorrelation. Moreover, the normal residual plots were shown and were homoscedastic. Approximately 49% of the operational performance is explained by other factor or variable which are not on the model or study. However, Innovation is a fairly good predictor of operational performance as its accounts for 33% of the operational performance.

Table 11: Linear regression model of predictors of Financial Performance

Model		B	95% Confidence interval	SE B	β	ρ
4	**Constant**	2.28	(-4.59, 9.16)	3.46		.511
	Innovation	0.59	(0.27, 0.91)	.16	.38	.001
5	**Constant**	-3.61	(-11.95, 4.74)	4.19		0.392
	Innovation	0.46	(0.13, 0.79)	.16	.30	.006
	EI Company	0.46	(0.07, 0.85)	.20	.25	.021
6	**Constant**	-9.69	(-18.63, -0.76)	4.49		.034
	Innovation	0.37	(0.053 ,0.69)	.16	.24	.023
	EI Company	0.21	(-0.20, 0.62)	.21	.11	.315
	EI Management	0.66	(0.22, 1.11)	.22	.33	.004

Note: R^2= .14 for model 4 (ρ=001) F=13.52; R^2= .20 for Model 5 (ρ=.021) F= 5.54; R^2= .28 for Model 6 (ρ=004) F=8.87

Table 10, depicts the linear regression model focused on the predictors of financial performance of the telecoms firm. The overall model fit is fairly moderate R^2= .28, adjusted R^2= .26 and F= 8.87 ρ=0.004 which is statistically significant. Durbin Watson statistic of 1.825 showed a low autocorrelation. Moreover, the normal residual plots were shown and were homoscedastic. Approximately 75% of the operational performance is explained by other factor or variable which are not on the model or study. However, innovation is a fairly good predictor of operational performance as its accounts for 27% of the financial performance.

4.4 Results pertaining to Hypothesis 2

This section of the report is concerned with the presentation of the results associated with the hypothesis 2 which states that higher quality human capital investments are positively related to the firm's general performance. H2a Higher quality human capital investments are positively related to the firm's operational performance. H2b Higher quality human capital investments are positively related to the firm's financial performance. In order to test the hypothesised relationship, correlation and linear regression were carried out. The depiction starts with the Pearson correlation output in Table 12**,** and is then followed by the output of the linear regression analysis shown in Table 13**.**

Table 12: Pearson correlation matrix: human capital investments and perceived performance

	1	2	3	4
1 Human Capital Investments	1.00			
2 Operational Performance	**.195**	1.00		
3 Financial Performance	**.029**	.798**	1.00	
4 General Performance	**.288**	.950**	.946**	1.00

***. Correlation is significant at 0.01 level (2-tailed). N=81*

Two of the performance variable significantly do not correlate with human capital investments. In this relationship the strongest correlation is between human capital investments and general performance by a weak relationship (.288, *p* <.05). Moreover, financial performance shows a much weaker association with human capital (.029 *p* <.05). Furthermore, the operational performance variables have a weak correlation with human capital investments (.195 *p* <.05).

Table 13: Linear regression model of perceived impact of HCI on firm operational performance.

Model		B	95% Confidence interval	SE B	β	ρ
7	**Constant**	13.10	(8.13, 18.97)	2.50		.001
	Experience	0.41	(-0.05, 0.87)	0.23	.19	.084
8	**Constant**	11.67	(2.43, 20.95)	4.65		.14
	Experience	0.43	(-0.05, 0.92)	0.24	.21	.080
	Education	0.24	(-1.09, 1.58)	0.67	.04	.719

Note: R^2= .037 for model 7 (ρ>0.05) F=3.07; R^2= .039 for Model 8 (ρ>0.05) F= 0.13

To understand and explain the statistical variance of the outcome variable which is the perceived performance based on the perceived influence of the predictor variable, human capital a linear regression analysis was computed. For the computation of the regression analysis an enter method was utilised to assess the relationship (Field, 2013).

Table 14 depicts the linear regression model focused on the predictors of operational performance of the telecoms firm. The overall model fit is very weak, with R^2= .037, adjusted R^2= .037 and F= 3.07 ρ>0.05 which is statistically significant. Therefore, the predictor variable does not predict the dependent variable. This is further confirmed by the t-test indicating that the independent variables education and experience do not help predict the financial performance

of the telecoms firm. Durbin Watson statistic of 1.764 showed a low autocorrelation. Moreover, the normal residual plots were shown and were homoscedastic. Approximately 97% of the operational performance is explained by other factor or variable which are not on the model or study. The regression analysis result show that there is weak to no association between the predictor and outcome variable. The absence of multicollinearity is explained by VIF=1.09 and, collinearity tolerance of .912.

Table 14: Linear regression model of human capital investments impact on firm financial performance

Model		B	95% Confidence interval	SE B	β	ρ
9	**Constant**	13.62	(8.756, 18.50)	2.45		.001
	Experience	.105	(-0.35, 0.56)	0.23	.05	.645
10	**Constant**	15.45	(6.39, 24.51)	4.55		.001
	Experience	0.71	(-0.41, 0.55)	0.24	.04	.77
	Education	-0.31	(-1.62, 1.00)	0.67	-.06	.64

Note: R^2= .003 for model 1 (ρ>.05) F=0.21; R^2= .006 for Model2 (ρ>.05) F= 0.22

Table 14 depicts the linear regression model focused on the predictors of financial performance of the telecoms firm. These results are closely similar to those of model 7 and 8. The overall model fit is very weak, with R^2= .006, adjusted R^2= -

0.020 and F= 0.22 ρ>0.05 which is statistically significant. Therefore, the predictor variable does not predict the dependent variable. This is further confirmed by the t-test indicating that the independent variables education and experience do not help predict the financial performance of the telecoms firm. Durbin Watson statistic of 1.537 showed a low autocorrelation. Moreover, the normal residual plots were shown and were homoscedastic. Financial performance of telecoms firms is explained by other factor or variable which are not on the model or study. The regression analysis result show that there is no association between the predictor and outcome variable. The absence of multicollinearity is explained by VIF=1.09 and, collinearity tolerance of .912.

4.5 Results pertaining to Hypothesis 3

Greater human capital investments positively moderate the nexus between innovation and general performance. In the results pertaining to hypothesis 1 there was a positive association between the relationship of innovation and performance. Also with respect to results associated to the preceding hypothesis 2 the results showed no association between human capital investments and performance. However, it's possible for a statistical linear regression model to include a product effect of two or more variable (also known as moderation) on the outcomes (Field, 2013; Baron & Kenny, 1986).

In this research study, it is then expedient to assess if there is any interaction effect from the combine variables of innovation and human capital on the outcome variable performance. It was then expedient to use the process tool by (Hayes, n.d.). This tool can be plugged in into IBM SPSS statistical software, and thus rendering the computation of moderation in SPSS more robust and efficient. In addition, it does simple slope analysis.

Table 15: Moderation regression model on effect of HCI on the predictor and predicted variable

Model		B	95% Confidence interval	SE B	t	ρ
11	**Constant**	31.85	(28.87, 34.83)	1.50	21.26	.001
	HCI	-0.30	(-1.18, 0.58)	0.44	-0.67	.504
	Innovation	1.59	(0.96, 2.22)	0.32	5.03	.001
	Moderation (INV X HCI)	0.014	(-0.169, 0.196)	0.09	0.15	.883

Note: R^2= .262, F=9.28, P=.001

The combine variables of innovation and human capital investments showed that there is no statistical interaction effect on performance as shown Table 15. R^2 showed zero change due to moderation effect. There is no moderation in a statistically significant effect on the interaction between innovation and human capital investments as depicted on the Table 15**.** However, the conditional effect of the moderator value which is the interaction of innovation and human capital investments is statistically significant as depicted on the Table 16 below.

Table 16: Conditional effect of X on Y at values of moderator

HCI	EFFECT	t	ρ
-3.40	1.54	3.70	.000
0.00	1.59	5.03	.000
3.40	1.63	3.48	.001

HCI at low regression coefficient will have statistically significant relationship with performance as shown in Table 22. Furthermore, as we move up the continuum of the regression coefficient, HCI will have a statistically significant relationship with performance. Higher up the continuum, the relationship is still statistically significant, however, it begins to move towards insignificance.

4.6 Summary of the results

The preceding sections of the report depicted the descriptive statistics of the major variable. It will further depict the assumption that needs to be adhered to, in order to carry out multiple regression analysis. The data proved to be normally distributed, and with a handful outliers that were corrected. Absence of multicollinearity was confirmed and the residual plots shows normality and homoscedasticity.

Innovation was strongly correlated to the variables of performance and the individual variables of entrepreneurial intensity were also strongly correlated with

each other. Dummy variable were created for the age of firm and size of the firm and they showed weak association with performance.

The most pervasive predictor of performance showed to be innovation as confirmed by the linear regression analysis. Furthermore, the regression analysis showed that human capital investments and its variables are weaker predictors of performance. Human capital investment proved not to moderate the relationship between innovation and performance.

CHAPTER 5: DISCUSSION OF THE RESULTS

5.1 Introduction

This section of the report is more concerned with the discussion of the results. This is achieved by briefly discussing the demographic profile of the respondents in relation to the main research question. This is then followed with the discussion pertaining to the three hypotheses as supported by literature and the results section – i.e. chapter 4 of this report. The results support some of the arguments in the literature appraisal section of the study. These results, show that innovation has a perceived direct impact on perceived performance. Human capital investments are, therefore, not suitable as direct predictors of perceived performance or have any moderating effect on the nexus between innovation and performance. However, the outcomes and task relatedness of human capital integrated with the investments will potentially have in effect. These were beyond the scope of this research study.

5.2 Demographic profile of respondents and descriptive statistics

The convenience research sample of this study is characterised by executive and senior management personnel of four major mobile telecoms firms founded and operating in South Africa. The two oldest firms in this study were founded between 1993 and 1994, and the two younger firms were founded in 2001 and 2009 respectively. The older firms account for almost 75% of the mobile telecoms market.

Figure 9 below shows and summaries the achieved proportional response rate for the survey after. The responses received by age is 56% for the older firm and

36% of the responses are from the younger firms and the 10% is from respondents who opted to remain anonymous. It is imperative to also indicate that the total number of responses were 108 from the 334. A gross response rate of 32% and a net response rate of 24% shown in Figure 10. However, 27 of the responses were not used for this research as they had statistically significant missing data points. In other cases, the reverse questions answers were used to eliminate responses that could potentially not be an accurate representation of the perception of the respondents. The gross response rate of 32% is fairly good, as most executives have busy schedules and will generally experience survey fatigue. Similar studies as this have been carried out with response rates as low as 11%.

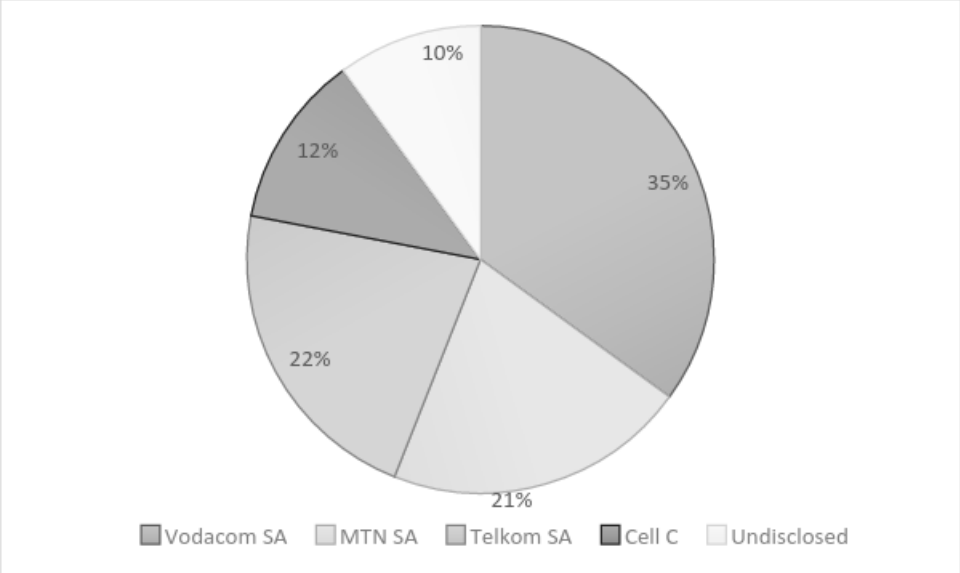


Figure 9: Proportional response rate

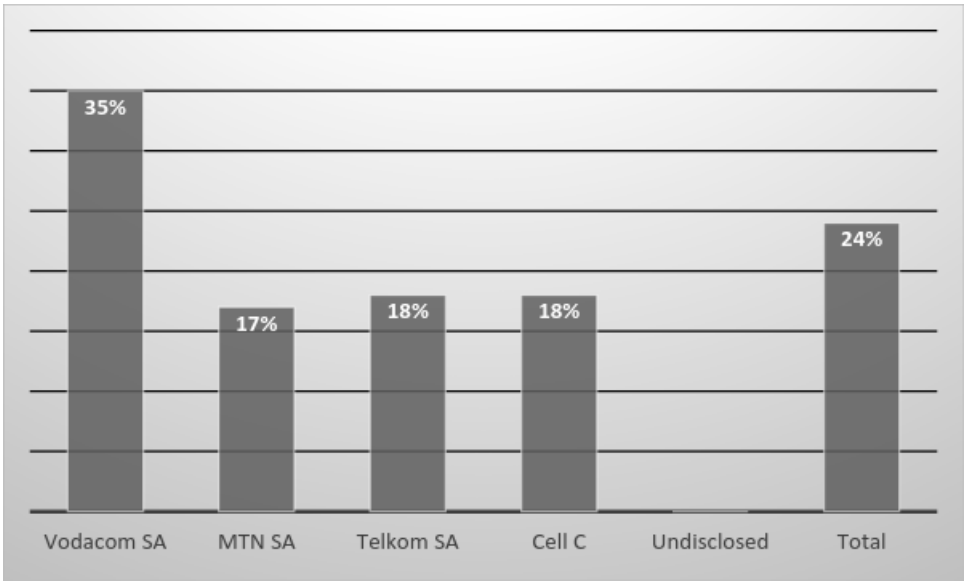


Figure 10: Response rate

The designation by company of the respondents is summarised below in Figure 11**.** The most pervasive designation of the respondent is IT with 40%, followed by 19% general management shown in Figure 12. Professionals in the fields such as accounting, finance, economics, and other accounted for 15% of the responses depicted in Figure 12. Sales was at 9% and engineering, customers service, and human resources represented 5% respectively for the respondents. It is also interesting to note that only 1% of the respondents accounted for research and development. This could be suggestive of the possibility that telecoms firms in South Africa are reactive to innovation, as opposed to driving innovation.

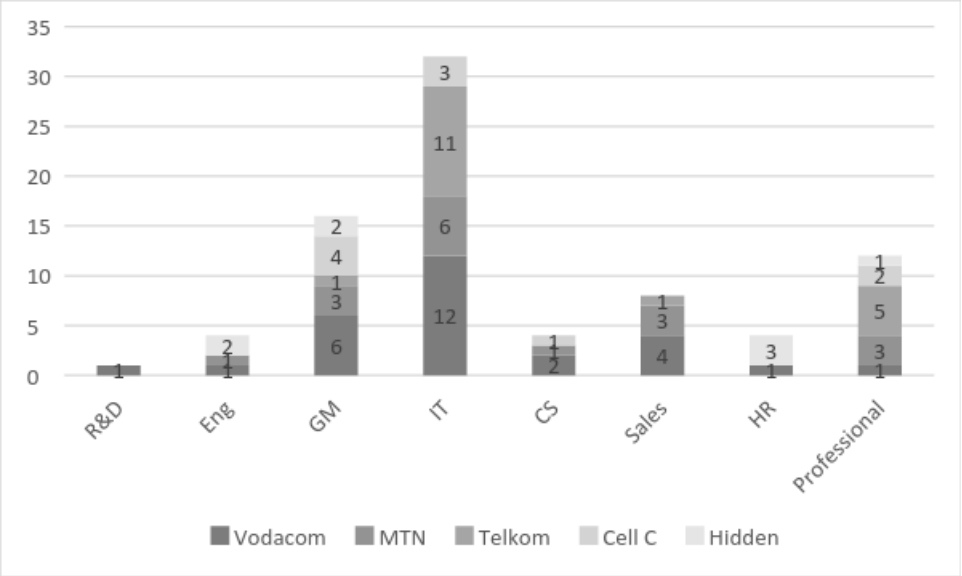


Figure 11: Respondent designation by company

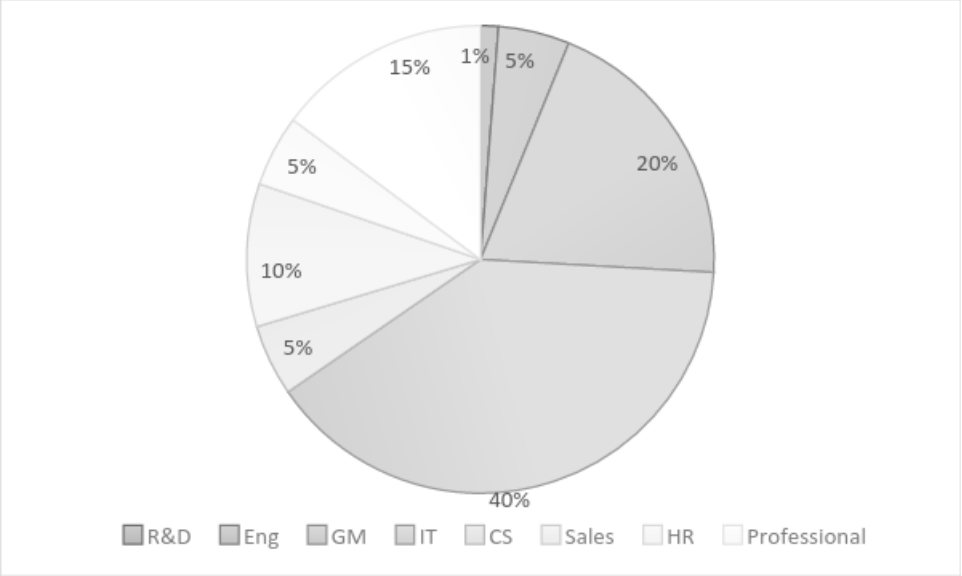


Figure 12: Designations of respondents

The assumptions of; linearity, normality of variable, normality of errors, and homogeneity of variance were made in order to carry out Pearson's correlations, linear regression, and F-test as required to test for the hypotheses 1 to 3. The

data for the major variables showed to be skewed and kurtotic, for both human capital investments and innovation. However, did not really differ significantly from normality. The histogram, Q-Q normality plots, and box plots depicted approximate normality of data with respect to the major variables.

The relationship between innovation and performance amongst the firm's employees survey for the study were compared. It appears that the perceived innovation and performance is minimised as the firm ages and also as the number of subscribers increases so the level of innovativeness diminishes. Thus, younger firms which are less than 20 years old experience the most perceived innovation and performance. Furthermore, firms with less than 25000 subscribers tend to experience higher perceived levels of innovation.

5.3 Discussion pertaining to Hypothesis 1

This section deliberates on the perceived positive relationship of innovation with firm performance. It further identifies the significance of innovation on performance. In the literature review Innovation is considered to be significant predictor of performance. This study, therefore, further confirmed the perceived influence of innovation on performance in the telecoms sector of South Africa.

Innovation is an applicable variable in predicting the perceived performance of the telecoms firm in South Africa. Innovation is also strongly associated with operational and financial performance of the telecoms firm. Thus, hypothesis 1 is supported and in line with theory, these study findings do support the notion that corporate entrepreneurship is imperative for the performance of the telecoms firm. This will further give the firm a competitive advantage. It is fairly logical to assume that innovative firms remain relevant and competitive, just as the seminal work of (Schumpeter, 1934) postulated. These findings are critical in that they

confirm that the management's innovativeness is directly associated to the performance of the telecoms firm.

5.4 Discussion pertaining to Hypothesis 2

Human capital investments variable which are measured by educational and experience are not direct predictors of innovation performance in the telecoms sector of South Africa. However, research has revealed that outcomes of the investments in human capital could be perceived as a more direct predictor of innovation success. This could possibly be translated to the telecoms sector too.

The seminal work of Becker and theory of human capital's main focus principally was on the investments, such as years of schooling and number of years in a particular vocation (Becker, 1993; Becker, 1964; Becker, 1962). This studies were to determine the association of years of schooling and the salaries associated with it. However, (Peteraf, 1993; Amit & Schoemaker, 1991; Barney, 1991) showed in their work that resources that are valuable, specific, and also very difficult to replicate potentially provide the foundation of the firm's' competitive advantage and performance. Thus, investments in human capital are not the best direct predictors of competitive advantage or performance for the firm.

These research finding are supported by arguments from (Hitt et al.,2001), suggesting that firm knowledge and its ability to generate firm specific knowledge are the heart of the theory of the firm (Spender, 1996). It has been depicted by (Zarutskie, 2008) that specific human capital in the form of education in various academic fields is not a solid or robust predictor of the firm performance. Based on this view, the outcome of years of schooling, which is knowledge, is more imperative compared to the investment in education. This thought is taken further

by (Grant, 1996) indicating that knowledge has a more imperative benefit in the company. However, a distinction in knowledge can be made to indicate that knowledge in both tacit and articulate. Zarutskie (2008), further noted that general knowledge which is an outcome of the investment in education could be a better proxy to predict the firm's performance.

This study further depicted that human capital investments have much less direct influence on financial performance of the firm when compared to operational performance. This variance could be due to the cost of superior human capital. This is because individual employees with higher human capital investment will generally command higher salaries (Becker, 1993; Becker, 1964 & Becker, 1962). Consequently, this affected the financial performance of the firm when compared to operational performance. Therefore, an assumption of a rather wavy relationship of human capital investments on performance will be more logical. This thought is supported by the work of Hitt et al., (2001). The human capital investments of the telecoms firm are not necessarily a direct fit for the innovation activities of the firm. Hypothesis 2 is not supported.

5.5 Discussion pertaining to Hypothesis 3

Human capital investments variable of educational and experience do not have a direct moderating effect between the nexus of innovation performance in the telecoms sector of South Africa. This reveals an imperative finding which is human capital investments do not have a moderating effect in the nexus between innovation and performance. Therefore, the question arises: what are other human capital variables that will have a moderating effect on the innovation performance nexus in the telecoms sector of South Africa? The outcomes of the investment in human capital and the task relatedness of the outcome will potentially have the moderating effect. However, this was not tested as it was beyond the scope of the study.

Researchers such as (Hitt et al., 2001; Peteraf 1993; Amit & Schoemaker, 1991; Barney 1991) indicate the notion and human capital interact with strategy, thus producing positive results for the firm. Innovation is a strategic tool for a firm to compete. It is fairly logical to assume that the interaction of human capital with innovation will produce positive results. However, this results contradict such an assumption.

Nevertheless, in this research study human capital investments variable of educational and experience do not moderate the nexus between innovation performance in the telecoms sector of South Africa. In the discussion of results pertaining to hypothesis 2, the argument is that human capital investments are not direct predictors of innovation performance. Similarly, this discussion pertaining to hypothesis 3 investments in human capital, will not have a moderating effect. However, outcomes of the investments in human capital and the task relatedness of human capital can have the moderating effect. These were, however, not tested, as they are beyond the scope of this study.

These results further support the notion of human capital investment on their own that do not necessarily predict the success of a firm. However, their composite with outcomes and task relatedness variables interacting with innovation would potentially have a perceived impact on the innovation performance nexus. Hypothesis 3 is not supported.

5.6 Conclusion

The findings of this research study are imperative because they suggest that human capital could potentially have complex relationship with the predictor and outcome variable. Furthermore, these results provide evidence for empirical studies and theoretical understanding of the resource based view. Moreover, the

practitioner in the field cannot assume that superior human capital investments will automatically translate to performance. Rather, the outcomes of these investments measured in knowledge, and skill acquired are more important for the performance of the telecoms firm.

Based on the statistical analysis and literature, Table 19 depicts the conclusion with respect to the hypotheses as laid out in the literature review chapter 2: Literature Appraisal. Innovation in the telecoms sector is perceived to be associated with a positive relationship with the firm performance. Innovation is a statistically significant predictor of perceived performance in the telecoms sector of South Africa. These finding are in line with previous research findings. In addition, younger telecoms firm depict higher innovation and performance mean. The revised model for this study is depicted below in Figure 3 without the human capital investment variables.

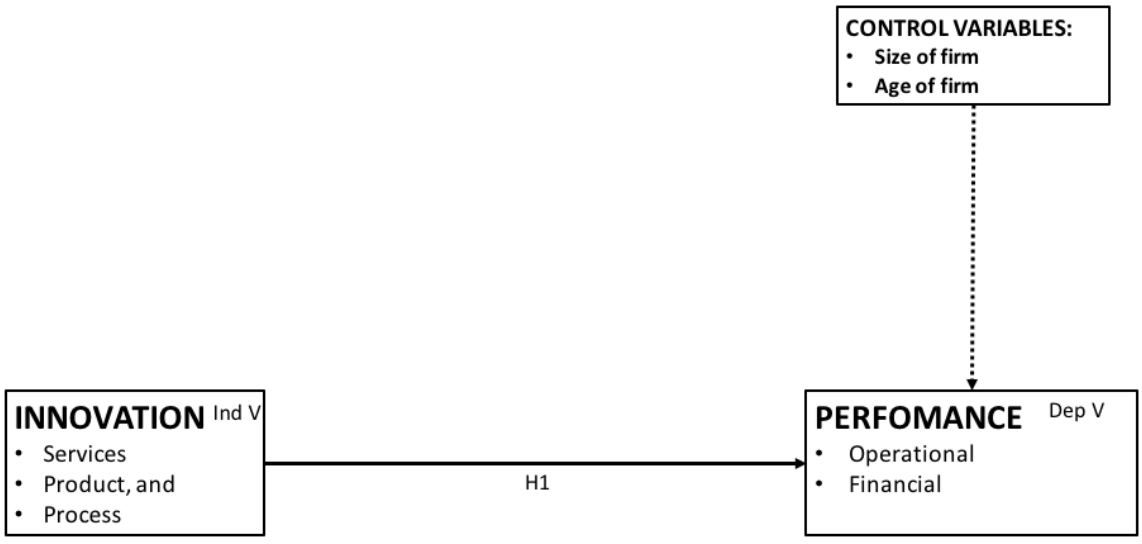


Figure 13: Revised model for the study

However, human capital investments (education level, and experience) show no relationship with perceived performance in the telecoms sector. Older telecoms firms associated with fairly educated and experienced personnel showed a

perceived lower performance when compared to younger telecoms firms. Lastly, there is minimal to no perceived effect of the moderation of human capital investment on the relationship between innovation and performance.

The management entrepreneurial innovativeness mean score is directly associated with the perceived performance of the telecoms firm. However, the human capital investments do not directly fit with the innovation activities of the telecoms firm.

Table 17: Summary conclusion drawn with respect to the hypotheses

Hypothesis	**Outcome**
Hypothesis 1	Supported
Hypothesis 2	Not Supported
Hypothesis 3	Not Supported

CHAPTER 6: CONCLUSION, IMPLICATIONS, AND RECOMMENDATIONS

6.1 Introduction

The pursuit to understand the moderating effect of human capital investments on the nexus between innovation and performance in the telecoms sector in South Africa is the first of its kind. Therefore, these findings of this study do bring new knowledge to both the business and academia. This final chapter of the research report study provides the conclusion of the study findings, the implications and recommendations for the workers in the field and the practitioner in the corporate. Suggestions for further research studies are made.

These conclusions are important as they provide further direction for the researcher, and also practitioners in the corporate world are guided with respect to the limitations and generalisability of the finding. The practitioner in business could possibly review the human capital investment of the firm, and try invest in human capital that fit to the innovation strategies of the firm.

6.2 Conclusions of the study

Human capital investments are not associated with telecoms firm performance in the South African context. That is because the outcomes of human capital and also its current task relatedness is more critical for firm performance. Furthermore, human capital investments and its variables of education and experience do not moderate the nexus between innovation and performance. However, the outcomes and task relatedness of the human capital investments will potentially moderate the relationship between innovation and performance. On the other hand, innovation does have a statistically significant association with

telecoms firms' performance. An assumption of a rather wavy relationship of human capital investments on performance is more logical. This thought is supported by the work of (Hitt et al., 2001).

6.3 Implications and Recommendations

Innovation is ambidextrous in nature, that is it is both exploratory and exploitative. In this study, the main focus is on the exploitative element of innovation. This was achieved by investigating the perceived number of; new; products, services, and processes in the telecoms firm. Therefore, the findings of this study are limited to the exploitative element of innovation and also explore the degree and frequency of entrepreneurship, shown by the innovativeness score. The human capital aspect focuses on the investments element which are shown by level of education and years of experience. A much wider and robust research instrument integrating the major variable in human capital theory is essential for further research studies.

These finding do have implications to business practitioners and the researcher in the field alike, that is for the firm to compete strategically utilising innovation as a tool. It is imperative to understand what aspects of the resources should be allocated to a particular innovation exercise. Human capital investments alone are not sufficient, as the study has demonstrated that these investments do not correlate to the success of the telecoms firm. Telecoms firm will have to focus on firm specific knowledge and these should be difficult to copy or transfer. These findings, also suggest that the outcomes of human capital investments are more important and thus firms should find ways of measuring them. Logically, firms also have to notice that the knowledge gained together with skills should be transferable to the innovative task at hand in order to realise maximum performance.

The first implication is that the findings are limited to the exploitative element of innovation and not the exploratory. The findings are also limited to the human capital investment aspect of the human capital; thus the generalisability is limited. These findings are also limited to the mobile sector of the telecoms sector focusing on voice calls and data. The treat from OTT on the traditional telecoms firm will continue despite telecoms firm's effort to get OTT regulated. Telecoms firms will have to be innovative, therefore will have to relook at the current task relatedness of the outcomes of their human capital investments.

6.4 Suggestions for further research

This research study is an important step towards understanding the perceived impact of human capital on the relationship between innovation and performance at firm level. However, more empirical research study work is required to provide additional robust evidence on the relationship between innovation and performance and also the perceived moderating effect of human capital.

The study intended to investigate the association of the perceived effect of human capital investment on the linear relationship between innovation and telecoms firm performance. The results suggest further work is required and future studies will have to investigate any moderating effects of the other human capital variables. The research studies could actually look at the human capital outcomes construct, looking at the specific variable of knowledge as an outcome of years of schooling, and also look at skill as an outcome of years of experience. Future studies could also try and look at the at task relatedness of the human capital.

A comparison of the human capital direct outcomes and task relatedness amongst firms could also be more important, that is to contribute to resource

based view of the firm (Peteraf, 1993; Amit & Schoemaker, 1991; Barney, 1991). This theory postulate that performance across different firms can be attributed to the variance of the firm's' resources and capabilities. Firm specific knowledge can enhance the human capital influence on the performance of the firm (Hitt, et al., 2001). Consequently, further research work could also look at this aspect in the telecoms sector.

Most researchers indicate that outcomes of corporate entrepreneurship can only be observed over the longer term. Therefore, longitudinal studies should be carried out to test if innovation performance is sustainable over time, as well as ascertain if the cost towards human capital investment can be indeed be offset time.

In order to effectively answer the research question and address the research problem, a qualitative research approach is necessitated. This is because the telecoms sector has fewer companies operating in South Africa, to warrant a robust quantitative positivist approach. The qualitative research approach would also introduce a more humanistic approach, and thus drawing more meaning and generate new knowledge for academia.

Despite the significant findings of this research study, other variables that potentially influence the outcome variable have not been tested in the study. Therefore, the study remains inconclusive, further robust research is required.

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APPENDIX A

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HUMAN CAPITAL INVESTMENTS AND INNOVATION SUCCESS IN THE TELECOMS SECTOR OF SOUTH AFRICA

My Name is Abraham Tshabuse,

I am currently completing a study on "human capital investments and innovation and success in the telecoms sector of South Africa. This study is a major component of the Masters in Management in the Field of Entrepreneurship and New Venture Creation degree (MMENVC), at the Graduate School of Business, University of the Witwatersrand, Johannesburg.

I am requesting a hand of support with respect to you participating in the survey. The survey data is to be used for this academic study analysis and no other purposes. The data collected to be kept secure and confidential. The survey is anonymous and no personal identification information will be requested and also at firm level. I would be happy to present on the findings of the study and also share the abstract upon completion of the study. You are welcome to contact me should you have any questions about the study.

The survey questionnaire will take a few minutes, about of 15 minutes at the most. For reliability and validity purposes kindly please complete all questions and honestly.

My masters' supervisor can be contacted to verify the legitimacy of the study. Dr. Jose Barreira (Research Supervisor): jose.barreira@wits.ac.za.

Thank you so much in anticipation for you time and assistance.

Mr. Abraham Tshabuse: abraham.tshabuse@icloud.com

CONSENT

I ……., hereby agree to participate in research on the human capital investments and on innovation success in telecoms sector of South Africa. I understand that I am participating freely and without being forced in any way to do so. I also understand that I can stop participating at any point should I not want to continue and that this decision will not in any way affect me negatively.

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 and the firm I work for will remain confidential at all times.

……..

Signature of participant **Date**: ……

APPENDIX B

Actual Research Instrument

Q1 Which of the following best describe your designation?

- ❍ Research and development (1)
- ❍ Engineering (2)
- ❍ General management (3)
- ❍ Information technology (4)
- ❍ Customer service (5)
- ❍ Sales (6)
- ❍ Human resources (7)
- ❍ Professional (8)

Q2 Please indicate if you belong to a professional body?

- ❍ Yes (1)
- ❍ No (2)

Q3 Please indicate your highest level of education?

- ❍ Less than high school (1)
- ❍ High school graduate (2)
- ❍ College diploma (3)
- ❍ 3-year degree (4)
- ❍ 4-year degree (5)
- ❍ Master's degree (6)
- ❍ Doctorate (7)

Q4 Have you received any education or training paid for or provided by your present employer over the last 2 years?

- ❍ Yes (1)
- ❍ No (2)

Q5 Please indicate if you started you career in the same field as you are currently?

- ❍ Yes (1)
- ❍ No (2)

Q6 How many years of experience do you have in your current discipline?

Q7 Please describe experience gained to date on the following, by selecting the corresponding item

	A great deal (1)	A lot (2)	Moderate (3)	A little (4)	None at all (5)
Supplier chain (1)	❍	❍	❍	❍	❍
Customer networks (2)	❍	❍	❍	❍	❍
Competitor knowledge (3)	❍	❍	❍	❍	❍
Market knowledge (4)	❍	❍	❍	❍	❍
Product/process knowledge (5)	❍	❍	❍	❍	❍

Q8 Our company is characterized by:

	Strongly agree (1)	Agree (2)	Somewhat agree (3)	Neither agree nor disagree (4)	Somewhat disagree (5)	Disagree (6)	Strongly disagree (7)
A high rate of new product/services introductions, compared to our competitors (Including new features) (1)	❍	❍	❍	❍	❍	❍	❍
An emphasis on continuous improvement in methods of production and / or service delivery (2)	❍	❍	❍	❍	❍	❍	❍
Risk-taking by key executive in seizing and exploring chancy growth opportunities (3)	❍	❍	❍	❍	❍	❍	❍
A "live and let live" philosophy in dealing with competitors (4)	❍	❍	❍	❍	❍	❍	❍
Seeking of unusual, novel solutions by senior executives to problems via the use of "idea people", brainstorming, etc (5)	❍	❍	❍	❍	❍	❍	❍
A top management philosophy that emphasizes proven products and services, and the avoidance of heavy new product development costs (6)	❍	❍	❍	❍	❍	❍	❍

Q9 Please select the item that approximates your response

	Strongly agree (1)	Agree (2)	Somewhat agree (3)	Neither agree nor disagree (4)	Somewhat disagree (5)	Disagree (6)	Strongly disagree (7)
Customer satisfaction of our company is better than that of key competitors (1)	❍	❍	❍	❍	❍	❍	❍
Quality development of our company is better than that of our key competitor (2)	❍	❍	❍	❍	❍	❍	❍
Cost management of our company is better than that of the competitor (3)	❍	❍	❍	❍	❍	❍	❍
Responsiveness of our company is better than that of key competitors (4)	❍	❍	❍	❍	❍	❍	❍
Productivity of our company is better than that of key competitors (5)	❍	❍	❍	❍	❍	❍	❍
Return on investment of our company is better than that of key competitors (6)	❍	❍	❍	❍	❍	❍	❍
Return on assets of our company is better than that of key competitors (7)	❍	❍	❍	❍	❍	❍	❍
Return on sales of our company is better than that of key competitors (8)	❍	❍	❍	❍	❍	❍	❍
Average profitability of our company is better than that of key competitors (9)	❍	❍	❍	❍	❍	❍	❍
Profit growth of our company is better than that of key competitors (10)	❍	❍	❍	❍	❍	❍	❍
Sales growth of our company is better than that of key competitors (11)	❍	❍	❍	❍	❍	❍	❍

Q10 Please estimate the number of new products your company introduced during the past two years…….

Q11 Please select the item that approximates your response

	Much more (1)	Moderately more (2)	Slightly more (3)	About the same (4)	Slightly less (5)	Moderately less (6)	Much less (7)
How many product improvements or revisions did you introduce during the past two years? (1)	❍	❍	❍	❍	❍	❍	❍
How does the number of new product introductions at your organisation compare with those of your major competitor (2)	❍	❍	❍	❍	❍	❍	❍

Q12 Please select the item that approximates your response

	A great deal (1)	A lot (2)	Moderate (3)	A little (4)	None at all (5)
To what degree did these new product introductions include products that did not previously exist in your market ("new to the market") (1)	❍	❍	❍	❍	❍

Q13 Please estimate the number of new services your company introduced during the past two years……

Q14 Please select the item that approximates your response

	Much more (1)	Moderately more (2)	Slightly more (3)	About the same (4)	Slightly less (5)	Moderately less (6)	Much less (7)
How many existing services did you significantly revise or improve during the past two years? (1)	❍	❍	❍	❍	❍	❍	❍
How does the number of new services introduction your company made compare with those of competitors? (2)	❍	❍	❍	❍	❍	❍	❍

Q15 Please select the item that approximates your response

	A great deal (1)	A lot (2)	Moderate (3)	A little (4)	None at all (5)
To what degree did this new service introduction include services that did not previously exist in your markets? (1)	❍	❍	❍	❍	❍

Q16 Please estimate the number of significant new methods or operational processes your organization implemented during the past two years?.....

Q17 Our company top-level decision making is characterized by:

	Strongly agree (1)	Agree (2)	Somewhat agree (3)	Neither agree nor disagree (4)	Somewhat disagree (5)	Disagree (6)	Strongly disagree (7)
Cautious, pragmatic, step-at-a-time adjustments to problems (1)	❍	❍	❍	❍	❍	❍	❍
Active search for big opportunities (2)	❍	❍	❍	❍	❍	❍	❍
Rapid growth as the dominant goal (3)	❍	❍	❍	❍	❍	❍	❍
Large, bold decisions despite uncertainties of the outcomes (4)	❍	❍	❍	❍	❍	❍	❍
Compromise among conflicting demands of owners, government, management, customers, employees, suppliers, etc (5)	❍	❍	❍	❍	❍	❍	❍
Steady growth and stability as primary concerns (6)	❍	❍	❍	❍	❍	❍	❍

Q18 (optional) What is the value of portfolio under your management?.....

Q19 (optional) What is your performance appraisal rating?.....

Q20 My company is:

- ❍ Vodacom (1)
- ❍ MTN (2)
- ❍ Telkom (3)
- ❍ Cell C (4)
- ❍ I rather not say (5)

APPENDIX C

Consistency matrix

Understanding how outcomes human capital investments do impact the relationship between innovation and success in the telecoms sector					
Sub-problem	**Literature Review**	**Hypotheses**	**Source of data**	**Type of data**	**Analysis**
Determine and measure the telecoms firm's entrepreneurial Intensity (EI) and success,	(Kuratko, Hornsby, & Hayton, 2015; Bierwerth, Schwens, Isidor, & Kabst, 2015; Kuratko, Morris, & Covin, 2011).	Innovativeness has a positive relationship with success in the telecoms sector	Primary data from cross sectional survey at the telecoms firm	Likert Scale and nominal	Multiple regression and descriptive statistics
Examine the elements of Human Capital Investments as antecedent to the success of the telecoms firms of South Africa, and	(Carmeli & Tishler, 2004). (Barreira, 2011) (Lawler, 2009) (Carmeli, 2004) (Hambrick & Mason, 1984) (Lucas, 1988) ((Becker S. G., 1964) (Schultz, 1959). (Zarutskie, 2008) (Bosma, van Praag, Thurik, & de Wit, 2004)	Higher quality human capital investments are positively related to firm's success	Primary data from cross sectional survey at the telecoms firm	Likert Scale data	Multiple regression and descriptive statistics
Establish that the top management human capital investments variables influencing the	(Varis & Littunen, 2010) (Marvel, Davis, & Sproul, 2016; Kuratko, Hornsby, & Hayton, 2015; Marvel & Lumpkin, 2007);	Greater human capital investments positively moderate the nexus between innovation and success	Primary data from cross sectional survey at the telecoms firm	Likert Scale	Multiple regression and descriptive statistics

entrepreneurial intensity of the firm.	Bierwerth, Schwens, Isidor, & Kabst, 2015; Kuratko, Morris, & Covin, 2011). (Block, Thurik, & Zhou, 2013)				