The Impact of Cloud Computing on The Innovation Performance of South African SMEs

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 in Entrepreneurship and New Venture Creation

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28 February 2018

ABSTRACT

This study investigates the impact of adoption of cloud computing on the innovation performance of South African SMEs.

Cloud computing adoption amongst SMEs is explored on the back of widespread usage of cloud services in South Africa. Extensive availability of a unique range of features endows SMEs with competitive advantage to achieve superior performance. How then does adopting cloud computing drive performance of SMEs and growth of the South African economy?

By way of an online survey, the degree of adoption of cloud computing, the management attributes of EO and performance are investigated. Spearman correlation and multiple regression analysis is used to test results and adjudicate on hypothesis.

The results show that there is vast adoption of cloud computing in the SaaS rather than PaaS and IaaS cloud service models in South Africa. Findings indicate that the interaction between adoption and EO leads to significant performance in SMEs.

Usage of cloud computing is still at its nascent stages; managers need to recruit IT specialists who have the skills and expertise to configure complex cloud computing deployments. They also need to invest in purposive cloud computing projects that can drive further adoption to enable business growth.

This study contributes to the body of knowledge on cloud computing usage, and the role of EO in the adoption of cloud computing to influence performance in South African SMEs.

Key words: Cloud computing, Entrepreneurial Orientation, innovativeness, risk-taking, proactiveness

DECLARATION

I, _____, 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 field of Entrepreneurship at the University of the Witwatersrand, Johannesburg. It has not been submitted before for any degree or examination in this or any other university.

Abelphard Murimbika

Signed at ……

On the …….. day of ……..…… 2018.

DEDICATION

I dedicate this work to my parents Abel and the late, Rosemary Murimbika, for the sacrifices they made in their lives for me to come this far. I am eternally grateful.

ACKNOWLEDGEMENTS

I wish to extend my sincere gratitude and appreciation to Dr McEdward Murimbika for inspiring me and launching me on this journey of Entrepreneurship, and for the insightful discourse and advise over the years. I also wish to extent appreciation to my supervisor, Dr Diran Soumonni who availed himself to assist me throughout the research process. I would like to express gratitude to my angels, Alissa and Gareth, for the sparkle they have brought into my life. I love you dearly.

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CHAPTER 1. INTRODUCTION

1.1 Introduction

The Fourth Industrial Revolution, or, Industry 4.0, is a phenomenon arising from advancements in industrial processes driven by complex digital manufacturing, network communication and computer and automation technologies (Zhou, Liu, & Zhou, 2015). Advancements in Cyber-Physical Systems (CPS), industrial wireless networks and some other enabling technologies are the propelling force behind the gradual roll out of this revolution (Wan, Hu, & Keliang, 2015). It is a concept for the application of cyber-physical systems based on computing, communications and control technologies to achieve real-time sensing, intelligent production systems, dynamic control and information services (Zhou, Liu, & Zhou, 2015). It has instigated astounding growth in the adoption and advancement of information technology to influence service and product innovation, quality, variety and speed of delivery in business industrial processes (Lee, Kao, & Yang , 2014).

This study investigates the recent advances in information and communication technology and their effect on small business performance in South Africa. The economic impact of the fourth industrial revolution is anticipated to be massive because of its promise to effect substantially increased operational effectiveness and to introduce the possibility for creating entirely new business models, services, and products (Hermann, Tobias, & Boris, 2016).

1.2 Theoretical Background to the Study

The world is on the verge of another industrial revolution. This time, the driver of this revolution is the advances in technology. This industrial revolution is unique; it is unlike the previous revolutions of mechanisation and the discovery of electricity. It is for the first time that a revolution is predicted before it happens (Hermann, Tobias, & Boris, 2016). It is predicted that it will have tremendous impact on industrial development by completely transforming the modus operandi for commercial manufacturing (Wan et al., 2015).

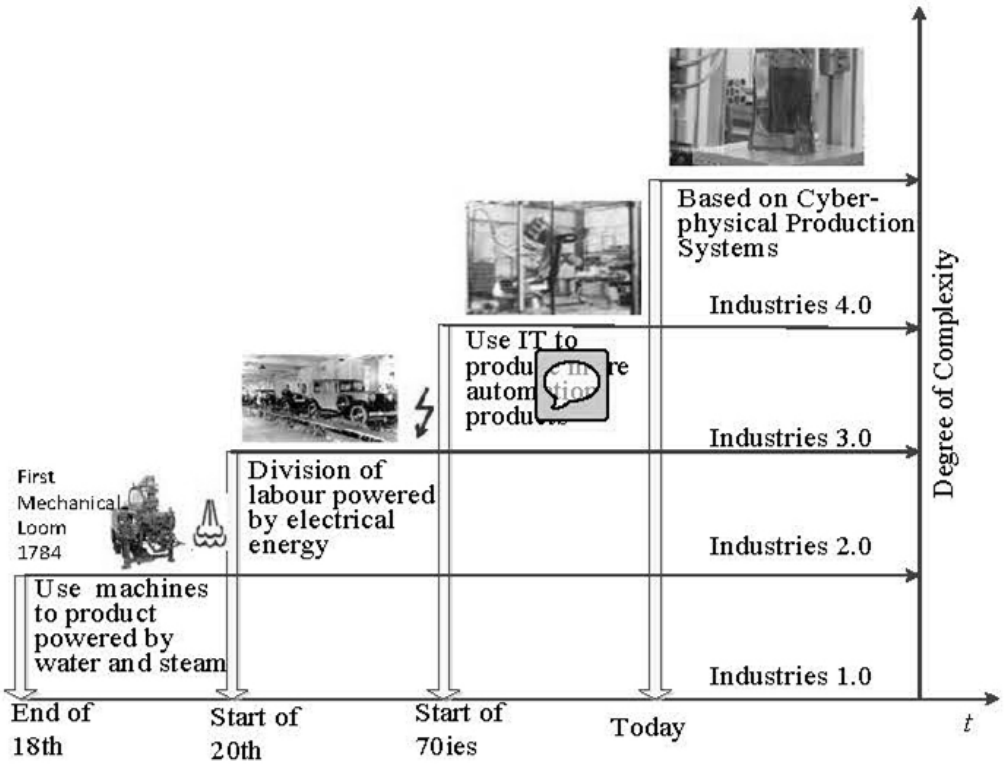


Figure 1 The four-industrial revolution history (Wan et al., 2015).

The digital technological revolution leads one to ask: what effect does being at the fore-front of using cutting-edge technology have on an economy like South Africa? What opportunities arise in South Africa from embracing front-line technology in industrial processes as is currently the case with Germany whose industrial manufacturing chains are already 90 percent supported by ICT (Wan et al., 2015). Industrie 4.0 will significantly drive industrial investments that will lead to increase in productivity, revenue and job creation in the next 5 to 10 years (Rüßmann et al., 2015). Important questions begin to arise, such as the level and extent of preparedness by South Africa to embrace Industrie 4.0 and the benefits thereof.

There are many technological advancements driving Industry 4.0: mobile internet and the internet of things, cloud computing, robotics, 3-D printing, big data, machine learning, virtual and augmented realities and advanced analytical techniques (Zhou, Liu, & Zhou, 2015). Cyber-Physical Systems, Internet of Things, Smart Factory Internet of Services are classified as the main components of Industrie 4.0, while

machine learning, smart products, big data and cloud computing are deemed enablers of Industrie 4.0 (Hermann, Tobias, & Boris, 2016).

Cloud computing provides a fundamental basis upon which Industrie 4.0 is operated. Although it is used to support massive industrial manufacturing, it has simple implementations that can be adopt and leveraged by small business.

This study is based on the premise that for a country like South Africa, businesses that have not embraced simple implementations of technology such as cloud computing lack the preparedness and readiness to fully realise the benefits of Industrie 4.0. SMEs benefit significantly from the promise of cloud computing as it endows them with the means to deliver cutting-edge IT services for significantly low upfront cost investments, permitting them to access and compete at global markets. It is for this reason that this study's pivot is on cloud computing adoption and its effect on the performance of South African SMEs.

1.3 Context of the Study

It is predicted that SMEs make up over 95% of enterprises and account for approximately 60% of private sector jobs the world over (Quartey, Turkson, Abor, & Iddrisu, 2017). In South Africa, SMEs account for a greater share of businesses (Quartey, Turkson, Abor, & Iddrisu, 2017), contributing between 51% and 57% of GDP, and almost 60% of jobs (Abor & Quartey, 2010). However, the stunted economic growth of several years has led to increased levels of unemployment in South Africa, especially amongst youth, (Neves, 2017). Although SMEs create employment, they have limited access to opportunities and markets, both nationally and internationally, because of limited access to capital (Osembe & Padayachee, 2016).

Technology creates new opportunities for businesses to imagine new means ends scenarios, which can eventually spur growth in the economy. A previous study on cloud computing in South Africa concluded that although there is interest amongst South African SMEs to migrate to emerging technologies, the rates of adoption is generally low (Mujinga, 2012). High technology adoption and application amongst SMEs means they can contribute directly to the development of the economy (Hinde & Van Belle, 2012).

1.4 Problem Statement

Studies conducted on cloud computing have mostly focused on factors influencing its adoption; considering factors such as the size of the organisation, the level of competency in ICT skills and the leadership and their propensity to adopt cloud solutions for their businesses (Hinde & Van Belle, 2012).

South Africa has high levels of adoption of cloud computing. Over 50% of businesses in South Africa are already using cloud services, and South Africa is leading Africa in the adoption of cloud computing technology (Muhammed, Zaharaddeen, Rumana, & Turaki, 2015). Interestingly, extant studies show that South African SMEs are leading corporates in cloud computing adoption (Pieterse, 2013). The World Economic Forum's Global Information Technology report of 2015 ranks South Africa in the top 20 of the top cloud computing export markets for the US based on ICT development companies (Dutta, Geiger, & Lanvin, 2015).

Although technology adoption is a complex phenomenon that is influenced by factors beyond the technological, organisational and environmental settings (Alshamaila & Papagiannidis, 2013), how do high levels of adoption of technology such as cloud computing endow SMEs with a superior edge that spurs economic growth? Moreover, how does one comparatively analyse how SMEs in South Africa use cloud computing to inspire innovation in their products, processes and services so that they gain competitive advantage in markets?

According to the Global Entrepreneurship Monitor Report of 2016-2016, innovation in South Africa remains low when compared to other factor driven economies (Kelley, Singer, & Herrington, 2015). What then is the impact of the high levels of adoption of cloud computing on the performance of innovation amongst SMES in South Africa?

1.5 Research Purpose, Research Question and Aims of The Study

This study investigates the effect of adoption of cloud computing on SMEs performance in South Africa. It is on this basis that this study investigated the following questions:

1.5.1 *Main Problem*

To what extent does adopting cloud computing affect the financial performance of South African SMEs?

1.5.2 *Sub-Problems*

- *What factors moderate the relationship between adoption of cloud computing and performance in firms*
- *To what extent does the relationship between adoption of cloud computing and entrepreneurial orientation (EO) influence superior firm performance*

This research seeks to make a comparative study of the extent to which SMEs in South Africa use cloud computing. The study will also investigate the moderating effect of innovativeness, risk-taking and proactiveness behaviours on the adoption of cloud computing, and their resultant effect on performance.

1.6 Conceptual Definition of Terms

The National Institute of Standards and Technology in the US Department of Commerce defines cloud computing as a model for enabling ubiquitous, convenient, on-demand network access to a shared pool of configurable computing resources (e.g. networks, servers, storage, applications, and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction (National Institute of Standards and Technology, 2011). For the purposes of this study, adopting cloud computing entails purposefully utilising cloud-based systems to accomplish enterprise tasks such as procurement, customer relationship management and automation. This type of application is beyond using cloud for email and files storage purposes only.

Cloud computing is offered in three basic architectures

- **Infrastructure-as-a-Service (IaaS)**: The tangible physical computing hardware such as servers, storage devices, networks are in a remote data centre, but are accessible by way of virtualisation through the internet. Providers deliver

computation resources, storage and network as internet-based services. Amazon's EC2 and Single Storage Service (S3) are examples of IaaS providers.

- **Platform-as-a-Service (PaaS):** Instead of buying licenses for operating systems, software development kits (SDKs) and tools like Java, they are available over the internet where cloud providers deliver platforms, tools and other business services that enable customers to develop, deploy, and manage their own applications. Microsoft Windows Azure and Google Apps are the most popular PaaS providers.

- **Software-as-a-Service (SaaS):** Instead of buying licenses to install application software on a client machine and upgrading with updates, cloud providers deliver applications hosted on the cloud infrastructure as internet-based services. Word processing, Customer Relationship Management (CRM) and Enterprise Resource Planning (ERP) applications are examples of SaaS. Quickbooks and Pastel accounting applications are popular SaaS software in South Africa.

Other types of cloud architectures in use as services are SaaS, Database as a Service, Information as a Service, Process as a Service, Integration as a Service, Security as a Service, Management/Governance as a service and Testing as a service (Khan, Iqbal, Ubaid, Amin, & Ismail, 2016).

Cloud computing uses four deployment configurations for organisations namely:

- **Public Cloud:** Which is accessible to the public from a third-party service providers through internet. Public cloud is cost effective for SMEs to deploy IT solutions, e.g. Google Apps.

- **Private Cloud:** Managed within an organisation and is suitable for large enterprises. Although private clouds provide the advantages of public clouds, they still incur capital expenditures.

- **Community Cloud:** Used by and controlled by a group of enterprises with shared interests.

- **Hybrid Cloud:** Which is a combination of public and private cloud.

1.7 Delimitations

This study will be delimited to the following:

- The scope of this study is limited to SMEs that are registered and conducting business in South Africa and that are using cloud computing for their operations.
- This study is limited to use of cloud computing technology only. Other forms of disruptive technology such as artificial intelligence, machine learning, robotics and internet of things are not subjects of analysis for this study.
- By cloud computing adoption, this study refers to purposive use of cloud architectures to perform business tasks. The study investigates use of cloud beyond emails and file storage.

1.8 Contribution of the Study

In South Africa, cloud solutions have become increasingly available, affordable and practical due to highly accessible internet. South African SMEs have the highest access to internet compared to their African counterparts (Pieterse, 2013). Cloud services ranging from office tools such as Office 365 and Google Apps to enterprise resource solutions such as SAGE ERP are widely accessible for SMEs. There is also cloud infrastructure and platforms upon which tailor-made solutions can be created.

The disruptive effect of industry 4.0 has far-reaching implications for industries, sectors and businesses. There is an option to adapt and acquire competitive advantage or be disrupted and wiped out of existence. It has become imperative for businesses to relook their business models and fit with disruptive transformation in their industries and sectors to avoid them being disrupted.

Cloud computing presents SMEs with lower capital investments in powerful and ubiquitous technology resources. Most cloud solutions are available on ‘per-user-per-month' or ‘per-user-per-year' basis, making them highly affordable and flexible for use by SMEs. Access to such resources allow SMEs to be innovative and to participate in local and global markets (Kelley et al., 2015).

In South Africa, there is extensive research on the factors affecting adoption of cloud computing in businesses, but limited knowledge about the extent to which cloud computing influences performance. This study primarily seeks to contribute to the body of knowledge on the effect of adoption of cloud computing and the profitability of SMEs in South Africa. The moderating effects of innovativeness, risk-taking and proactiveness on the extent of adoption and performance are also explored.

This study will also establish the extent to which SMEs in South Africa are using cloud computing. It will also explore the most popular cloud computing architectures and the justifications for their wide usage. This report will categorically posit the influence of cloud computing adoption and applications of emerging technology on the sustainability of SMEs in South Africa.

1.9 Structure of Report

The next chapters debate on the theoretical framework informing this study. The research method, population and sample, the research instrument, data collection and data analysis methods are discussed. The results are then presented, followed by a discussion. Finally, a conclusion that includes implications and recommendations for future research is drawn.

CHAPTER 2. LITERATURE REVIEW

2.1 Introduction

This chapter gives a theoretical background for this study in detail. Theory relating to cloud computing, adoption, EO and performance is discussed. Hypotheses for adoption of cloud-computing, EO and performance characteristics are developed.

2.2 Literature Background

2.2.1 *Technology, The Engine for Growth*

Information technology is changing business value chains by altering value activities and redefining the way markets interact with products and services (Porter & Millar, 1985). Information Technology (IT) is a viable means to achieve innovation. It has positive causal effects on business performance in many but one departments; profitability, market share, market value, cost of operation, speed of delivery, co-ordination of organisations within the value chain, employee relationships, communication, access to knowledge and market information and business organisation and management (Moghavvemi, Hakimian, & Feissal, 2012).

From institutional governance perspective, IT governance helps organisations identify new business opportunities by maximising the benefits from IT investments and improving the overall organisational understanding of IT (Majendran, n.d.). It is commonly agreed amongst researchers that growth of output is a result of technological advancements. Economic growth is exclusively a result of technological progress emanating from innovation (Aghion, Philippe, & Howitt, 1992). This is further supported by Gene et al. (1994) who alluded that the industrial innovations driven by improvements in technology are the real force behind consistent economic development. Gene et al. (1994) argues that one cannot talk of sustainable economic growth without including technology because the diminishing natural resources and labour investment combinations cannot produce higher returns from fixed goods production using unchanging methods. Organisations must create conducive

ecosystems where innovation is not inhibited by cumbersome processes, rules, and resource constraints.

Technology such as cloud computing becomes a necessity because it provides automated frameworks that deliver services quickly and cheaply (Gene & Helpman, 1994). For the purposes of this study, I will focus on cloud computing technologies and how they apply innovation in a way SMEs in South Africa model their business processes to gain competitive advantage.

2.2.2 *The Concept of Cloud Computing*

Cloud computing is a form of utility computing, which has followed from paradigms of cluster computing to grid computing (Chen, Low, & Wu, 2011). It entails providing massively scalable IT capabilities as a service to external determinants via the internet (Cearley, 2009), following a model which enables ubiquitous, convenient, on-demand access to shared pool of configurable computing resources such as networks, servers, storage, applications, and services; that can be rapidly provisioned and released with minimal management effort or service provider interaction (National Institute of Standards and Technology, 2011). It is a transformation towards using technology applications, platforms and resources as a service instead of locating them on personal computers (Chen et al., 2011). Cloud computing is a technology model that functions independent of device and location where hardware and software computing services are delivered on-demand to customers via network means in a self-service fashion (Marston, Li, Bandyopadhyay, Zhang, & Ghalsasi, 2011). It works on the concept of virtualisation, a form of computing that separates technology services and resources from the underlying physical delivery environment (Sareen, 2013). Virtualisation hides the physical characteristics of computing technology from users, but instead presents abstract computing platforms (Marston at al., 2011). It is a conjunction of two major developments in information technology:

- **IT Efficiency** – which draws on the power of modern computers and their efficient use through highly scalable hardware and software

- **Business Agility** – where information technology provides competitive means by way of rapid deployment, parallel batch processing, use of compute-intensive

business analytics and mobile applications that interact with users in real time (Marston et al., 2011).

Although cloud computing has significant effects on productivity in firms, the effects are only fully realised if, and when, cloud computing is widely spread and used (Oliveira & Martins, 2011). Adopting cloud computing has a positive causal effect on business performance in many ways; it increases profitability, market share, market value, cost of operation, speed of delivery, co-ordination of organisations within the value chain, employee relationships, communication, access to knowledge and market information and business organisation and management (Moghavvemi et al., 2012). It allows firms to achieve superior economies of scale to deliver exceptional products and services at lower costs than rivals, gaining and sustaining significant competitive advantage (Moghavvemi et al., 2012). For the purposes of this study, adopting cloud computing entails purposefully utilising cloud services to accomplish business tasks beyond simple email and files storage utilities.

2.2.3 *Cloud Computing and the Fourth Industrial Revolution*

Information Technology (IT) evolution has introduced radical transformation of the world in which we live and work, whose impact is comparable to that of the introduction of mechanisation and electricity of the first and second industrial revolutions (Wan et al., 2015). PCs and smart devices connected through smart networks with greater miniaturisation enabling ubiquitous computing to powerful, autonomous microcomputers increasingly networked wirelessly with each other and with the internet; a convergence of the physical virtual worlds is forming Cyber-Physical Systems (Wan et al., 2015). Industrie 4.0, or *Industrial Internet*, is the integration of networked complex physical machines and device sensors and software, which predicts, controls and plans for better industrial performance (Hermann, Tobias, & Boris, 2016).

The two main categories of Industrie 4.0 are:

- Intelligent factories, which are distributed production facilities controlled by intelligent production systems;

- Intelligent manufacturing, which are the entire enterprise production logistics management, human-computer interaction and 3D printing (Wan et al., 2015).

The main components of Industrie 4.0 are Cyber-Physical Systems, Internet of Things, Smart Factory Internet of Services. Other technology such as Machine-to-machine (M2M) communication, Smart Products, big data and cloud computing as enablers of Industrie 4.0 (Hermann et al., 2016). Big data and cloud computing are integral data services utilising data generated from Industrie 4.0 implementations (Hermann et al., 2016).

Big data and cloud computing are two inseparable functions of technology that offer crucial support to industry. Industrial Cloud manages a lot of virtual computing data and makes up resource pools that can be used to provide on-demand services through the internet by autonomous and heterogeneous means (Wan et al., 2015). More so, Industrial Big Data cannot be operated from a single computer; but must rather apply the distributed architectures of cloud computing to handle large volumes of data (Wan et al., 2015).

2.2.4 *Cloud Computing and Adoption in South Africa*

There is a perception that although there is interest amongst South African SMEs to migrate to cloud, adoption of cloud computing in South Africa is low because of a myriad of challenges facing its implementation (Mujinga, 2012). However, recent research refutes this; more than 50% of businesses in South Africa are already using cloud services, and South Africa is leading Africa in adoption of cloud computing technology (Muhammed et al., 2005). More so, research conducted by Ovum in 2013 revealed that South African SMEs have the highest adoption rates of cloud computing compared to their corporate counterparts (Pieterse, 2013). Further evidence suggests that the World Economic Forum's Global Information Technology report of 2015 ranks South Africa in the top 20 of the top cloud computing export markets in Africa based on ICT development efforts (Dutta, Geiger, & Lanvin, 2015). This suggests of widespread cloud computing application in South Africa, which justifies analysis of application and extent of adoption of cloud computing.

2.2.5 *Cloud Computing Adoption Frameworks*

There are many technology adoption frameworks used in information systems (IS) literature: technology acceptance model (TAM), theory of planned behaviour (TPB), unified theory of acceptance and use of technology (UTAUT), Diffusion on Innovation DOI and the technology, organisation, and environment (TOE) framework (Oliveira & Martins, 2011). Different adoption models are applied to measure different units of analysis;

- **User (micro-level)** – focus on individual factors of adoption
- **Firm (meso-level)** – focus on firm-level factors of adoption
- **Market/innovation (macro-level)** – focus on broader environmental or sectorial factors of adoption (Alshamaila & Papagiannidis, 2013).

The TAM, TPB and UTAUT measure variables of analysis at the individual level, whilst DOI and TOE frameworks are the only ones that measure at the firm level (Oliveira & Martins, 2011). The DOI theory measures how, why, and at what rate technology innovation spreads through cultures (Oliveira & Martins, 2011). It is also the only framework measuring different units of analysis at both individual and firm levels. DOI however falls short of the breadth and depth to frame the causal effects of application of adopted technology (Moghavvemi, et al., 2012). The theory of innovation diffusion does not account for the extent to which technology is applied, and its effect on innovation. On the other hand, the TOE framework is an organisational level theoretical framework that represents the innovation process, the organisational environmental influences for adoption and the implementation of innovations (Alshamaila & Papagiannidis, 2013). It investigates the context that influences the process by which firms adopt and implement technological innovation (Oliveira & Martins, 2011). The unit of analysis for this study is the firm, therefore, the TOE framework will be most suitable for meso-level analysis to investigate the extent of adoption of cloud computing and the influences thereof.

2.2.6 *Superior Competitive Advantage via the Cloud*

According to Schumpeter, capitalism follows a form of constant economic change conditioning industrial transformation through economic action (Schumpeter, 1975). Entrepreneurs sustain capitalism when they displace existing economic structures and create new ones in the process through creative destruction (Schumpeter, 1975). Development happens in the form of innovation, which arises from carrying out new combinations in production or transportation, or markets, resulting in the displacement of industry (Schumpeter, 1975).

Competitive advantage transcends beyond price; entrepreneurs compete by introducing new commodities, new technology and even new sources of materials (Schumpeter, 1975; Porter & Millar, 1985; Moghavvemi et al., 2012). Technology helps to mitigate economies of scale and the gains that conventionally come with large-scale production (OECD, 2000). When technology is implemented and used effectively, SMEs can achieve superior economies of scale to deliver exceptional products and services at lower costs than rivals, gaining and sustaining significant competitive advantage (Moghavvemi et al., 2012). More so, significant reductions in the cost of accessing, processing, and transmitting information creates competitive advantage for SMEs by giving them new ways to outperform their competition (Porter & Millar, 1985). Widespread organisational innovation by way of new and significantly improved products and processes results in significant improvements in firm performance (OECD, 2017). Businesses compete at global markets as they enjoy lower start-up costs that allow them to utilise platforms for rapid innovation and development, which also enables them to respond faster and cheaper to market needs. As a result, they realise significant financial performance.

Cloud computing discounts the need for entrepreneurs to find resources to develop, test, and avail innovations to markets, freeing them to focus on innovation itself rather than on the means to avail it (Boss, Malladi, Quan, & Legre, 2007). A study conducted by King & Levine (1993) on financial systems and their nexus with entrepreneurship and innovation showed that there are greater rewards from engaging in product and service innovation compared to continuing with existing products and existing means. Cloud computing breads innovation (Ratten, 2016). Adopting cloud computing gives firms the means to engender innovation by discounting the need for businesses to

acquire resources to develop, test, and avail their products to market (Boss e tal., 2007). At product and process levels, there are greater rewards in innovating products and services rather than continuing with existing means (King & Levine, 1993).

Although different disciplines view innovation and define it from their different standpoints (Baregheh, Rowley, & Sambrook, 2009), research recognises that it involves introducing new means or new products in line with Schumpeter's theory. Innovations are resultant new creations and new combinations of existing elements of economic significance. Innovation entails introducing new methods, processes or products into a market (Kelley et al., 2015). Innovation follows a multi-stage process where organisations convert ideas into new or improved processes, products or services with the aim of advancing, competing and differentiating themselves successfully in a marketplace (Baregheh et al., 2009). It happens because of a new intermediate good, which can be used to produce an output in more efficient ways than before (Aghion et al., 1992). In organisations, it can take place at products, services, operations, processes, and people levels (Baregheh et al, 2009). A defining characteristic of innovation is that it is doing new things or the doing things that are already being done in a new way (Schumpeter, Joseph A., 1947). A more general definition of innovation is that it is a multi-stage process where organisations convert ideas into new or improved processes, products or service with the aim of advancing, competing and differentiating themselves successfully in their marketplace (Baregheh et al., 2009). The Global Entrepreneurship Monitor report, for example, assesses innovation by measuring the extent to which entrepreneurs introduce products or services that are new to some or all customers, and that are not offered by competition (Kelley et al., 2015). Innovation takes place because of the unexpected success, failure or outside event, the incongruity between reality and its current and presumed states, change in process, or change in industry or market structure. (Drucker, 1984).

There is consensus in research that in any context, there is a direct link between innovation and economic activity. Organisational innovation can drive significant improvements in firm performance (OECD, 2017). Innovation is a resultant new creation in a method of economic significance emanating from combinations of existing elements and it is measured by the frequency with which entrepreneurs introduce products or services that are new to some or all customers, and that are not

offered by competition (Kelley et al., 2015). It is how firms can make changes in their methods and use of means of production and which improve their productivity and/or commercial performance (OECD, 2017). The level of innovation dictates the rate of economic growth (King & Levine, Finance, entrepreneurship, and growth, 1993), suggesting that investments in innovative activities must translate to growth in the economy.

There are numerous classifications for types of innovation (Camisón & Villar-López, 2014); the most commonly accepted distinguishes four types: product, process, marketing, and organisational (OECD, 2005). Technological innovation focuses on product and process; non-technological innovation focuses on marketing and organisational innovations (OECD, 2005). This study's focus is on product and process innovation with cloud computing technology being the basis.

2.2.7 *Entrepreneurial Orientation*

Entrepreneurship is defined as the process of identifying commercial opportunities and creating new demand by finding new ways of exploiting the opportunities (Burns, 2001). The pursuit of exploiting opportunities may consist of methods, practices, and decision-making styles that managers use to act entrepreneurially (Lumpkin & Dess, 1996). Such activities may include experimenting with new technologies, the willingness to seize new product-market opportunities, and the appetite to undertake risky ventures. A popular method for characterising and distinguishing key entrepreneurial processes analyses five dimensions of entrepreneurship:

i. autonomy
ii. innovativeness
iii. risk taking
iv. proactiveness
v. aggressiveness (Covin & Slevin, 1989).

The dimensions define a term named Entrepreneurial Orientation (EO), which reflects on the decision-making styles, processes and practices that facilitate the pursuit of opportunities in firms (Urban & Sefalafala, 2015; Morris & Sexton, 1996; Lechner & Gudmundsson, 2014). EO is the strategic orientation of firms which dictates the

managerial processes that allow some firms to act and compete based on internal and external factors (Wiklund & Shepherd, 2003). However, of the five dimensions of EO mentioned, three are consistently used in literature; these are innovativeness, risk-taking and proactiveness (Rauch, Wiklund, Lumpkin, & Frese, 2009). For the purposes of this study, the three dimensions of EO will be used.

Innovativeness exhibits creativity, experimenting with and being supportive of new ideas (Bouncken, Pluschke, Pesch, & Kraus, 2016). It is the behaviour of seeking creative, unusual, or new solutions to problems (Morris & Sexton, 1996). Innovativeness is the ability to engage in creativity and experimentation by introducing new products or services as well as leadership in technology research and development in new processes (Rauch et al., 2009).

On the other hand, risk-taking entails committing resources in the pursuit of outcomes and probabilities that are uncertain or only partly known (Bouncken et al., 2016). Entrepreneurial firms are considered risk-taking when they take bold actions of venturing into the unknown, borrowing heavily and/or committing significant resources towards ventures in uncertain environments or when they demonstrate the willingness to commit resources to opportunities that have reasonable chance of failure (Rauch et al., 2009; Morris & Sexton, 1996).

The dimension of pro-activeness entails the ability to identify and seize new opportunities by monitoring market changes and identifying future trends (Bouncken et al., 2016) Proactiveness entails doing whatever is necessary to act on entrepreneurial ideas (Morris & Sexton, 1996). Proactiveness means opportunity-seeking, forward-looking perspectives that are characterized by the introduction of new products and services ahead of the competition and acting in anticipation of future demand (Rauch et al., 2009).

2.3 The Relationship between Cloud Computing Adoption and Firm Performance

Previous research on EO converges on the idea that firms perform better when the exhibit characteristics of newness, responsiveness, and a degree of boldness (Lumpkin & Dess, 1996). In fast-paced environments characterised by rapid change

and shortened product and business model lifecycles, firms innovate frequently while taking risks in their product market strategies (Rauch et al., 2009). Businesses that practice EO by taking a stance to anticipate demand and aggressively position their new product and service offerings often leads to strong performance (Rauch et al., 2009).

Performance is measured based on financial (profitability, sales growth, market share and overall performance) and non-financial (start-up goals, jobs, satisfaction with overall performance) indicators (Keh, Nguyen, & Ng, 2007). The Resource Based View (RBV) supposes that firms that have resources, capabilities and exceptional characteristics gain competitive advantages over those that do not to achieve superior performance (Camisón & Villar-López, 2014). Firms that successfully create unique IT capability from cloud computing enjoy superior financial performance by bolstering firm revenues and/or decreasing operational costs (Bharadwaj, 2000). Because cloud computing allows reduction in operational costs and increased revenue, firm performance in this study is based on financial performance, specifically, profit. As such, technology such as cloud computing is one of the most important sources of competitive advantage owing to its causal abstruseness (Camisón & Villar-López, 2014). Superior firm performance is achieved because of significant increase in profits emanating from the adoption of cloud computing. We can thus hypothesis that:

H1 A positive relationship exists between adoption of cloud computing and superior firm performance

2.4 The Relationship between EO and Firm Performance

For innovation to happen, risk-taking and proactiveness must also be present (Avlonitis & Salavou, 2007; Geneedy, 2016). Firms cannot be innovative without taking risk and entrepreneurial without being action oriented (Geneedy, 2016). Entrepreneurial orientation reflects on the capability of management to embark on proactive and aggressive initiatives in pursuit of competitive advantage (Avlonitis & Salavou, 2007), and it is a prerequisite for firm success (Urban & Sefalafala, 2015). As such, we can hypothesis that:

H_2 A positive relationship exists between EO and superior firm performance

H_{2a} A positive relationship exists between innovativeness and superior firm performance

H_{2b} A positive relationship exists between proactiveness and superior firm performance

H_{2c} A positive relationship exists between risk-taking and superior firm performance.

2.5 The Relationship between Cloud Computing Adoption and EO that Influences Firm Performance

For firms to adopt such technology as cloud computing, they must also demonstrate innovativeness, proactiveness and risk-taking behaviours to accomplish new means of conducting business of economic benefit. As such, we further hypothesise that:

H_3 There exists positive interaction between adoption of cloud computing and EO, which leads to superior firm performance

H_{3a} There exists positive interaction between adoption of cloud computing and innovativeness, which leads to superior firm performance

H_{3b} There exists positive interaction between adoption of cloud computing and proactiveness, which leads to superior firm performance

H_{3c} There exists positive interaction between adoption of cloud computing and risk-taking, which leads to superior firm performance.

2.6 Conceptual Framework of Hypotheses

Based on the hypothesis developed, a theoretical model for the effect of adoption of cloud computing on firm performance is shown in the diagram below:

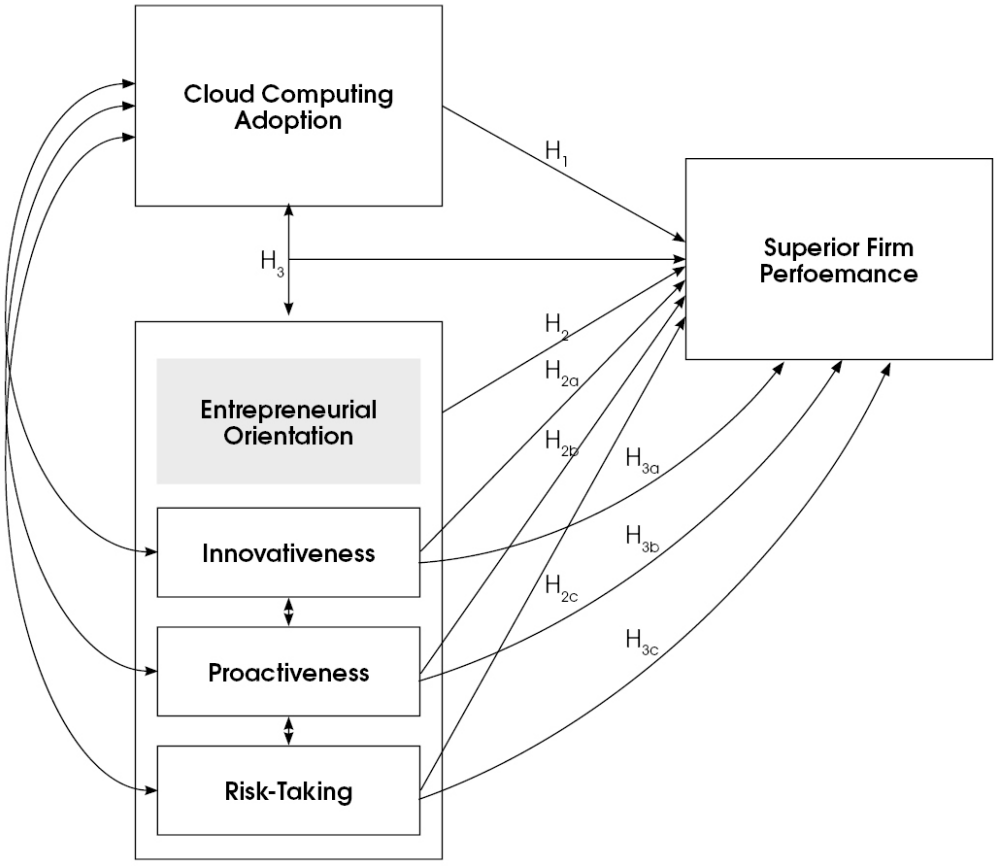


Figure 2: Conceptual Model (Source: My Work)

2.7 Conclusion of Literature Review

Based on the literature reviewed, cloud computing allows firms to leverage economies of scale that deliver value. Behavioural traits of management reflected in EO moderate the effect of adoption of cloud computing to aid firm performance. Owing to their characteristic absence of legacy and bureaucratic constraints, SMEs adopt cloud computing better than big businesses. That makes small businesses that adopt small businesses attain a unique edge over those that do not to compete in the markets and perform exceptionally.

Based on that, this study examined the following hypotheses:

H_1 **A positive relationship exists between adoption of cloud computing and superior firm performance**

H_2 **A positive relationship exists between EO and superior firm performance**

H_{2a} **A positive relationship exists between innovativeness and superior firm performance**

H_{2b} **A positive relationship exists between proactiveness and superior firm performance**

H_{2c} **A positive relationship exists between risk-taking and superior firm performance**

H_3 **A positive relationship exists between adoption of cloud computing and EO, which leads to superior firm performance**

H_{3a} **A positive relationship exists between adoption of cloud computing and innovativeness, which leads to superior firm performance**

H_{3b} **A positive relationship exists between adoption of cloud computing and proactiveness, which leads to superior firm performance**

H_{3c} **A positive relationship exists between adoption of cloud computing and risk-taking, which leads to superior firm performance**

CHAPTER 3. RESEARCH METHODOLOGY

This chapter discusses the research methodology used to achieve the objectives of the study. The methods to test the research model hypothesised, data collection, sampling, construct operationalisation and questionnaire are discussed. Methods to ensure reliability and validity and to test the study's hypotheses are also outlined.

3.1 Research Methodology / Paradigm

Objectivism supposes that that there exists independent reality (Antwi & Hamza, 2015). The ontology of objectivism deduces that positivism assumes that reality can be measured using properties independent of the researcher and his instruments, that is, knowledge is objective and quantifiable (Antwi & Hamza, 2015). For this study, based on the theory that has been defined, data is collected to adjudicate on the theory, and conclusions are drawn from the results. (Creswell, 2014).

Qualitative, quantitative or mixed methods can be used to conduct research; qualitative research uses questions and procedures to explore phenomena, and the researcher interprets meaning from data, while quantitative methods use statistical procedures to test objective theories and examine relationships among measurable variables (Creswell, 2014). For this study, a quantitative method will be used to collect data using a structured research instrument to test the hypothesis developed and measure the relationships between adoption of cloud computing, factors of EO and outcomes of firm performance.

3.2 Research Design

Using an online questionnaire, this research will perform a cross-sectional survey on SMEs in South Africa to collect primary data on

(i) the extent of adoption of cloud computing
(ii) the level of EO and
(iii) firm performance.

A survey is best suited for this study as it offers a multitude of inherent strengths when compared to other methods of collecting data:

- Surveys offer the best way of measuring a wide variety of unobservable data
- Surveys are suited for remotely collecting data from a large population that may be impossible observe directly
- Because surveys are unobtrusive, respondents can respond at their convenience, which may be preferable to them
- Surveys take researchers less time, effort and cost than most methods such as case and experimental research (Bhattacherjee, 2012).

3.3 Population and Sample

3.3.1 *Population*

A population, also known as unit of analysis, may be a person, group, organisation, country, object, or any other entity of study. For this study, the unit of analysis is the firm and the population is made up of SMEs in South Africa. According to the National Small Business Amendment Act (2003), SMEs are categorised by sector according to the number of employees and annual turnover. With the exclusion of micro businesses, small and medium businesses have turnover ranging from R0.5 million to R51 million (Department of Trade and Industries, Republic of South Africa, 2003).

3.3.2 *Sample and sampling method*

Because this population is broad, it is impractical to investigate it to its entirety. A sample, which is an accessible section of the target population, or subset of the entire population of interest upon which observations and statistical inferences about that population is drawn (Bhattacherjee, 2012).

This study uses the AltX listing as basis for a sampling frame. AltX is an alternative public equity exchange listing on the Johannesburg Stock Exchange for small and medium-sized companies in South Africa that have share capital of at least R2 million (AltX, 2017). It is wholly owned and operated in parallel with the JSE Securities

Exchange. AltX currently has 58 listed small and medium-sized companies (AltX, 2017). Because this sample is too small for this study, the survey will be extended to include 250 other randomly selected small businesses that may not necessarily be listed on AltX but fall within the categories of between R0.5 million and R51 million, and have adopted cloud computing. By drawing responses from four people from each organisation in the capacities of management and ICT personnel, a potential 1200 respondents were anticipated, which were sufficient to perform this study.

3.4 Limitations of the Study

This study is limited to cloud computing and its effects on superior firm performance. Other forms of disruptive technology such as artificial intelligence, machine learning, robotics and internet of things are not subjects of analysis in this study. Further studies will need to be conducted to investigate their effects on the superior performance in South African firms.

3.5 The Research Instrument

A custom questionnaire was developed to collect primary data to measure adoption of cloud computing, EO and firm performance. Questions were drawn from the TOE instrument (Tornatzky, Fleischer, & Chakrabarti, 1990) and the EO instrument (Covin & Slevin, 1989). Questions from the TOE instrument will explore the technology, organisation and environment attributes influencing cloud computing adoption. The EO instrument will use questions that quantity attributes of innovativeness, risk-taking and proactiveness in firms.

Table 1: Measurement instrument

Description of Construct/Variables/Items	Sourced From
Cloud Computing Adoption	TOE Framework (Tornatzky et al., 1990)
Entrepreneurial Orientation • Innovativeness • Risk-Taking • Proactiveness	EO Instrument (Covin & Slevin, 1989)

3.5.1 *Pilot Study*

Prior to administering the questionnaire, a pilot study was conducted. A pilot test entails distributing the questionnaire to a small subset of respondents who represent the target population to determine validity of the instrument and to ensure that reliable measures of dependent and independent variables are used (Creswell, 2014). The questionnaire was distributed to a potential 35 respondents. From these, 15 complete responses were received.

Using SPSS, reliability tests were conducted to determine internal consistency, that is, based on the factors of adoption, innovativeness, risk-taking, proactiveness and performance, how the respective set of questions measure the same thing (Bland & Altman, 1997). A useful coefficient of measuring internal consistency α uses a range from 0 (independence) to 1 (highest degree of consistency). α coefficients of between 0.7 and 0.8 are regarded as satisfactory and accepted (Bland & Altman, 1997).

Cronbach's alpha coefficients for each of the variables were observed. Based on the results of the tests, 2 questions were dropped, and 3 questions were rephrased. The questions that were dropped were because of low coefficients. For example, dropping

the question with the lowest α coefficient increased loading for factor adoption to above the acceptable value of 0.7.

Variables with coefficients between 0.6 and 0.7 were rephrased to rid ambiguity. For example, there were 5 questions in the pilot tool measuring innovativeness. 1 question was dropped to conform to 3 or 4 variables per factor. Of the remaining variables, the variable with the lowest α coefficient was rephrased to make the question more succinct and rid vagueness. The following table shows the original questions in the pilot tool and the revisions that were made for the survey instrument:

Table 2: Original and Revised Questions of Research Instrument

Original Question	Revised Question
• Our business places strong emphasis on continuous improvement in products and services	• Our business places strong emphasis on using cloud computing to achieve continuous process improvement
• Our business typically initiates actions that competitors respond to	• Our business introduces new cloud-based products and services ahead of its competitors
• Cloud computing has helped us to reduce operating costs	• Adopting cloud computing in our ICT systems has helped us to reduce ICT operating costs

The final research questionnaire is available in Annexure 1.

3.6 Procedure for data collection

The questionnaire will be administered as an online survey through Qualtrics. Emails with a hyperlink to the survey were circulated to targeted respondents. The link opened

the survey in Qualtrics, where respondents directly responded to questions in the measurement instrument.

3.7 Data analysis and interpretation

Multivariate data analysis techniques are used to model factors and responses and find relationships that exists between multiple factors to extract useful information from multivariate data (Var, 1998). They aid analysis in cases where there are many independent and/or many dependent variables (DVs) that are all correlated with one another to varying degrees (Tabachnick & Fidell, 2007). For this study, multivariate statistical methods were used to analyse how variables of adoption, innovativeness, risk-taking and proactiveness influence performance outcomes in SMEs (Tabachnick & Fidell, 2007).

3.7.1 *Validity and reliability of research*

Meaningful interpretations can be made from data that is collected using instruments with high validity and reliability of scores (Creswell, 2014).

In quantitative studies, validity is defined as the extent to which a concept is accurately measured, that is, is the instrument measuring the correct variable that it is designed to measure (Heale & Twycross, 2015). It is the precision in which the findings accurately reflect the data (Noble & Smith, 2015).

External validity refers to whether observed associations can be generalized from the sample to the population (Bhattacherjee, 2012). Internal validity, or causality, examines the observed changes in dependent variables that are caused by corresponding changes in hypothesised independent variables, and not by other variables that are external to the research context (Bhattacherjee, 2012).

Validity tests examine the validity of:

i. Content - The extent to which a research instrument accurately measures all aspects of a construct
ii. Construct - The extent to which a research instrument (or tool) measures the intended construct

iii. Criterion - The extent to which a research instrument is related to other instruments that measure the same variables (Heale & Twycross, 2015).

Reliability, on the other hand, measures the consistency of an instrument, that is, the extent to which a research instrument consistently produces the same results if it is used in the same situation on repeated occasions (Heale & Twycross, 2015). It examines the consistency of the analytical procedures, including accounting for personal and research method biases that may have influenced the findings (Noble & Smith, 2015).

Reliability tests are used to examine

i. The homogeneity – the extent to which all the items on a scale measure one construct
ii. Stability - the consistency of results using an instrument with repeated testing
iii. Equivalence - among responses of multiple users of an instrument, or among alternate forms of an instrument (Heale & Twycross, 2015).

Answers to questionnaires remain relatively the same through test-retest methods, which means the instrument is stable, it demonstrates a high degree of reliability and therefore the results are repeatable (Golafshani, 2003).

3.7.2 *Spearman's Correlation*

Correlation analysis is a method that is used to measure the association between variables (Tabachnick & Fidell, 2007). Correlation analysis is conducted to check for consistency in research administration and scoring (Creswell, 2014). For this study, it was performed to analyse innovativeness, risk-taking and proactiveness in relation to performance; that is, to check if there are relationships between dependent variables and independent variables.

A quantitative measure of strength of correlation is called correlation coefficient; it expresses how closely a change in the magnitude of one variable affects the change in the magnitude of another variable (Data). This is referred to as a measure of association or of correspondence (Data).

The Spearman rank-order correlation is a nonparametric measure of the strength and direction of association that exists between two variables measured on at least an ordinal scale. These numbers measure the strength and direction of the linear relationship between the two variables. The correlation coefficient can range from -1 to +1, with -1 indicating a perfect negative correlation, +1 indicating a perfect positive correlation, and 0 indicating no correlation at all. Negative correlation also means that low scores on the first are associated with high scores on the second (Ritchie, et al., 2001). In other words, the variables move in the same direction when there is a positive correlation. The variables move in opposite directions when there is a negative correlation. In a sample it is denoted by and *rs*.

3.7.3 *Data Reduction*

Data reduction refers to techniques that are used to aggregate or amalgamate information that is contained in large data sets into manageable information sets (Agarwal & Rao, 2014). Data reduction includes simple techniques such as tabulation and aggregation, or more sophisticated techniques like principal components analysis and factor analysis.

For this study, the Principal Component Analysis (PCA) technique was used for data reduction to isolate factors that are critical for each dimension under analysis (Acock, 2014). PCA is a linear dimensional reduction technique that identifies orthogonal directions of maximum variance in the original data, and projects the data into a lower-dimensional space formed from a subset of the highest variance components (Agarwal & Rao, 2014). The objective of PCA is to find unit-length linear combinations of the variables with the greatest variance (Afifi, May, & Clark, 2012).

Variables under study are. PCA transforms the original set of variables that are highly correlated hence effectively reporting the same thing to a new set of uncorrelated variables called principal components (Agarwal & Rao, 2014). Factor loadings for the default rotation represent both how the variables are weighted for each factor, but also the correlation between the variables and the factor. For a factor to be critical, the *eigenvalue* should be greater than 1.

3.7.4 *Hypothesis Testing*

Hypothesis tests are conducted to analyse the existence and the extent of association between dependent and independent variables. It is conducted by performing t-tests to compare the differences in the means of variables to a given value. The smaller the standard of error of the mean, the more the sample mean is close to the mean of the population and the larger the magnitude of the t-value, giving a smaller p-value.

SEM is a technique that uses various types of models to depict relationships among observed variables to provide a quantitative test of a theoretical model being hypothesised by research (Schumacker & Lomax, 2010). Various theoretical models can be tested using SEM to hypothesise how sets of variables define constructs and how these constructs are related to each other.

For this study, hypotheses were tested using Structural Equation Modelling (SEM) using Partial Least Squares (PLS).

CHAPTER 4. PRESENTATION OF RESULTS

4.1 Introduction

This chapter provides analysis from STATA software version 14 (StataCorp, 2015). The data was analysed with a confidence interval of 95%, with significance level of $p<0.05$ (5%). The chapter focuses on the data analysis and interpretation of the findings resulting from the study. The results are presented in tables. The presentation of the results begins with the demographic characteristics of the respondents, followed by frequency tables for each section, correlations, hypothesis testing and lastly structural equation modelling.

4.2 Demographic Profile of Respondents

4.2.1 *Data Screening*

From a total number of 1,230 potential respondents, 136 responses were received. Of these, 40 respondents were excluded on that basis that they indicated they had not yet adopted cloud computing, leaving a total of 96 responses for analysis.

For this study, the subject of analysis is SMEs in South Africa who have annual turnover of between R500,000 and R50 million. Of the 96 respondents, 8 reported that their annual turnover of below R500,000, and a further 9 reported that their annual turnover was above R50 million. These 17 respondents fall outside of the classification set for this study, and they must be excluded to leave 79 valid responses.

However, 96 (100) and 79 (80) are in the same margin of error bands. The degree of accuracy is the same up to N=76. Hence, even if the profit variable has been reported with N=96 instead of 79, there is no statistical difference caused by the 17 responses in terms of the turnover variable.

Secondly, it is of advantage to use n=96 for all variables because statistical power is greater as N increases. Therefore, this analysis will use 96 responses.

4.2.2 *Demographic Results*

At what level is your position in the organisation?

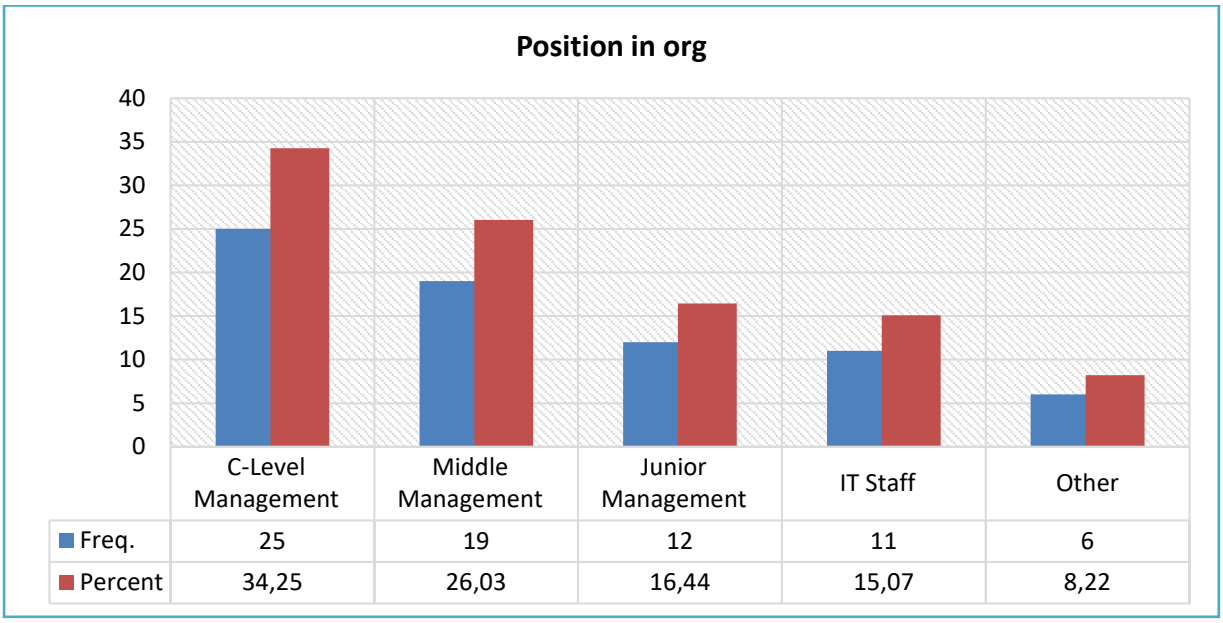
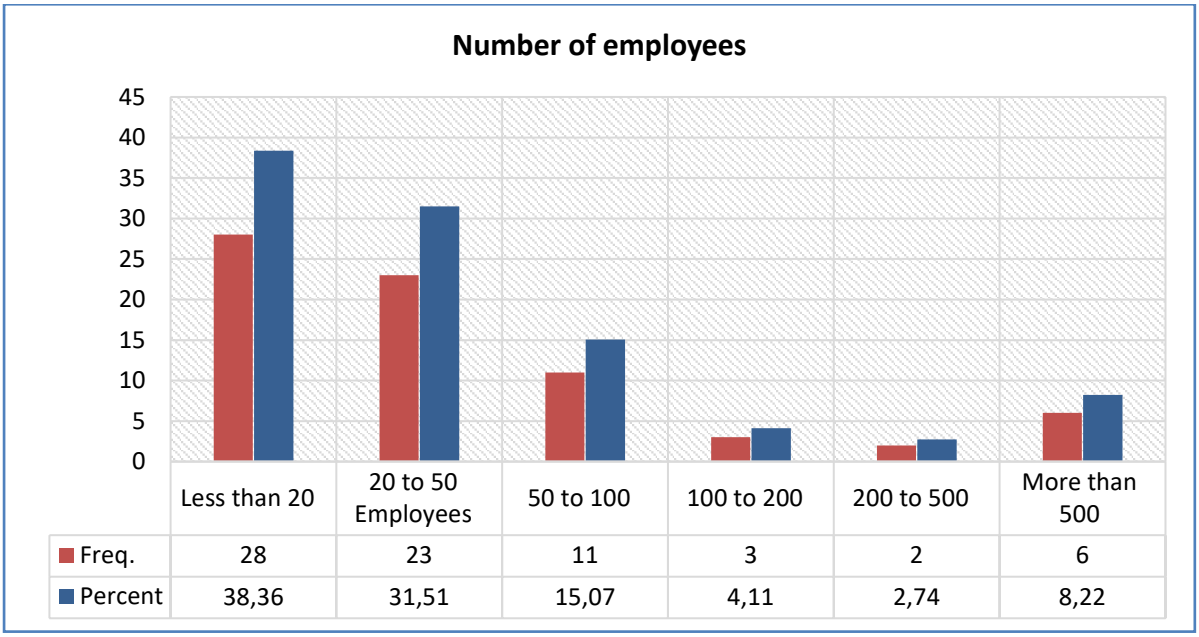


Figure 3: Designation in Organisation

Figure 3 indicates that a third (34.3%) of respondents were in C-level management and a quarter in middle management (26%). There were proportionally fewer respondents in junior management (16.4%), IT staff (15.1%) and in other positions (8%).

Most respondents (>50%) were in management (junior, mid-level and C-Level).

How many employees in total are working at your organisation?



	Less than 20	20 to 50 Employees	50 to 100	100 to 200	200 to 500	More than 500
Freq.	28	23	11	3	2	6
Percent	38,36	31,51	15,07	4,11	2,74	8,22

Figure 4: Total Number of Employees

Figure 4 indicates that almost 4 out of 10 (38.4%) respondents reported their companies had less than 20 employees, 3 in 10 (31.5%) reported they had 20-50 employees, 15% reported they had 50 to 100 employees. Very few respondents reported that their companies had above 100 employees.

Most firms (>50%) had 100 employees and less, which constitutes the size of small businesses by number of employees in South Africa.

What is the annual turnover for your organisation?

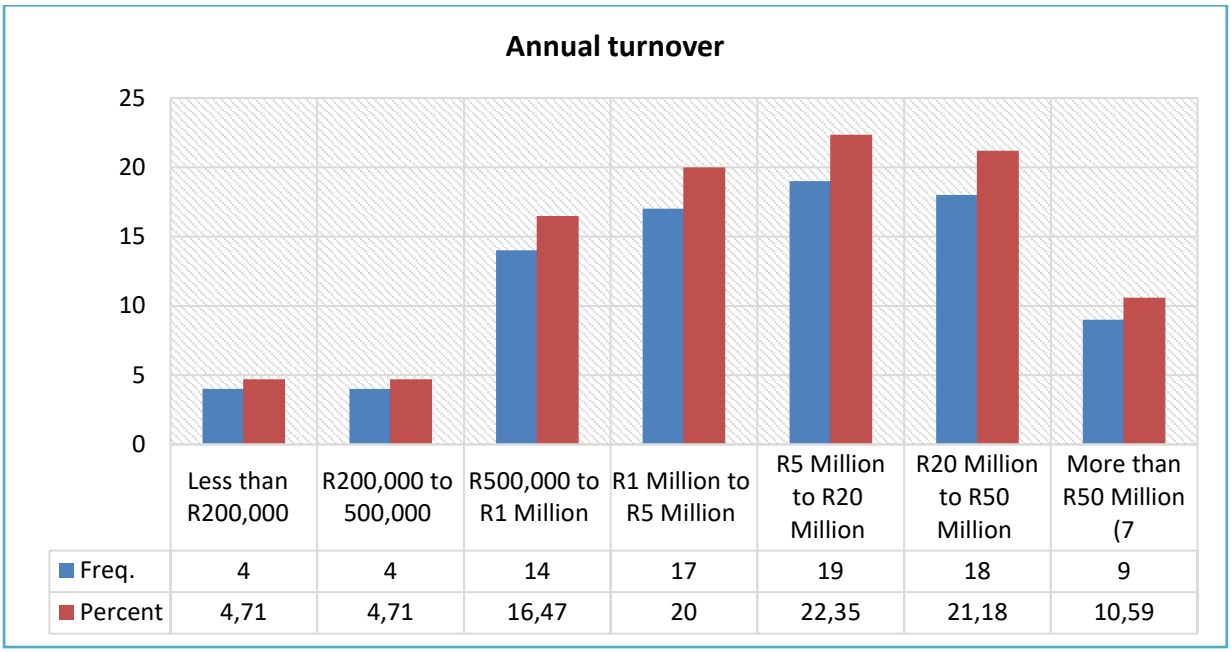
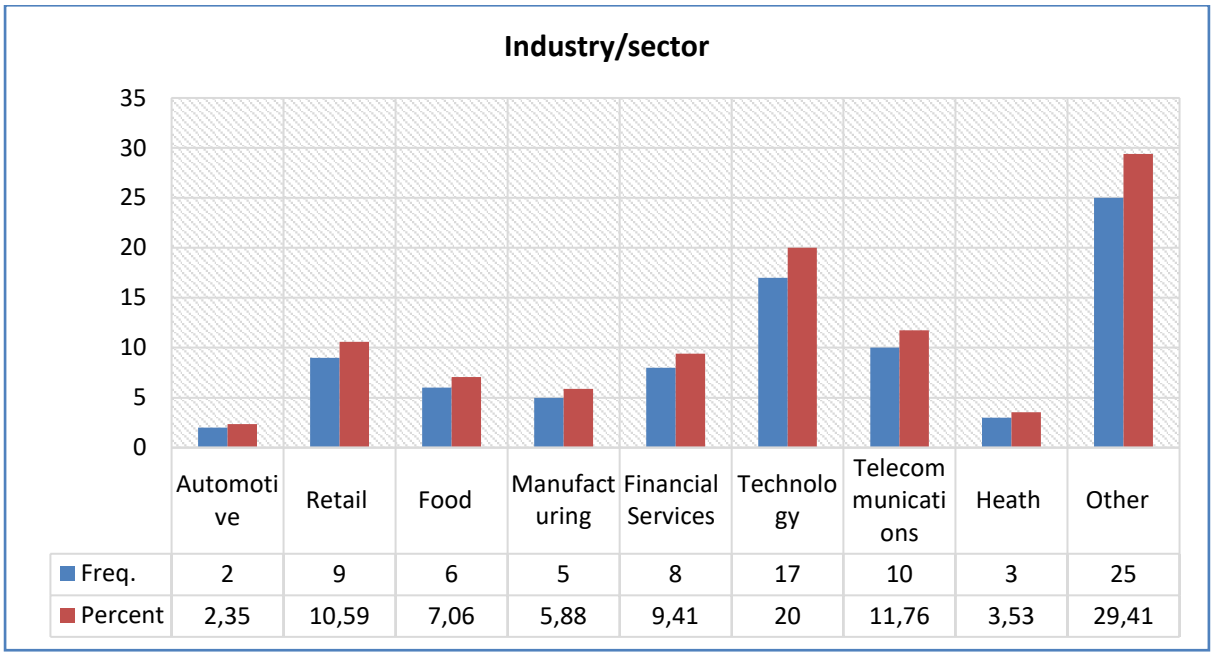


Figure 5: Annual Turnover

Figure 5 indicates that a fifth (22.4%) of firms made an annual turnover of between R5 million and R20 million, another fifth (21.2%) made an annual turnover of between R20 million and R50 million, and between R1 million and R5 million (20%). Those who had an annual turnover of between R500,000 and R1 million constituted of 16%, while those who had an annual turnover of more than R50 million were 1 in 10 (10.6%). Very few made an annual turnover of less than R500,000 (9.4%).

Almost 90% of firms had turnover below R50 million, which constitutes the demographic for small business by annual turnover in South Africa.

In what industry/sector is your organisation?



	Automotive	Retail	Food	Manufacturing	Financial Services	Technology	Telecommunications	Heath	Other
Freq.	2	9	6	5	8	17	10	3	25
Percent	2,35	10,59	7,06	5,88	9,41	20	11,76	3,53	29,41

Figure 6: Industry/Sector

Figure 6 indicates that a fifth (20%) of the respondents were in the technology sector, 11% were in the telecommunications sector, another 11% in retail, 9.4% in the financial sector, 7% in the food sector, and 6% in the manufacturing sector. Less than 5% were each in automotive (2.4%), and health sector. Other sectors were constituted of most firms (29%).

How many years has your organisation been operational?

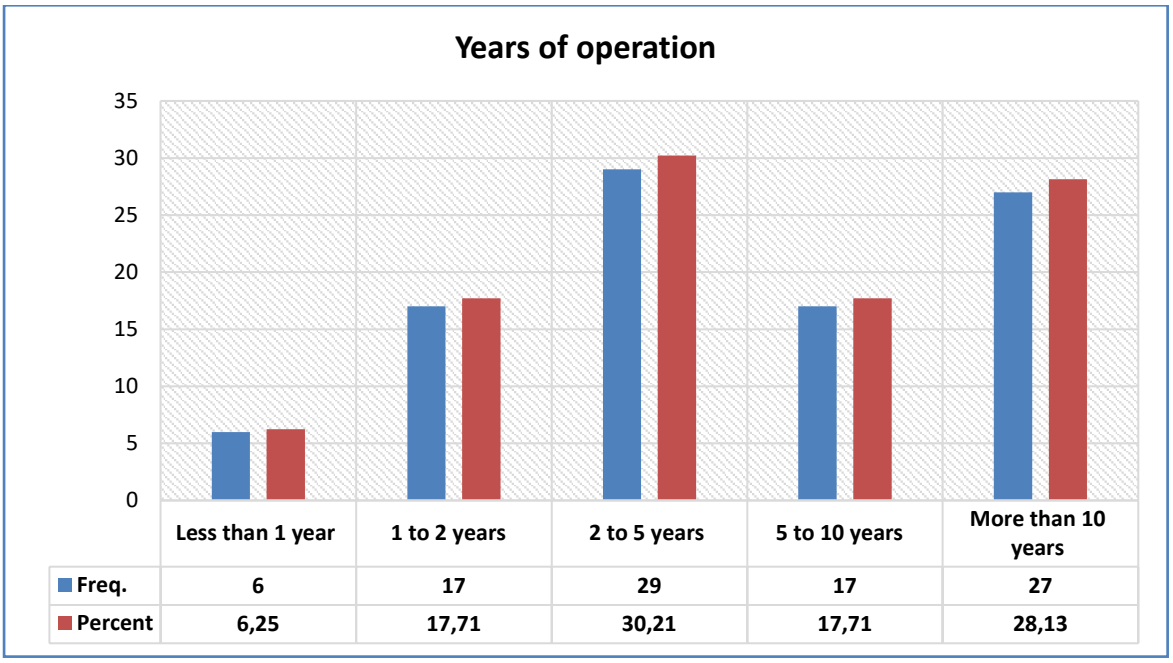
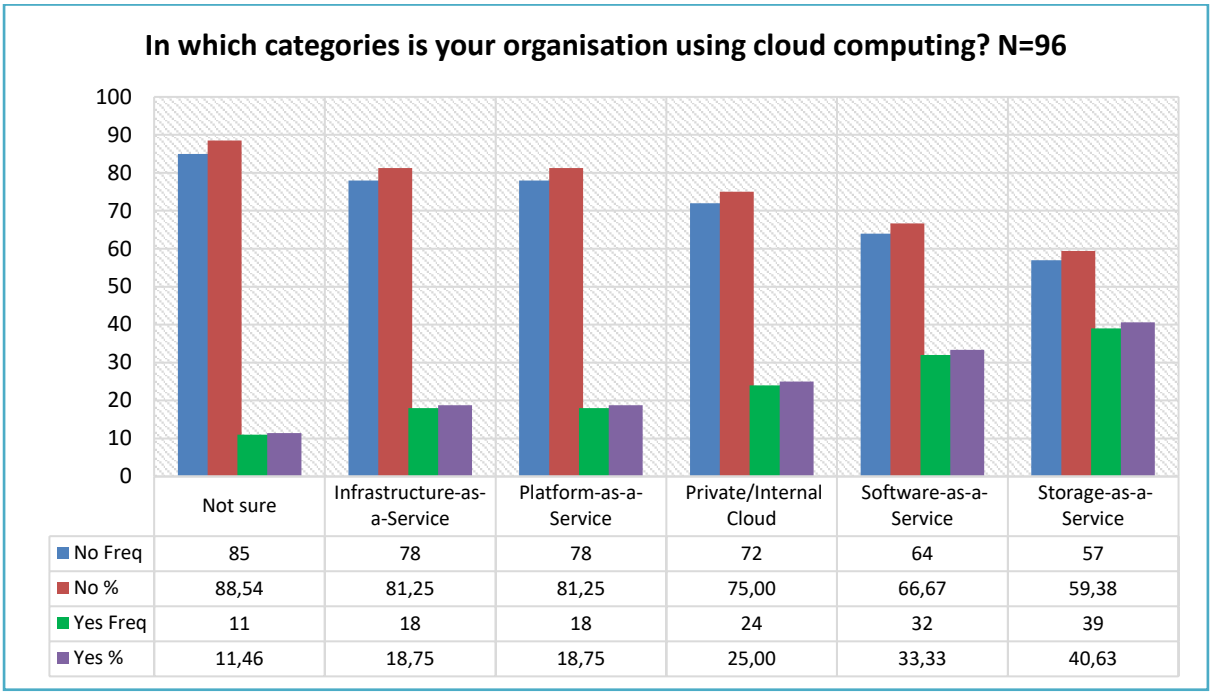


Figure 7: Years of Operation

Figure 7 indicates that 3 in every 10 firms (30%) had been in operation for between 2 and 5 years, whilst 28.1% had been in operation for more than 10 years. Nearly 20% of the firms had been operational for between 1 and 2 years and between 5 and 10 years respectively. Very few firms (<10%) had been in operation for less than a year.

4.2.3 *Cloud Computing*

In which categories is your organisation using cloud computing



	Not sure	Infrastructure-as-a-Service	Platform-as-a-Service	Private/Internal Cloud	Software-as-a-Service	Storage-as-a-Service
No Freq	85	78	78	72	64	57
No %	88,54	81,25	81,25	75,00	66,67	59,38
Yes Freq	11	18	18	24	32	39
Yes %	11,46	18,75	18,75	25,00	33,33	40,63

Figure 8: Cloud Computing Architecture

Figure 8 indicates that most firms were using cloud in the SaaS and private cloud architectures. There was generally lower usage of cloud computing in IaaS and PaaS architectures. They felt that there was no usage of cloud computing in IaaS (81.3%), PaaS (81.3%), private/internal cloud (75%), SaaS (66.7%), and SaaS (59.4%). They felt that cloud computing was relatively better used in SaaS (40.6%), SaaS (33%), private/internal cloud (25%). Less than 20% felt this was used in IaaS and PaaS respectively, while 11% were unsure which infrastructure they used.

Table 3: Importance of Cloud Computing

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Cost savings on hardware	1.37	2.74	1.37	10.96	12.33	31.51	39.73
Cost savings on software	1.37		5.48	10.96	12.33	34.25	35.62
Cost savings on IT operations staff	4.11	2.74	1.37	10.96	17.81	30.14	32.88
Better collaboration across teams	5.48		4.11	9.59	16.44	27.4	36.99
Ability to rapidly launch new products and services	4.11	5.48		13.7	16.44	34.25	26.03
Outsourcing of non-core competencies	5.48	4.11	2.74	15.07	15.07	28.77	28.77
Ability to grow and shrink IT capacity on demand	8.22	4.11	4.11	12.33	16.44	31.51	23.29
Pricing flexibility	4.11	2.74	5.48	19.18	20.55	27.4	20.55
No upfront investment	8.22	6.85	5.48	12.33	20.55	27.4	19.18

Convenience for the development teams	13.7	5.48	6.85	8.22	9.59	31.51	24.66

Not Important (1) *Not very Important (2)* *Somehow not Important (3)* *Neutral (4)* *Somehow Important (5)* *Very Important (6)* *Most Important (7)*

Respondents were asked what their organisations viewed as the most important benefits of cloud computing. Eight out of ten (just above 80%) of respondents felt the following were important in cloud computing: cost savings on hardware (83.6%), cost savings on software (82.2%), cost savings on IT operations staff (80.8%), better collaboration across teams (80.8%). Seven out of ten (at least 70%) believed that the following were important in cloud computing: ability to rapidly launch new products and services (76.7%), outsourcing of non-core competencies (72.6%) and ability to grow and shrink IT capacity on demand (71.2%). A relatively lower percentage, six out of ten (at least 60%) believed that the following aspects were important in cloud computing: pricing flexibility (68.5%), no upfront investment (67.1%) convenience for the development teams (65.8%). Notably, a quarter of the respondents felt convenience for the development teams was least important of all, followed by no upfront investments. The highest rated in terms of importance were cost savings on hardware and cost savings on software.

4.2.4 *Adoption of Cloud Computing*

Table 4: Adoption of Cloud Computing

		(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**
Our business has adopted cloud computing technologies	Freq	7	5	4	6	18	27	15
	Perc	8.54	6.1	4.88	7.32	21.95	32.93	18.29

Cloud computing solutions are replacing legacy technologies in our business	Freq	5	2	8	12	15	20	34
	Perc	5.21	2.08	8.33	12.5	15.63	20.83	35.42
Our day to day tasks can only be accomplished using cloud computing systems	Freq	11	7	1	14	11	25	27
	Perc	11.46	7.29	1.04	14.58	11.46	26.04	28.13

Strongly Disagree (1) Disagree (2) Somewhat disagree (3) Neither agree nor disagree (4)Somewhat agree (5) Agree (6) Strongly agree (7)

The respondents were asked the extent to which they agree or disagree with three statements pertaining to adoption of cloud computing. Table 4 indicates that seven out of ten (73.2%) of respondents felt that their business had adopted cloud computing technologies, a fifth (19.5%) disagreed, while very few (7.3%) were unsure. A similar proportion (71.9%) felt that cloud computing solutions were replacing legacy technologies in their business, while few did not agree (15.6%) and 12% who were unsure. Further results show that six out seven employees (65.6%) felt that their day to day tasks could only be accomplished using cloud computing systems, a fifth disagreed (19.8%) while less than 14,6% were unsure.

4.2.5 *Innovativeness*

Table 5: Innovativeness

		(1)	(2)	(3)	(4)	(5)	(6)	(7)
Our business places strong emphasis on new and innovative products and services	Freq	1	6	6	2	18	22	34
	Perc	1	7	7	2	20	25	38
Our business has increased the number of services and products offered in the past two years	Freq	4	7	4	3	14	35	29
	Perc	4	7	4	3	15	36	30
In our business there is a strong relationship between the number of new ideas generated and the number of new ideas successfully implemented	Freq	4	7	4	3	14	35	29
	Perc	4	7	4	3	15	36	30

Our business places strong emphasis on continuous improvement in products and services	Freq	3	5	4	12	20	25	27
	Perc	3	5	4	13	21	26	28

Most respondents (80%) agreed that their businesses place strong emphasis on new and innovative products and services, (83.1%) felt that their businesses have increased the number of services and products offered in the past two years, (81.3%) and that there is a strong relationship between the number of new ideas generated and the number of new ideas successfully implemented. The least rated aspect of innovativeness was that business placed strong emphasis on continuous improvement in products and services (75.0%). These results indicate that the four aspects of innovativeness were highly rated in terms of importance.

4.2.6 *Risk Taking*

Table 6: Risk Taking

		(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**
When confronted with uncertain decisions, our business typically adopts a bold posture in	Freq	3	5	8	12	22	27	19
	Perc	3.13	5.21	8.33	12.5	22.92	28.13	19.79

order to maximise the probability of exploiting opportunities								
In general, our business has a strong inclination towards high-risk projects	Freq	3	5	8	12	22	27	19
	Perc	3.13	5.21	8.33	12.5	22.92	28.13	19.79
Owing to the environment, our business believes that bold, wide-ranging acts are necessary to achieve our business' objectives	Freq	2	5	6	10	21	30	22
	Perc	2.08	5.21	6.25	10.42	21.88	31.25	22.92
The term risk-taker is considered a positive attribute for	Freq		6	5	10	18	29	28
	Perc		6.25	5.21	10.42	18.75	30.21	29.17

employees in our business								

Table 6 indicates that 7 out of 10 respondents were in agreement on the four aspects of risk taking. They felt that when confronted with uncertain decisions, their business typically adopts a bold posture to maximise the probability of exploiting opportunities (70.8%). They felt that in general, their businesses have a strong inclination towards high-risk projects (70.8%). They also felt that owing to the environment, their businesses believes that bold, wide-ranging acts were necessary to achieve business objectives (76.1%). They further felt that the term risk-taker is considered a positive attribute for employees in our business (78.1%).

4.2.7 *Pro-activeness*

Table 7: Pro-activeness

		(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**
Our business is very often the first to introduce new products and services	Freq	2	9	4	17	22	24	18
	Perc	2.08	9.38	4.17	17.71	22.92	25	18.75
Our business introduces new cloud-based products, services and solutions	Freq	3	10	12	15	21	22	13
	Perc	3.13	10.42	12.5	15.63	21.88	22.92	13.54

ahead of its competitors								
Our business continuously monitors market trends and identifies future needs of our customers	Freq	3	3	5	10	12	38	25
	Perc	3.13	3.13	5.21	10.42	12.5	39.58	26.04

There were varied expressions by respondents on factors of pro-activeness. Two thirds of the respondents (66.6%) agreed that their businesses were very often the first to introduce new products and services, while a third (33,3%) disagreed to this. Five to six respondents (58.3%) agreed that business introduced new cloud-based products, services and solutions ahead of competition, with a quarter (26.1%) in disagreement, while 15.3% were uncertain. The highest rated aspect in this sub scale was that their businesses continuously monitored market trends and identified future needs of their customers (78.1%), with a fifth of them thinking otherwise.

4.2.8 *Performance*

Table 8: Performance

		(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**
Adopting cloud computing for our ICT systems has helped us to	Freq	3	8	2	18	10	32	23

reduce ICT operating costs								
	Perc	3.13	8.33	2.08	18.75	10.42	33.33	23.96
Cloud computing has helped our business to increase its revenue	Freq	2	6	4	14	16	22	32
	Perc	2.08	6.25	4.17	14.58	16.67	22.92	33.33
Cloud computing has helped our business to realise significant growth in turnover	Freq	3	3	4	8	16	26	36
	Perc	3.13	3.13	4.17	8.33	16.67	27.08	37.5

Table 8 indicates that two thirds of the respondents were generally in agreement that adopting cloud computing has helped to reduce ICT operating costs (67.7%), with a third (33.3%) having different sentiments. 7 out of 10 (72.9%) felt that cloud computing has helped their businesses to increase revenue, and a quarter (27.1%) feeling otherwise. The highest rated aspect in this sub scale was that cloud computing has helped their business to realise significant growth in turnover (81.3%), with a fifth felt otherwise.

4.2.9 *Principal Component Analysis*

PCA could not be performed because of inadequacy of sample size (n<100).

4.3 Descriptive Statistics

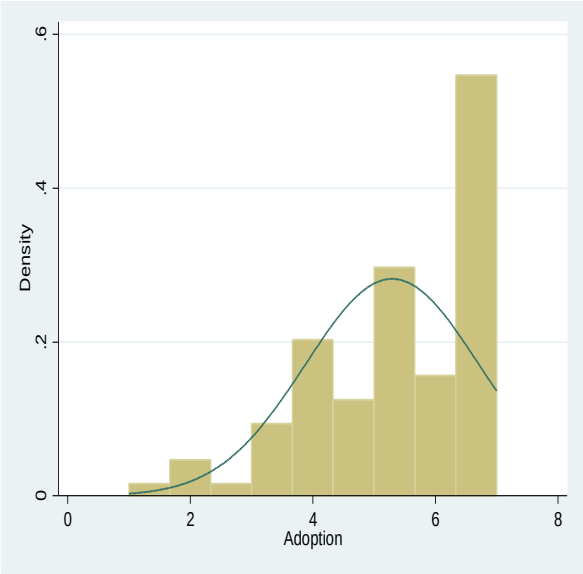


Figure 9: Adoption

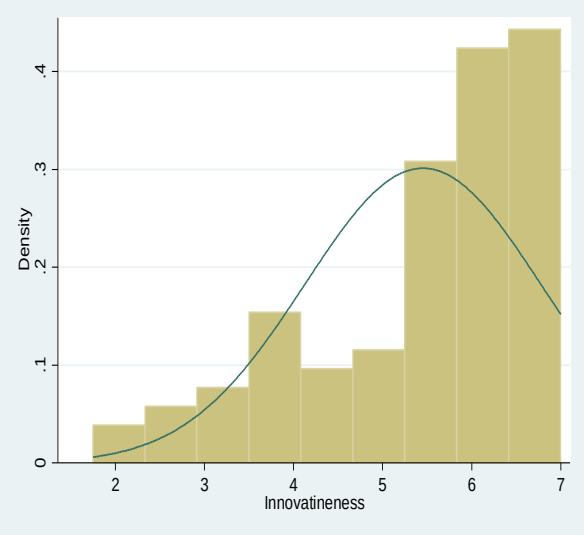


Figure 10: Innovativeness

Figures 9 and 10 above indicate that the data for the 2 dimensions of adoption and innovativeness scales were not normally distributed. The distribution is not bell

shaped, hence not symmetric. The data is skewed[1] to the right (towards importance). This pattern applies to innovativeness scale. The fact that the kurtosis[2] on the right tail of the distribution is not equal to zero is evidence of non-normally distributed data.

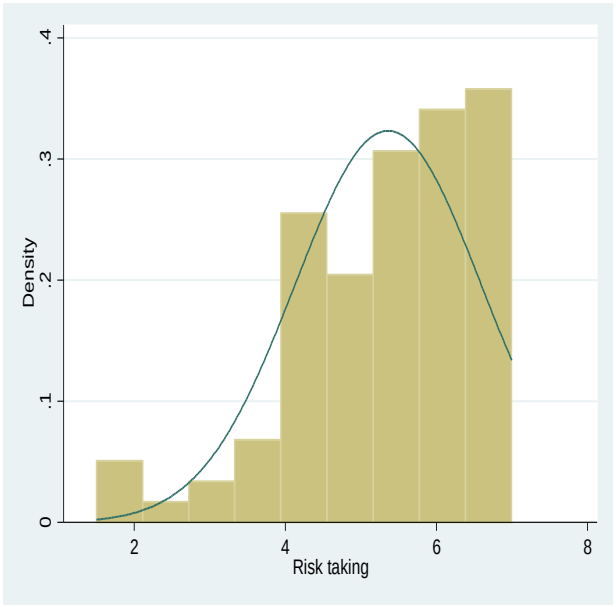


Figure 11: Risk-Taking

[1] Skewness measures the degree and direction of asymmetry.
[2] Kurtosis is a measure of tail extremity reflecting either the presence of outliers in a distribution or a distribution's propensity for producing outliers (Westfall, 2014)

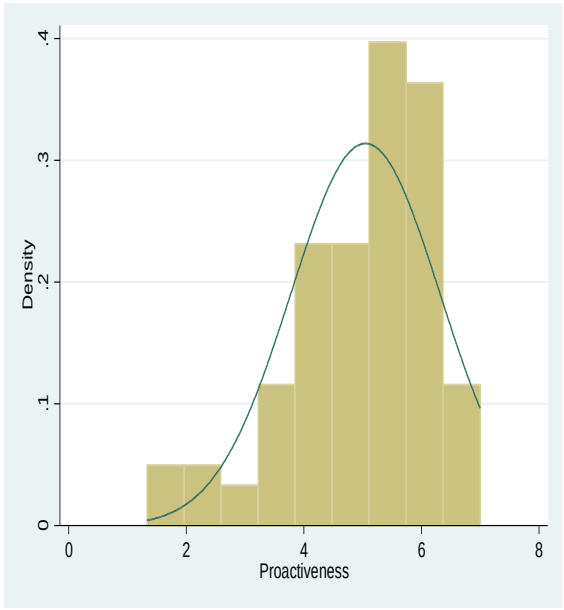


Figure 12: Pro-activeness

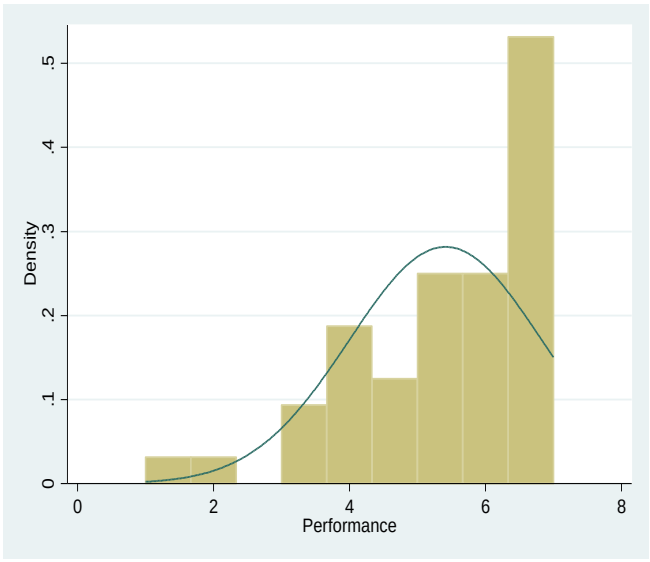


Figure 13: Performance

Figures 11, 12 and 13 above indicate that the data for the 3 dimensions of **risk taking**, **proactiveness and performance** scales were not normally distributed. The distribution is not bell shaped, hence it is not symmetric. The data is skewed[3] to the

[3] Skewness measures the degree and direction of asymmetry.

right (towards importance). The fact that the kurtosis[4] on the right tail of the distribution is not equal to zero is evidence on non-normally distributed data.

Table 9: Two tail significance at 5% level

	PERFM	EO	INNOV	RISK	PROACT	ADOP
PERFM	1					
EO	0.7340*	1				
INNOV	0.6977*	0.8987*	1			
RISK	0.5482*	0.8461*	0.6550*	1		
PROACT	0.6484*	0.8616*	0.6797*	0.5513*	1	
ADOP	0.5586*	0.6009*	0.6204*	0.3888*	0.5173*	1

Table 9 shows that there are significantly strong correlations amongst innovativeness, proactive and risk-taking factors of entrepreneurial orientation (EO). Innovativeness is strongly and positively associated with firm performance ($r=0.069$. $p<0.05$). Risk taking is strongly and positively associated with firm performance ($r=0.54$ $p<0.05$). Pro-activeness is strongly and positively associated with firm performance ($r=0.064$. $p<0.05$). Adoption of cloud computing is strongly and positively associated with firm performance ($r=0.069$. $p<0.05$). The results suggest that a unit increase in each of the EO factors is likely to increase firm performance

[4] Kurtosis is a measure of tail extremity reflecting either the presence of outliers in a distribution or a distribution's propensity for producing outliers (Westfall, 2014)

4.4 Results Pertaining to the Relationship between Adoption of Cloud Computing and Superior Firm Performance

The following tables tests the null hypothesis against the hypothesis that there is no relationship that exists between the independent factors and performance.

Table 10: Paired t-test- Adoption of Cloud Computing and Superior Firm Performance

Variable	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf.	Interval]
PERFM	96	5.41	0.14	1.42	5.126	5.700
ADOP	96	5.30	0.14	1.41	5.009	5.582
diff	96	0.12	0.14	1.33	0.387	0.151

mean(diff) = mean(ADOP - PERFM) t = -0.869 Pr(|T| > |t|) = 0.3866

Table 10 results indicate that there is a slight positive difference (Ho: mean (diff) >0) between the means of adoption of cloud computing and superior firm performance. The p-value associated with the t-test is not statistically significant at 5% level (p >0.05), hence, the null hypothesis (H0: mean (diff) = 0) of no relationship is not rejected. Although the t-statistics suggests a positive effect of adoption on performance, a conclusion can be made that that there is no evidence of this positive relationship between adoption of cloud computing and superior firm performance.

4.4 Results Pertaining to the Relationship between Entrepreneurial Orientation (EO) and Superior Firm Performance

H2a A positive relationship exists between innovativeness and superior firm performance

Table 11: Paired t-test: Innovativeness and Superior Firm Performance

Variable	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf.	Interval]
PERFM	89	5.42	0.15	1.46	5.112	5.727
INNOV	89	5.45	0.14	1.32	5.173	5.731
diff	89	-0.03	0.12	1.09	-0.197	0.262

mean(diff) = mean(INNOV - PERFM) t = -0.28 Pr(|T| > |t|) = 0.7766

Results from **Table 11** indicate that there is a negligible difference (Ho: mean (diff) <0), between the means of innovativeness in cloud computing and firm performance. The p-value associated with the t-test is not statistically significant at 5% level (p >0.05), hence, the null hypothesis (Ho: mean (diff) = 0) of no relationship is not rejected. Although the t-statistics suggests a slight negative effect of innovativeness on performance, a conclusion can be made that that there is no evidence of a relationship between innovativeness in cloud computing and superior firm performance.

H2b A positive relationship exists between risk-taking and superior firm performance

Table 12: Paired t-test: Risk-Taking and Superior Firm Performance

Variable	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf.	Interval]
PERFM	96	5.41	0.14	1.42	5.126	5.700
RISK	96	5.36	0.13	1.23	5.112	5.612
diff	96	0.05	0.13	1.27	0.308	0.206

mean (diff) = mean(RISK - PERFM) t = 0.39 Pr(|T| > |t|) = 0.69127

Table 12 results indicate that there is a difference (Ho: mean (diff) >0) between the means of risk-taking in cloud computing and superior firm performance. The p-value associated with the t-test is not statistically significant at 5% level (p >0.05), hence, the null hypothesis (Ho: mean (diff) = 0) of no relationship is not rejected. Although the t-statistics suggests a slight positive effect of risk-taking on performance, a conclusion can be made that that there is no evidence of this positive relationship.

H2c A positive relationship exists between proactiveness and superior firm performance

Table 13: Proactiveness and Superior Firm Performance

Variable	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf.	Interval]
PERFM	96	5.41	0.14	1.42	5.126	5.700
PROACT	96	5.05	0.13	1.27	4.791	5.306
diff	96	0.36	0.12	1.13	0.594	0.135

mean(diff) = mean(PROACT - PERFM) t = 3.14 Pr(|T| > |t|) = 0.0022

Table 13 results indicate that there is a difference (Ho: mean (diff) >0) between the means of proactiveness in cloud computing and superior firm performance. The p-value associated with the t-test is statistically significant at 5% level ($p < 0.05$), hence, the null hypothesis (Ho: mean (diff) = 0) of no relationship is rejected. The t-statistics suggests 3 times positive effect of proactiveness on performance. In this case, a conclusion can be made that that there is a relationship between proactiveness in cloud computing and superior firm performance.

H2 A positive relationship exists between entrepreneurial orientation (EO) and superior firm performance

Table 14: EO and Superior Firm Performance

Variable	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf.	Interval]
PERFM	89	5.42	0.15	1.46	5.112	5.727
EO	89	5.29	0.12	1.12	5.056	5.529
diff	89	0.13	0.11	0.99	-0.336	0.082

mean(diff) = mean(EO - PERFM) *t = 1.20* *Pr(|T| > |t|) = 0.23*

Entrepreneurial orientation (EO) was defined as the resultant of acts of of risk taking, proactiveness and innovativeness. Table 14 results indicate that there is a slight difference (Ho: mean (diff) >0) between the means of entrepreneurial orientation (EO) in cloud computing and superior firm performance. The p-value associated with the t-test is not statistically significant at 5% level (p >0.05), hence, the null hypothesis (Ho: mean (diff) = 0) of no relationship is not rejected. Although the t-statistics suggests a positive effect of entrepreneurial orientation (EO) on performance, a conclusion can be made that that there is no evidence of a positive relationship.

4.5 Results Pertaining to the Relationship Between Adoption of Cloud Computing and EO, which Leads to Superior Firm Performance

Table 15: The Effect of Adoption and EO on Performance

	Coef.	Std. Err.	z	P>z	[95% Conf.	Interval]
Structural						
PERFM <-						
ADOP	0.26	0.09	2.88	0.004	0.083	0.435
EO	0.76	0.11	6.79	0	0.540	0.979
_cons	0.14	0.50	0.03	0.977	-0.965	0.993
var(e.PERFM)	0.89	0.13			0.662	1.191

Table 15 results indicate that the p-value associated with adoption and EO are statistically significant at 5% level ($p < 0.05$), hence, the null hypothesis (Ho: mean (diff) = 0) of no relationship is rejected. A conclusion can be made that that there is evidence of a positive relationship between adoption of cloud computing and EO, which leads to superior firm performance. The β-coefficients indicate that adoption combined with EO has 26% positive chances of influencing performance, while EO alone had 76% likelihood of doing so. Although preceding tests indicated a weak relationship between adoption of cloud computing and firm performance, these results overrule and conclude that adopting cloud computing leads to superior performance in firms.

H3a A positive relationship exists between adoption of cloud computing and innovativeness, which leads to superior firm performance

Table 16: The Effect of Adoption and Innovativeness on Performance

	Coef.	Std. Err.	z	P>z	[95% Conf.	Interval]
Structural						
PERFM <-						
ADOP	0.29	0.10	2.93	0.003	0.094	0.472
INNOV	0.58	0.10	5.73	0	0.384	0.783
_cons	0.73	0.48	1.52	0.129	-0.212	1.668
var(e.PERFM)	.98	0.15			0.734	1.321

Table 16 results indicate that the p-value associated with adoption and EO are statistically significant at 5% level ($p < 0.05$), hence, the null hypothesis (Ho: mean (diff) = 0) of no relationship is rejected. There is evidence of a positive relationship between adoption of cloud computing and innovativeness, which leads to superior firm performance. The β-coefficients indicate that adoption combined with innovation has 29% positive chances of influencing performance, while Innovation had 58% likelihood of doing so.

H3b A positive relationship exists between adoption of cloud computing and proactiveness, which leads to superior firm performance

Table 17: The Effect of Adoption and Pro-activeness on Performance

	Coef.	Std. Err.	z	P>z	[95% Conf.	Interval]
Structural						
PERFM <-						
ADOP	0.31	0.09	3.57	0	0.138	0.473
PROACT	0.54	0.10	5.75	0	0.361	0.734
_cons	1.04	0.47	2.2	0.028	0.113	1.956
var(e.PERFM)		0.15			0.765	1.348

Table 17 results indicate that the p-value associated with adoption and proactiveness are statistically significant at 5% level ($p < 0.05$), hence, the null hypothesis (Ho: mean (diff) = 0) of no relationship is rejected. This is evidence of a positive relationship between adoption of cloud computing and proactiveness, which leads to superior firm performance. The β-coefficients indicate that adoption put together with proactiveness has 31% positive chances of influencing performance, while proactiveness had 54% likelihood of doing so.

H3c A positive relationship exists between adoption of cloud computing and risk-taking, which leads to superior firm performance

Table 18: The Effect of Adoption and Risk-Taking on Performance

Coef.		Std. Err.	z	P>z	[95% Conf.	Interval]
Structural						
PERFM <-						
ADOP	0.41	0.08	4.91	0	0.245	0.570
RISK	0.48	0.10	4.71	0	0.261	0.634
_cons	0.85	0.54	1.58	0.114	-0.203	1.909
var(e.PERFM)	1.11	0.16			0.836	1.473

Table 18 results indicate that the p-value associated with adoption and risk-taking are statistically significant at 5% level ($p < 0.05$), hence, the null hypothesis (Ho: mean (diff) = 0) of no relationship is rejected. This is evidence of a positive relationship between adoption of cloud computing and risk-taking, which leads to superior firm performance. The β-coefficients indicate that adoption put together with risk-taking has 41% positive chances of influencing performance, while proactiveness had 48% likelihood of doing so.

Table 19: Multiple Regression Analysis

PERFM	Coef.	Std. Err.	t	P>t	[95% Conf.	Interval]
ADOP	0.32	0.101	3.14	0.003	0.1150	0.5192
INNOV	0.16	0.152	1.06	0.293	-0.1420	0.4633
RISK	0.09	0.110	0.78	0.437	-0.1340	0.3065
PROACT	0.33	0.115	2.89	0.005	0.1028	0.5634
Position	-0.08	0.085	-0.93	0.354	-0.2485	0.0902
No. of employees	-0.01	0.076	-0.08	0.935	-0.1587	0.1461
Annual turnover	0.01	0.089	0.08	0.935	-0.1711	0.1858
Age of organisation	-0.30	0.129	-2.33	0.023	-0.5588	-0.0426
_cons	2.14	0.836	2.56	0.013	0.4718	3.8122

Table 19 indicates that two factors were significant in having effects on firm performance. Adoption had 32% likelihood of improving performance, defined as

annual profit. Proactiveness had 33% likelihood of improving performance, a unit increase in proactiveness is likely to improve profit by 32%. Firms that were registered for fewer years were more likely to increase performance by 30%.

4.6 Summary of the Results

This chapter summarises the empirical findings of the study. The demographic profile of the results was explained. Descriptive summaries of variables were also given. Tests for skewness and kurtosis were performed to determine the distributions of variables for normality.

Correlation and multiple regression analysis were performed on the hypothesis for basis to accept or reject the study's hypotheses. Table 20 below summarises the results from hypothesis testing:

Table 20: Results of Hypothesis

H1	A positive relationship exists between adoption of cloud computing and superior firm performance	Accepted
H2	A positive relationship exists between EO and superior firm performance	Rejected
H2a	A positive relationship exists between innovativeness and superior firm performance	Rejected
H2b	A positive relationship exists between proactiveness and superior firm performance	Accepted
H2c	A positive relationship exists between risk-taking and superior firm performance	Rejected

H3	A positive relationship exists between adoption of cloud computing and EO, which leads to superior firm performance	Accepted
H3a	A positive relationship exists between adoption of cloud computing and innovativeness, which leads to superior firm performance	Accepted
H3b	A positive relationship exists between adoption of cloud computing and proactiveness, which leads to superior firm performance	Accepted
H3c	A positive relationship exists between adoption of cloud computing and risk-taking, which leads to superior firm performance	Accepted

CHAPTER 5. DISCUSSION OF THE RESULTS

5.1 Introduction

This chapter discusses findings from the empirical survey. The demographic profile of respondents is discussed. Results of hypothesis tests are summarised, and a conclusion is drawn.

5.2 The Outlook of Cloud Computing Adoption on South African SMEs

5.2.1 *Management and Cloud Computing*

The activities of experimenting with new technologies such as cloud computing is a management function that reflects on the methods, practices, and decision-making styles that managers use to pursue and exploit opportunities (Lumpkin & Dess, 1996). This is consistent with findings from the study which show that most respondents are employees in management at junior, mid and C-levels. Entrepreneurial orientation is a characteristic of management and it is demonstrated by the willingness to proactively adopt technological innovations such as cloud computing, even when the benefits are uncertain (Morris & Sexton, 1996). It is the role of management to demonstrate the willingness to seize new opportunities and appetite to undertake risky ventures.

5.2.2 *SME Demographic in South Africa*

The study shows consistent attributes with the SME demographic in South Africa. SMEs are categorised differently by every sector based on the number of employees and annual turnover. In broad terms, SMEs are categorised as companies that have turnover up to R50 million (Department of Trade and Industries, Republic of South Africa, 2003) and up to 200 employees. SMEs in South Africa have turnover below R50 million, and they also often have employees below 200.

Organisation infrastructural factors such as skills and expertise related to technology influence adoption of cloud computing (Gangwar, Date, & Ramaswamy, 2015). The more technology skills are found in firms influence higher levels of adoption of

technology innovations. This is consistent with the finding from the study as the technology and telecommunications sectors have the highest frequency of firms that are using cloud computing.

Small businesses in South Africa adopt cloud computing to leverage comparative advantage to compete with big businesses relative to their size. Although most firms that are using cloud computing have been in existence for between 2 and 5 years and more than 10 years, there is no basis from literature upon which to support or refute the influence of the number of years of existence on adoption of cloud. The largest number of firms that have adopted cloud computing a fairly new, followed by organisations that have been in existence for more than 10 years.

5.2.3 *Cloud Computing*

Based on the results, the findings are consistent with literature. Most respondents (70%) indicated their businesses have adopted cloud computing. This is consistent with literature suggesting that more than 50% of businesses in South Africa are indeed using cloud computing, most them being SMEs (Muhammed et al., 2015).

Although there are indications of widespread applications of cloud computing, higher levels of adoption are concentrated in the SaaS and SaaS configurations rather than the IaaS and PaaS architectures. Cloud service architectures follow stacking models where each architectural model provides levels of abstraction and automation of tasks (Kevis, 2014). Abstractness and automation provide agility to consumers, so they spend less time on managing infrastructure, freeing them to focus on their business (Kevis, 2014). IaaS is the most abstract and has the least automation; meaning that it requires the most effort, skill and expertise from the consumer to create functional cloud-based systems. PaaS has moderate abstractness, and SaaS is the least abstract and it provides the most automation. SaaS cloud vendors provide complete software solutions which require very little effort from users to configure and customise and use complete solutions.

Factors of organisational infrastructure and expertise related to technology influence the extent of adoption of cloud computing (Gangwar et al, 2015). The largest providers of IaaS and PaaS facilities are Google Cloud, Amazon Web Services and Microsoft

Azure. Implementing cloud solutions via these means is more complex, it requires higher levels of skill and expertise, capitals which are not found in SMEs. It is natural that IaaS and PaaS models are unpopular due to the limited availability of skill and expertise and effort required to develop solutions for them.

The pervasiveness of SaaS models is also attributed to the low cost of entry of services offered for SaaS. Google Drive and DropBox have free service plans for low disk space applications (below 15GB and 2GB respectively). Customer relationship management software such as HubSpot CRM and ZOHO are free. This finding also confirms why businesses rated the importance to cost savings on hardware and software the highest. Cloud computing provides huge cost savings and leverage for small businesses that do not have the resources to adequately support functions that may not necessarily be their core business.

SMEs in South Africa have embraced cloud computing although its knowledge and skills are not so widespread. While larger companies are usually multinationals who have a huge number of staff and a wider pool of skills, SMEs have smaller staff compliments that lack talent and expertise on cloud computing, which hinders their ability to exploit it to its fullest potential (Johnston, Loot, & Esterhuyse, 2016).

5.2.4 *Adoption of Cloud Computing*

SMEs in South Africa are leading their corporate counterparts in adopting cloud computing (Pieterse, 2013). The findings indicate that for core operations, small businesses have embraced cloud over legacy systems owing to their nimble and flexible nature, with the absence of bureaucratic models and legacy systems that daunt bigger organisations. Start-ups, small businesses and risk-taking enterprises make up the largest collection of early adopters of cloud computing (Kevis, 2014).

5.2.5 *EO*

EO measures entrepreneurial behaviour using the dimensions of innovativeness, risk-taking and pro-activeness. EO and its attributes of innovativeness, high appetite for risk, and proactiveness were highly rated in terms of importance. Literature suggests

that innovativeness, proactiveness and risk-taking happen together, and it takes the presence of one for the others to be present also.

Innovativeness

The findings reflect on overwhelmingly high importance given towards innovative practices in firms. Although innovation is highly prioritised in South African firms, according to Global Entrepreneurship Monitor report, South Africa ranks very low amongst factor economies in innovation (Kelley et al., 2015). This can be explained by extant literature which does not conclusively show a causative relationship between perceptions of innovativeness and innovation.

Risk-taking

As is the case with innovativeness, firms have high risk-taking propensities. This is not surprising because it follows the same pattern as innovativeness.

Proactiveness

The findings on proactiveness follow the same trajectory as innovativeness and risk-taking; firms reflected high proactive inclinations in their practices. This is consistent with the results showing significantly strong correlations amongst innovativeness, proactive and risk-taking factors of EO, confirming literature which suggests that where characteristics of innovativeness are present, risk-taking and proactiveness characteristics will be shown (Avlonitis & Salavou, 2007; Geneedy, 2016).

5.3 Adoption of Cloud Computing and Performance

Cloud computing provides efficient, scalable, and cost-effective ways for businesses to deliver information technology services over the Internet (Stahl, et al., 2012). According to the Resource Based View, firms that have resources, capabilities and exceptional characteristics gain superior competitive advantages to achieve superior performance over those that do not (Camisón & Villar-López, 2014).

The findings from the study confirm that superior financial performance is enhanced by technological innovation such as cloud computing. Firms that successfully create unique IT capabilities from cloud computing architectures master superior financial

performance by bolstering firm revenues and/or decreasing operational costs (Bharadwaj, 2000). Cloud computing has unique ability to facilitate positive outcomes from achieving IT economies of scale, cost reductions and access to professional skills for small businesses (Garrison, Wakefield, & Kim, 2015).

5.4 EO and Firm Performance

EO is a trait found in organisations that practice innovation frequently and extensively, exhibiting high risk-taking propensities, and that are highly aggressive (Gautam, 2016). Results from the empirical study show that there is, however, no evidence supporting the hypothesis that entrepreneurial orientation leads to high performance in firms. This is in contradiction to literature which posits that entrepreneurial orientation is an important component driving firm success (Urban & Sefalafala, 2015); and organisations that have higher levels of EO perform better than organisations that don't (Gautam, 2016).

Empirical findings show that individual factors of EO have different effects on firm performance. Since this study was conducted in the context of adoption of cloud computing, the adoption of cloud computing may be a moderating factor in the relationship between EO and firm performance. This is particularly possible for economies like South Africa whom although they have widely adopted cloud computing, the extent of innovation within the adoption of cloud computing may still be low owing to a lack of skill and expertise within small staff compliments (Johnston et al., 2016).

5.4.1 *Innovativeness*

The findings show that innovativeness does not show evidence of a positive relationship with firm performance. This finding contradicts research conducted by Booyens (2011) which reported high innovation rate in South African SMMEs. A possible explanation may be that dissimilar contexts may exhibit attributes of innovativeness, risk-taking and proactiveness in EO to different extents. Moreover, the adoption of cloud computing by South African firms has not advanced the frontiers of

knowledge through investments in R&D, or registration of patents, or even collaborations with R&D institutions such as universities.

Although cloud computing is widespread in South Africa, it is still at its nascent stages of development and lacking expertise and complex formations that extend the applications thereof.

5.4.2 *Risk-taking*

The findings show that risk-taking follows the same trajectory as innovativeness; there is no evidence of a positive relationship with firm performance. Although innovativeness, risk-taking and proactive propensities happen together, it is important to understand how each of them influence firm performance. Because the EO of firms is demonstrated by organisational routines such as strategy, decision making behaviours and management styles which drive firm success (Bouncken, Pluschke, Pesch, & Kraus, 2016), different organisations in different industries and sectors may demonstrate different levels of innovativeness, risk-taking and pro-activeness. This finding is consistent with findings from Lumpkin & Dess (1996) which suggest that the dimensions of EO in any given context may vary independently of each other.

5.4.3 *Proactiveness*

Unlike innovativeness and risk-taking, empirical findings show that proactiveness has a strong and positive influence on firm performance. This finding corresponds with that reported from a study conducted to investigate the effect of EO on the performance in small businesses from the Eastern Cape province in South Africa where proactiveness recorded a significant positive influence, whilst innovativeness and risk-taking recorded minor influence on business performance (Matchaba-Hove, Farrington, & Sharp, 2015). It is possible that innovativeness, risk-taking and proactiveness are mutually exclusive components of EO that may not necessarily be equally represented in every context.

5.5 The Impact of Adoption of Cloud Computing and EO on Firm Performance

5.5.1 *The Effect of the Interaction between Adoption and EO on Firm Performance*

The primary focus of this study was to investigate the influence of cloud computing adoption and the characteristics found in firms that drive performance. Although there was no evidence of a strong and positive relationship between EO and firm performance, findings support the hypothesis that the interaction between adoption of cloud computing and EO leads to firm performance.

Adoption of cloud computing is a demonstration of the characteristics of EO. It requires innovativeness to try new means ends configurations to drive firm performance. Implementing cloud computing is risk-taking, and it demonstrates the proactiveness of management. The findings are consistent with literature that suggests that the behaviour of management are proactive, who take risk in experimenting with new things drives firm performance over those who do not.

5.5.2 *The Effect of the Interaction between Adoption and Innovativeness on Firm Performance*

Innovativeness did not show a direct significant relationship with firm performance. However, accounting for its interaction with adoption showed a strong positive relationship. That is because innovativeness is an organisational attribute of top management that directly influences the adoption of cloud computing. The organisation dimension of the TOE framework measures the firm's innovation-adoption decisions that influence technology capabilities (Gangwaret al., 2015).

5.5.3 *The Effect of the Interaction between Adoption and Risk-taking on Firm Performance*

Alike innovativeness, risk-taking did not show a positive significant relationship with firm performance, but it showed a strong positive relationship only when accounting

for its interaction with adoption. A possible explanation may be that because innovativeness takes place where risk-taking propensities are also present, they follow a similar trend where they are both present.

5.5.4 *The Effect of the Interaction between Adoption and Proactiveness on Firm Performance*

Unlike innovativeness and risk-taking, proactiveness showed a strong and positive significant relationship with firm performance as well as when accounting for its interaction with adoption. Proactiveness is also an organisational attribute of top management that directly influences the adoption of cloud computing.

Extant literature approves of the individual impact of adoption of cloud computing and EO on firm performance. However, this study established that a strong and positive effect exists from the interaction between EO and adoption, leading to firm performance.

Firms that acquire new means to achieve some new ends must be innovative, proactive and have high-risk propensity in the first instance (Ratten, 2016). Being innovative and creative, experimenting with and being supportive of new ideas around the cloud computing adoption and implementation leads to firm performance (Bouncken, Pluschke, Pesch, & Kraus, 2016).

In conclusion, SMEs that tactically and purposefully adapt and utilise cloud computing technology to achieve specific business ends can provide superior products and services that cannot be matched by those that don't (Garrison, Wakefield, & Kim, 2015).

5.6 Conclusion

The results from empirical findings confirmed the positive impact of adoption of cloud computing and EO on firm performance. Although innovativeness, risk-taking and pro-activeness on performance could not individually influence performance, when their interaction with adoption is accounted for, they showed a significant positive influence on performance.

In a nutshell, firms that make cloud computing deployments which are informed and supported by creative, novel ideas to identify future trends and pursue new opportunities drive firm performance.

CHAPTER 6: CONCLUSIONS, IMPLICATIONS AND RECOMMENDATIONS

6.1 Introduction

This chapter gives a conclusive summary of this study. A summary of the purpose and context of this study is given, followed by the results from the empirical findings. Details for implications and recommendations from this study are explained, and limitations and suggestions for future research are espoused.

6.2 Conclusions of the Study

The purpose of the study was to investigate the extent to which SMEs in South Africa are using cloud computing. Cloud computing bequeaths tremendous benefits to South African SMEs; scale, on demand resources at a fraction of cost; giving them opportunities of entry into markets with superior products and services. This study explored the application of cloud computing in SMEs in South Africa. It also examined the influence of decision-making styles, the processes and practices undertaken by managers in pursuing opportunities availed in cloud computing and how they influence firm performance.

A model for research was developed with the TOE framework to understand the adoption factors of cloud computing, coupled with other moderating factors investigating the concept of EO.

A firm that has unique resources, abilities and special characteristics in its possession has a competitive advantage over one that does not, and that unique advantage enables it to perform exceptionally (OECD, 2017). Cloud computing endows firms with ability to achieve exceptional economies of scale by reducing the cost of accessing extraordinary skills and resources that drive performance (Garrison, Wakefield, & Kim, 2015). Findings from this study have confirmed the effect of cloud computing adoption and EO attributes on performance for SMEs in South Africa.

The study has also validated that adoption of cloud computing does not happen in isolation. It happens in a context of organisational characteristics that moderate the extent of performance.

6.3 Implications and Recommendations

This study has practical implications on application of technology in SMEs. Although this study is restricted to cloud computing, the principles apply to IT-decision making around other cutting-edge technologies such as robotics, machine learning, internet of things and virtual realities.

Managers must invest in purposive cloud computing projects that drive business growth. To accomplish that, they need specialised IT workforce at their disposal. SMEs traditionally do not enjoy the luxury of bloated skilled resources to influence decision-making and technology implementations. Therefore, managers must invest in recruiting IT specialists who have skill sets across the conventional IT environments and the cloud platforms.

It is also of vital importance that managers fully comprehend the cloud computing and the various deployment model. Cloud computing gives unprecedented agility to organisations and significantly reduces costs. Managers ought to invest in training to upskill themselves and their employees in the knowledge domains of cloud computing.

For policy makers, markets like South Africa have incredible growth opportunities. Young, technology-savvy workforce has ability to develop innovative technology concepts that must be supported by adequately resourced innovation ecosystems. The development of this sector can extend the frontiers of innovation on cloud computing through advances in R&D and patents.

6.4 Limitations of the Study

This study was limited to a very small subset of small and medium size businesses in South Africa. The findings herein may not apply to organisations of other geographies and of different sizes. Because of the small sizes in the number of staff in SMEs, the

respondents may not be specialists in the fields information technology and cloud computing.

Limited literature on cloud computing in South Africa implied that the literature reviewed for this study was drawn from the rest of the world. Literature from the rest of the world does not necessarily apply to South African context.

A significant number of respondents were unsure and did not understand concepts such as models and architectures of cloud computing. Moreover, responses were collected from management in SMEs. Because SMEs do not have the privilege of huge staff, the absence of widespread skills and knowledge on technology and cloud computing may not be representative of expert opinion. Moreover, specialist knowledge in fields such as cloud computing is normally outsourced, implying that staff within SME institutions may not be privy to intricate details about cloud computing, architectures and models for adoption.

The deployment of cloud computing is SMEs is vast and broad, which makes it difficult to use one standard of measure to gauge the extent that cloud computing it being utilised in firms.

6.5 Suggestions for Further Research

Cross-sectional data collection does not give definite results of causality. Future research may conduct longitudinal research designs to understand the innovation performance of cloud computing on SMEs.

The study was conducted across sectors and industries. As a result, decisive extents of the effect of constructs such as innovativeness, risk-taking and pro-activeness on performance cannot be established. Future research may need to conduct sector-specific studies to find the moderating effects of these on performance.

The scales used in this study could also not precisely gauge the extend of adoption of cloud computing amongst SMEs in South Africa. Although adoption of cloud computing is widespread, it is difficult to extrapolate the gap that exists between deployments and opportunities. Future studies may need to employ different instruments to understand the extent of application of cloud computing.

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APPENDIX A: RESEARCH INSTRUMENT

The Impact of Cloud Computing on the Innovation Performance of South African SMEs

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Start of Block: PREAMBLE

The University of Witwatersrand
Graduate School of Business Administration
Cell: *084 219 8011*
Email: *abelphard@gmail.com*

Date: *25 November 2017*

Dear Sir/Madam

Thank you for paying attention to this questionnaire. The purpose of this research is to examine the impact of cloud computing on innovation performance in South African SMEs.

I am therefore appealing for your assistance to complete the questionnaire herein. This research is purely for academic purposes and the information you provide will be kept in strict confidence.

The survey will take you approximately ***5 minutes to complete****.*

Yours Sincerely

Abelphard Murimbika

Cand. Master of Management - Entrepreneurship, New Venture Creation

End of Block: PREAMBLE

Start of Block: SECTION A

Q1 Has your organisation adopted cloud computing?

- O Yes (1)
- O No (2)
- O Don't know (3)

Skip To: End of Survey If Has your organisation adopted cloud computing? = No

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Q2 In which categories is your organisation using cloud computing?

- ☐ Private/Internal Cloud (1)
- ☐ SaaS (2)
- ☐ IaaS (3)
- ☐ PaaS (4)
- ☐ SaaS (5)
- ☐ Not sure (6)

Q3 What does your organisation view as the most important benefits of cloud computing?

	Not Important (1)	Not very Important (2)	Somehow not Important (3)	Neutral (4)	Somehow Important (5)	Very Important (6)	Most Important (7)
Cost savings on hardware (1)	O	O	O	O	O	O	O
Cost savings on software (2)	O	O	O	O	O	O	O
Cost savings on IT operations staff (3)	O	O	O	O	O	O	O
Ability to rapidly launch new products and services (4)	O	O	O	O	O	O	O
Ability to grow and shrink IT capacity on demand (5)	O	O	O	O	O	O	O
Convenience for the development teams (6)	O	O	O	O	O	O	O

No upfront investment (7)	O	O	O	O	O	O	O
Pricing flexibility (8)	O	O	O	O	O	O	O
Better collaboration across teams (9)	O	O	O	O	O	O	O
Outsourcing of non-core competencies (10)	O	O	O	O	O	O	O

End of Block: SECTION A

Start of Block: SECTION B

Q4 At what level is your position in the organisation?

- O C-Level Management (1)
- O Middle Management (2)
- O Junior Management (3)
- O IT Staff (4)
- O Other (5)

Q5 How many employees in total are working at your organisation

- O Less than 20 (1)
- O 20 to 50 Employees (2)
- O 50 to 100 (3)
- O 100 to 200 (4)
- O 200 to 500 (5)
- O More than 500 (6)

Q6 What is the annual turnover for your organisation

- O Less than R200,000 (1)
- O R200,000 to 500,000 (2)
- O R500,000 to R1 Million (3)
- O R1 Million to R5 Million (4)
- O R5 Million to R20 Million (5)
- O R20 Million to R50 Million (6)
- O More than R50 Million (7)

Q7 In what industry/sector is your organisation

- O Automotive (1)
- O Retail (2)
- O Food (3)
- O Manufacturing (4)
- O Financial Services (5)
- O Technology (6)
- O Telecommunications (7)
- O Heath (8)
- O Other (9) _____

Q8 How many years has your organisation been operational?

- O Less than 1 year (1)
- O 1 to 2 years (2)
- O 2 to 5 years (3)
- O 5 to 10 years (4)
- O More than 10 years (5)

End of Block: SECTION B

Start of Block: SECTION C

Q9 Please indicate the extent to which you agree or disagree with the statement by ticking the corresponding number in the 7 point scale below:

	Strongly Disagree (1)	Disagree (2)	Somewhat disagree (3)	Neither agree nor disagree (4)	Somewhat agree (5)	Agree (6)	Strongly agree (7)
Our business has adopted cloud computing technologies (1)	O	O	O	O	O	O	O
Cloud computing solutions are replacing legacy technologies in our business (2)	O	O	O	O	O	O	O
Our day to day tasks can only be accomplished using cloud computing systems (3)	O	O	O	O	O	O	O

End of Block: SECTION C

Start of Block: SECTION D

Q10 Please indicate the extent to which you agree or disagree with the statement by ticking the corresponding number in the 7 point scale below:

	Strongly Disagree (1)	Disagree (2)	Somewhat disagree (3)	Neither agree nor disagree (4)	Somewhat agree (5)	Agree (6)	Strongly agree (7)
Our business places strong emphasis on new and innovative products and services (1)	O	O	O	O	O	O	O
Our business has increased the number of services and products offered in the past two years (2)	O	O	O	O	O	O	O

In our business there is a strong relationship between the number of new ideas generated and the number of new ideas successfully implemented (3)	O	O	O	O	O	O	O
Our business places strong emphasis on continuous improvement in products and services (4)	O	O	O	O	O	O	O

End of Block: SECTION D

Start of Block: SECTION E

Q11 Please indicate the extent to which you agree or disagree with the statement by ticking the corresponding number in the 7 point scale below:

	Strongly disagree (1)	Disagree (2)	Somewhat disagree (3)	Neither agree nor disagree (4)	Somewhat agree (5)	Agree (6)	Strongly agree (7)
When confronted with uncertain decisions, our business typically adopts a bold posture in order to maximise the probability of exploiting opportunities (1)	O	O	O	O	O	O	O
In general, our business has a strong inclination towards high-risk projects (2)	O	O	O	O	O	O	O

Owing to the environment, our business believes that bold, wide-ranging acts are necessary to achieve our business' objectives (3)	O	O	O	O	O	O	O
The term risk-taker is considered a positive attribute for employees in our business (4)	O	O	O	O	O	O	O

End of Block: SECTION E

Start of Block: SECTION F

Q12 Please indicate the extent to which you agree or disagree with the statement by ticking the corresponding number in the 7 point scale below:

	Strongly disagree (1)	Disagree (2)	Somewhat disagree (3)	Neither agree nor disagree (4)	Somewhat agree (5)	Agree (6)	Strongly agree (7)
Our business is very often the first to introduce new products and services (1)	O	O	O	O	O	O	O
Our business introduces new cloud-based products, services and solutions ahead of its competitors (2)	O	O	O	O	O	O	O

Our business continuously monitors market trends and identifies future needs of our customers (3)	O	O	O	O	O	O	O

End of Block: SECTION F

Start of Block: SECTION G

Q13 Click to write the question text

	Strongly disagree (1)	Disagree (2)	Somewhat disagree (3)	Neither agree nor disagree (4)	Somewhat agree (5)	Agree (6)	Strongly agree (7)
Adopting cloud computing for our ICT systems has helped us to reduce ICT operating costs (1)	O	O	O	O	O	O	O
Cloud computing has helped our business to increase its revenue (2)	O	O	O	O	O	O	O

Cloud computing has helped our business to realise significant growth in turnover (3)	O	O	O	O	O	O	O

End of Block: SECTION G

APPENDIX B: CONSISTENCY MATRIX

Sub-problem	Literature Review	Hypotheses	Source of data	Type of data	Analysis
To what extent does adoption of cloud computing influence superior firm performance	(Moghavvemi, Hakimian, & Feissal, 2012) (Oliveira & Martins, 2011)	**H_1 A positive relationship exists between adoption of cloud computing and superior firm performance**	Use research instrument to survey data	Interval	Correlation Analysis, Multiple Regression Analysis
To what extent does EO influence superior firm performance	(Camisón & Villar-López, 2014) (Avlonitis & Salavou, 2007)	**H_2 A positive relationship exists between EO and superior firm performance** **H_{2a} A positive relationship exists between innovativeness and superior firm performance**	Use research instrument to survey data	Interval	Correlation analysis, Multiple regression analysis

		H_{2b} A positive relationship exists between proactiveness and superior firm performance **H_{2c} A positive co-relationship exists between risk-taking and superior firm performance**			
To what extent does the relationship between adoption of cloud computing and EO influence superior firm performance	(Avlonitis & Salavou, 2007) (Camisón & Villar-López, 2014) (Urban & Sefalafala, 2015)	**H_3 There exists positive interaction between adoption of cloud computing and EO, which leads to superior firm performance**	Use research instrument to survey data	Interval	Correlation analysis, Multiple regression analysis
To what extent does the relationship between	(Avlonitis & Salavou, 2007)	**H_{3a} There exists positive interaction between adoption of cloud computing**	Use research instrument to survey data	Interval	Correlation analysis, Structured

adoption of cloud computing and I. innovativeness, II. proactiveness, and III. risk-taking influence superior firm performance	(Camisón & Villar-López, 2014) (Urban & Sefalafala, 2015)	**and innovativeness, which leads to superior firm performance** **H_{3b} There exists positive interaction between adoption of cloud computing and proactiveness, which leads to superior firm performance** **H_{3c} There exists positive interaction between adoption of cloud computing and risk-taking, which leads to superior firm performance**			Equation Modelling, Multiple Regression Analysis

APPENDIX C: DRAFT COVER LETTER

Dear Sir/Madam

My name is Abelphard Murimbika. I am completing my Master of Management Degree in Entrepreneurship, New Venture Creation with Wits University.

For the purposes of my degree, I am conducting an empirical research study on the impact of cloud computing on SMEs in South Africa. As a business owner/senior manager in your organisation I am inviting you to complete an online questionnaire pertaining to how cloud computing has aided innovation within your organisation.

If you consent to participate, the online survey will take approximately 15 minutes to complete. The questionnaire consists of 50 questions related to company demographics, cloud computing adoption and innovation characteristics. Please understand that your participation is voluntary. The choice of whether to participate or not, is yours alone. No risks, penalties or losses will be incurred if you opt not to participate in the study. If you agree to participate, you may stop participating in the research at any time by simply exiting from the online survey. If you do this, there will be no penalties or losses and you will not be prejudiced in any way. This questionnaire is for research purposes only. There are no right or wrong answers.

All responses will be kept strictly confidential. Moreover, all responses are anonymous as neither your name nor any information that can be used to identify your organisation is recorded. Results will only be reported in the aggregate and a copy of the report will be made available to respondents on request. All data will be destroyed once the University requirements have been met. Results of this study will promote our understanding of cloud computing adoption by South African firms and the factors influencing the organisational adoption decision.

Thank you for considering your participation.

If you would like to receive feedback on my study or have any concerns or questions about the research please contact me on 1539774@students.wits.ac.za or 084 219 8011 or you may contact my supervisor Dr Diran Soumonni Email:

Diran.Soumonni@wits.ac.za at Wits Business School. By submitting the completed questionnaire your consent to participate in the research is assumed and you understand that you are participating voluntarily and that you can withdraw your participation at any stage.

APPENDIX C: CONSENT FORM

Analysis of motivations of sustainable entrepreneurship in Gauteng Province

Who I am

Hello, I am Abelphard Murimbika (Student Number: 1539774). I am conducting research for the purpose of completing my MM in Entrepreneurship and New Venture Creation at Wits Business School.

What I am doing

I am conducting a quantitative study to understand the impact of cloud computing on innovation performance in SMEs

Your participation

I am asking you whether you will allow me to conduct one interview with you. If you agree, I will ask you to participate in one interview for approximately 15 minutes. Please understand that your participation is voluntary and you are not being forced to take part in this study. The choice of whether to participate or not, is yours alone. If you choose not take part, you will not be affected in any way whatsoever. If you agree to participate, you may stop participating in the research at any time and tell me that you don't want to continue. If you do this there will also be no penalties and you will NOT be prejudiced in ANY way.

Confidentiality

Any study records that identify you will be kept confidential to the extent possible by law. The records from your participation may be reviewed by people responsible for making sure that research is done properly, including my academic supervisor/s. (All of these people are required to keep your identity confidential.)

All study records will be destroyed after the completion and marking of my research assignment. I will refer to you by a code number or pseudonym (another name) in the research assignment.

Risks/discomforts

At the present time, I do not see any risks in your participation. The risks associated with participation in this study are no greater than those encountered in daily life.

Benefits

There are no immediate benefits to you from participating in this study. However, this study will be extremely helpful to us in understanding how the internal environment of your organisation support corporate entrepreneurship.

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

This research has been approved by the Wits Business School. If you have any complaints about ethical aspects of the research or feel that you have been harmed in any way by participating in this study, please contact the Research Office Manager at the Wits Business School, Mmabatho Leeuw. Mmabatho.leeuw@wits.ac.za.

If you have concerns or questions about the research you may call my academic research supervisor Dr Diran Soumonni **Email:** Diran.Soumonni@wits.ac.za.

CONSENT

I hereby agree to participate in research on the impact of cloud computing adoption on SMEs in 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 will remain confidential.

_____ _____

Signature of Participant **Date**