# Cloud computing for competitive advantage: A case of rural SMEs in the Eastern Cape Province of South Africa

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December 2020

# Cloud computing for competitive advantage: A case of rural SMEs in the Eastern Cape Province of South Africa

By

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Submitted in partial fulfilment of the requirements for the degree of

**MASTER OF BUSINESS ADMINISTRATION**

In the Faculty of Business and Economic Sciences at the

**Nelson Mandela University**

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December 2020

# Declaration

I, **Mbongo Mhlanga Mpongwana**, hereby declare that the project work titled "**Cloud computing for competitive advantage: A case of rural SMEs in the Eastern Cape Province of South Africa**" submitted by me for partial fulfillment of the degree of **Master of Business Administration** at **Nelson Mandela University** is my work, and that all sources used and/or quoted have been acknowledged by means of reference.

I further declare that the work has not been previously submitted and will not be submitted in future, neither in part nor in full, for the award of any other degree at this or any other university.

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Mbongo M. Mpongwana

## Acknowledgements

I wish to express my gratitude to my supervisor, Prof. Ephias Ruhode, for his support, insightful guidance and patience during the process of my research studies.

# Dedications

I would like to dedicate this research dissertation to my mother, who would basically ask me of my progress at every opportunity. Her belief in me that I can achieve almost anything kept me pushing even at times I felt like giving up. To my two sisters, thank for always supporting me. I know I can always count on you, for anything. To my little brother, growing up I always wished that I had an older brother whom I can look up to, and who can also guide me through life. Since that is a privilege I never had, I instead wish to become to you the brother that I've always wanted to have.

To my wife, thank you for the support and encouragement you always give me. Thank you for the sacrifices you've made and the understanding you always showed. And thank you for the greatest gift of them all, our first child that we are expecting in the next coming months.

# Abstract

The emergence of new ICTs over the past decades has had a substantial impact on commerce and to societies in general. However, the high costs and the relevant skills and expertise that are associated with the implementation and maintenance of the latest ICTs impedes SMEs from taking full advantage of their use. The introduction and adoption of cloud computing has addressed some of these challenges for SMEs. Despite this, SMEs in rural South Africa have not fully adopted or realized the advantages of cloud computing, which could be owing to a number of factors.

The aim of this study was to explore how rural SMEs in the Eastern Cape Province of South Africa can leverage on the capabilities of cloud computing for competitive advantage. The study adopted an interpretivist, quantitative approach to identifying the enablers and barriers of cloud computing adoption. The research population was defined as all the SMEs that operate outside of Buffalo City and Nelson Mandela Bay Metropolitan Municipalities. Convenience and snowball sampling techniques were used as non-probability sampling methods. Data was collected from the participants using a structured self-administered online questionnaire.

The Technology-Organization-Environment framework was used as a basis in formulating the research theoretical framework, focusing on technological, organizational and environmental elements that could potentially influence adoption of cloud computing by rural SMEs. Microsoft Power BI was used to present demographic information as well as descriptive statistics for the factors included in the proposed research model. IBM SPSS 22 was used for correlation and linear regression analysis.

The review of related literature revealed that access to markets, access to finance, inadequate public infrastructure and lack of skilled resources are some of the major challenges that rural SMEs face. This study found seven of the statistically examined factors to be significant predictors of cloud adoption by rural Eastern Cape SMEs. These are market demand, use of online-based marketing, having formal business plans, reliable electricity, awareness of SaaS, use of basic Internet-based services such as email and websites as well as Internet costs.

The study recommends that policy makers must ensure that environmental factors that are beyond the control of SMEs, such as access to reliable electricity and affordable Internet, are put in place in order to create a conducive SME ecosystem. SMEs that already have Internet and web presence in the form of emails, websites and online marketers are more likely to adopt cloud-based services. This presents an opportunity for cloud service providers to create targeted strategies for these potential adopters which could further increase cloud adoption. Also, formalized small businesses that boast formal documented business plans are more likely to adopt cloud-based services, which is an aspect that can be fostered through business incubation.

**Keywords**: Cloud Computing, Adoption, SME, Competitive Advantage, Rural, South Africa

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# Chapter 1: Scope of the Study

## 1.1. Introduction

The emergence of new technologies of the twenty first century has enabled companies to become more integrated in trade and communication, resulting in what is now known as globalization. As such, Information and Communication Technologies (ICTs) have become an integral part of business operations and a source of competitive advantage. However, the costs and expertise associated with implementing in-house ICTs have impeded Small and Medium Enterprises (SMEs) from taking full advantage of globalization. This is particularly the case for SMEs in rural communities of Sub-Sahara Africa.

The introduction of cloud computing has alleviated some of the financial challenges facing SMEs as users of cloud computing pay for services as an operational expense without the need for significant upfront investment in ICTs. SMEs have long been identified as a critical role player in improving socio-economic conditions of the communities in which they operate. Thus, understanding the challenges and factors that influence the adoption of cloud computing as a source of competitive advantage for rural SMEs is an interesting proposition. This study explores how rural SMEs in the Eastern Cape Province of South African can leverage on the capabilities of cloud computing for competitive advantage and access to global markets.

## 1.2. Problem Background

The emergence of new ICTs in the past decades has had a substantial impact on commerce and to societies in general. ICT generally refers to the technologies that are used to access, gather, process, present and/or communicate information. These technologies could include hardware such as computers, software that runs on computers and connectivity such as Internet or Local Area Networks (LAN). Thus, ICT can be defined as a collection of hardware, software, Internet and Telecommunications components that enable businesses and societies in general to create, consolidate and communicate information that can be used for various purposes (Hamelink, 1997).

The advancements in microminiaturization of computers from the personal computers of the 1970s to those of the early 2000s, as well as the introduction of technologies such as the Internet led to what is now known as the information age. Information age is the period of the twenty first century that is characterized by a society – known as information society – where information is transferred freely and easily, and where knowledge that would have otherwise been difficult or impossible to access has become easily accessible (Miah & Omar, 2012). This has brought an obvious shift from the industrial revolution of the eighteenth to nineteenth centuries, to the current economies that are now largely based on information and technologies – sometimes referred to as post-industrial economy or information economy.

ICTs have brought about processes in which local, regional and national economies and societies have become integrated in trade and communication, a phenomenon known as globalization (Gurgul & Lach, 2014). Thus, globalization has made it much easier for organizations to compete in national and international markets and has largely been facilitated by the extensive use of ICTs. This has been found to have demonstrated a significantly positive impact on economic development and the improvement of the business ecosystem by providing access to business information, bringing access to financial resources, facilitating access to the market and the exchange of ideas and know-how. ICTs have thus become a key factor in driving global competitiveness for communities, regions and/or countries. Strong relationships between ICTs and global competitiveness is more prevalent in regions that are more ICT ready than those with low ICT readiness (Yunis, Koong, Liu, Kwan, & Tsang, 2012).

The high costs and the relevant skills and expertise that are associated with the implementation and maintenance of the latest ICT infrastructure impedes SMEs from taking full advantage of globalization (Tan, Chong, Lin, & Eze, 2009). Moreover, the digital divide – which is defined as “the gap in usage and access to digital infrastructure and services between individuals, households, businesses or geographical areas” (Shenglin *et al.*, 2017, p. 2) – remains a major obstacle preventing SMEs from fully realizing the benefits of globalization. This is particularly the case for SMEs in rural communities of developing countries such as South Africa, and has a negative impact on economic and social inclusiveness of communities in which these SMEs operate.

The introduction and adoption of cloud computing has addressed some of the challenges that SMEs encounter in the implementation of ICTs and has enabled them to access and compete in the global markets. Cloud computing deals with hardware, software, data access and computation that may not necessarily require the end-user's knowledge of the configuration or physical location of the system delivering the service (Jadeja & Modi, 2012). It can be defined as a service that is provisioned on demand, for both hardware and software, for customers over a network in a self-service manner. The resources that provision these services are shared, rapidly scalable and dynamic, and are released with minimal user interaction (Marston, Li, Bandyopadhyay, Zhang, & Ghalsasi, 2011). Users therefore pay for cloud computing as an operational expense without the need to invest significant capital into ICT infrastructure. Ultimately, by adopting and implementing cloud computing, SMEs get several benefits including reduced entry costs of using the modern ICTs without making substantial infrastructure investments.

SMEs in rural South Africa have not fully adopted or realized the advantages of cloud computing (Mohlameane & Ruxwana, 2014; Seifu, Dahiru, Bass, & Allison, 2017). This could be owing to several factors, such as basic infrastructure challenges, cloud computing awareness and cultural differences to name but a few. There is little to no evidence found of research that has been conducted on the adoption and implementation of cloud computing for competitive advantage for rural SMEs in South Africa.

The aim of the study is to explore how rural SMEs in the Eastern Cape Province of South African can leverage on the capabilities of cloud computing for competitive advantage. The findings can also assist policy makers in ensuring that there is an effective and efficient ICT ecosystem that is necessary to enable and facilitate the adoption of cloud computing by rural Eastern Cape SMEs, thereby enabling these SMEs to access and compete in global markets. This, in turn, can greatly improve the socio-economic conditions and social inclusiveness of the communities in which these SMEs operate.

## 1.3. Problem Statement

SMEs have long been attributed as key drivers of economic growth and poverty alleviation in developing economies (Jili, Masuku, & Selepe, 2017; Blackburn & Athayde, 2000). According to a report released by SEDA, South African SMEs account for as high as 66% of employment which includes employment for SME owners that is reported at 15.5%. This means that, excluding SME owners, SMEs account for a little over 50% of the currently employed South African workforce (SEDA, 2019). It is evident from this that an ecosystem that ensures growth and sustainability of SMEs is important to ensure economic growth and the alleviation of poverty.

Despite the evidence of the importance of SMEs in addressing the socioeconomic challenges prevalent in rural communities (Wilkinson, et al., 2017), most rural SMEs' growth is still hindered by a number of issues, including lack of access to finance and their local market being too small to facilitate their growth (Lekhanya L. M., 2016). As the world is becoming increasingly connected both socially and economically through the use of ICTs, it is becoming increasingly important for organizations to adopt and use technology for competitive advantage and access to global markets to ensure sustained growth.

A South African study that included three SMEs operating in various sectors in the highly industrial Gauteng Province of South Africa found cloud computing to be a promising cost-effective alternative implementation of ICT, as compared to traditional cost-intensive in-house ICT solutions (Mohlameane & Ruxwana, 2013). The introduction of cloud computing has alleviated some of the financial challenges of adopting and using ICTs for SMEs (Yeboah-Boateng & Essandoh, 2013). Cloud computing can greatly improve the economic efficiency of an organization by reducing operational costs and investments on servers and other ICT infrastructure, thus increasing scalability and flexibility which is particularly important for SMEs as they lack financial resources for upfront investment on ICT resources (Hinde & Van Belle, 2012; Ferri, Maffei, Mangia, & Tomo, 2017).

Despite this, South African rural SMEs have not fully adopted the use of ICTs, and by extension – cloud computing, which has a significant negative impact on their access to global markets, competitiveness and growth (Nkosana, Skinner, & Goodier, 2016; Dyubele, Cele, & Mbangata, 2020; Ayong & Naidoo, 2019). This research explores

how rural SMEs in the Eastern Cape Province of South Africa can leverage on the capabilities of cloud computing for competitive advantage.

## 1.4. Research Questions

### 1.4.1. Primary Research Question

The primary research question that is addressed by this study is:

- How can rural SMEs in the Eastern Cape Province of South African leverage on the capabilities of cloud computing to achieve competitive advantage?

### 1.4.2. Secondary Research Questions

In order to address the primary research question, the following secondary research questions will be addressed:

- What are the major challenges that rural SMEs face?
- How can ICTs be used to meet the challenges facing rural SMEs?
- What are the challenges that impede rural SMEs in adopting and using ICTs?
- How do rural SMEs perceive cloud computing and its associated benefits?
- What are the main drivers and impediments of could computing adoption in rural SMEs?
- How can cloud computing be adopted and used as a tool for competitive advantage by rural SMEs?

## 1.5. Research Objectives

The primary objective of the study is to gain understanding of the antecedents and impediments of cloud computing adoption for competitive advantage by rural SMEs in the Eastern Cape Province of South Africa. This is to further advance modeling of cloud computing adoption as well as assist relevant parties in creating conducive ecosystems for cloud computing adoption for rural Eastern Cape SMEs. In order to achieve this goal, the following research objectives are identified:

- To explore major challenges that face rural SMEs, which hinder their growth and sustainability.
- To explore how ICTs in general can be used to meet the challenges that face rural SMEs.
- To explore the challenges that impede rural SMEs from adopting and using ICTs to meet their challenges.
- To explore rural SMEs' perceptions of cloud computing and its associated benefits.
- To explore the determinates and impediments of cloud computing adoption within the context of rural SMEs.
- To explore how cloud computing can be adopted and used by rural SMEs as a tool for competitive advantage.

## 1.6. Relevance of the Study

Financial constraints are a major limitation in the implementation of ICTs for SMEs. Cloud computing alleviates this limitation by introducing cost effective, efficient and flexible means to implement ICTs for SMEs. The findings can be used by policy makers to ensure that an effective ICT ecosystem is in place to facilitate the adoption and implementation of cloud computing for competitive advantage by rural SMEs in the Eastern Cape province of South Africa. This ecosystem would then enable these SMEs to access and better compete in global markets, and in the process contribute positively to the socio-economic conditions of the rural communities in which they operate. Academics and researchers can also test the model and expand on it to further the body of knowledge in this field.

## 1.7. Research Methodology

Research methodology includes the steps, procedures and strategies that are followed in order to gather and analyze data during the research investigation (Myers, 2009). Whilst there are a number of distinctions in research methods, the most common are qualitative and quantitative. The quantitative research method has been selected for this study as it will assist in identifying enablers and barriers in cloud computing

adoption and help better understand their significance through the use of various statistical methods and techniques.

For the purpose of this study, the research population is defined as all the SMEs that operate outside the two metropolitan regions of the Eastern Cape Province – Buffalo City Metropolitan Municipality and Nelson Mandela Bay Metropolitan Municipality – as these two major areas contribute significantly to the province's annual GPD. The study has adopted non-probability sampling techniques as means of collecting data from participants. More specifically, the study will use a combination of convenience and snowball sampling techniques.

Primary quantitative data will be collected through a structured self-administered questionnaire designed to be completed online at the participant's convenience, however within a limited period of time. Microsoft Power BI will be used to visually present demographic information as well as descriptive statistics for the factors included in the proposed research model. IBM SPSS 22 will be used for correlation and linear regression analysis.

## 1.8. Ethical Considerations

The study deals with organizations' IT strategies which may include proprietary information that gives them competitive advantage, therefore, there needs to be some level of confidentiality that is maintained. As such, anonymity of the participants and their organizations will be prioritised. In order to achieve this, codes will be used to refer to SMEs and managers that have participated in the study, such as S1 and M1 for SME 1 and Manager 1 respectively. Ethical clearance will also be applied for through NMU Business School before data is collected from the participants.

## 1.9. Limitations of the Study

There are a few limitations to this study. Firstly, the sample size that will be used for the study is small and therefore cannot be generalized to the entire population being studied. Further studies can build on the results to explore the population further. Secondly, due to cost and time limitations, the research could only examine a limited

number of factors that influence adoption and implementation of cloud computing by rural SMEs in the Eastern Cape Province of South Africa. However, these limitations have not been deemed to significantly influence the findings of the study in any way.

## 1.10. Chapter Outline

The research is comprised of five chapters. To give a better understanding and guideline of the research, the purpose of each chapter is briefly outlined below:

**Chapter 1: Scope of the Study** – This chapter gives the scope and background of the study, which serves as an introduction to the research question. The chapter is made of the problem background, research problem, research questions, objectives, relevance of the study, ethical considerations, and scope and limitations of the study.

**Chapter 2: Literature Review** – This chapter focuses on reviewing relevant literature relating to the South African SME landscape and the use of ICTs with focus on rural SMEs. A comprehensive definition of SMEs within the South African context, as well as cloud computing is also provided. Relevant technology acceptance theories such as the Technology Acceptance Model (TAM), Diffusion of Innovation (DOI) Theory, Unified Theory of Acceptance and Use of Technology (UTAUT) and Technology-Organization-Environment (TOE) Framework are also discussed. The chapter concludes by reviewing the use of cloud computing services within South African SMEs.

**Chapter 3: Research Methodology and Design** – The research design and the methodology that are used to carry out the study are outlined in this chapter. The chapter begins by discussing research paradigms and the location of this study's paradigm. Qualitative and quantitative research methods are discussed, and the rationale for quantitative methods is outlined. This is followed by defining the research population and outlining the sampling design. The chapter ends with discussions on the data collection methods, research instrument, data analysis techniques ethical considerations and research limitations.

**Chapter 4: Data Analysis and Results** – This chapter presents the data that was collected using the data collection instrument detailed in the previous chapter. This

data is presented in the form of descriptive statistics, correlation analysis and multivariable regression analysis. Microsoft Power BI is used for descriptive statistics visualization. IBM SPSS 22 is used for correlation analysis and linear regression analysis to determine the significant prediction and direction of relationships between cloud adoption and various independent variables.

**Chapter 5: Discussion and Conclusion** – This chapter focuses on the conclusions of the research study reflecting on the research problem and recommendations thereof. The significance of predictors in the proposed theoretical framework is also concluded in this chapter and an updated theoretical framework for predicting the use of cloud-based services is presented.

## 1.11. Chapter Summary

This chapter has presented the background of the study as well as the problem statement. The research questions, primary objective and secondary objectives that will be addressed in order to achieve the primary objective have also been outlined. The chapter closes off by highlighting the relevance of the study, ethical considerations, scope and limitations as well as outlining each of the chapters that will be covered in the study.

# Chapter 2: Literature Review

## 2.1. Introduction

This chapter reviews existing literature on South African SMEs and their challenges. It begins by analyzing South African definition of SMEs as contained in The South African National Small Business Act (1996), as well as thresholds that are used in categorizing SMEs in different sectors. It then provides an overall understanding of the South African SME landscape and challenges faced by small businesses, with particular focus being placed on rural SMEs in provinces such as the Eastern Cape.

Globalization that has been brought about by the introduction of ICTs has changed the way in which business is conducted. Adoption of ICTs is therefore important for small businesses to stay competitive and ensure sustained growth in order to address South African socio-economic challenges and drive social inclusiveness. Adoption and use of ICTs within South African SMEs is thus reviewed in this chapter. One of the most promising technological innovations that can benefit small businesses is cloud computing. In this chapter, cloud computing is defined, and its characteristics, service and deployment models are also outlined.

There are a number of models that are used to study and analyse technology acceptance and use. These include the Technology Acceptance Model, Diffusing of Innovation Theory, Unified Theory of Acceptance and Use of Technology, and Technology-Organization-Environment Framework. The aforementioned models and theories are reviewed in this chapter to better understand the antecedents of cloud computing adoption in South African SMEs. A research theoretical framework that is underpinned by the Technology-Organization-Environment (TOE) framework is then proposed for this study. Hypotheses that are derived from literature on general SME challenges as well as ICT and cloud adoption challenges are also outlined, and form part of each of the TOE elements of the proposed research theoretical framework.

## 2.2. SMEs in South Africa

### 2.2.1. Definition of Small and Medium Enterprises

It has been widely noted that there is no specific definition of SMEs that can be taken as a reference by all researchers, economists and statistical agencies. The definitions have been cited to differ mainly by three categories: definitions by industries, definitions by national laws, as well as those by international institutions (Berisha & Pula, 2015). Despite the lack of a universal definition and the lack of aligned criteria in categorizing SMEs, the importance of having these definitions cannot be taken lightly. Defining SMEs is important for national governments for various reasons, including: determining qualifying criteria for specific forms of small business support, setting thresholds for tax and other government regulations, as well as monitoring and nurturing the health of an SME ecosystem to ensure their sustainable growth and development (OECD, 2004).

The term SME is indicative of the size of the organizations that are being described. As such, quantitative measurable indicators are often used by economists to divide organizations accordingly into classes. The most common indicator that is used to distinguish between small businesses and large corporations is the number of employees, with other financial indicators such as annual turnover and value of assets often being an important indicator of the scale and performance of an organization, and to compare its position with competitors in the market (Berisha & Pula, 2015). This criteria of using the number of employees and various financial indicators to define SMEs is also used by international institutions such as The World Bank (Kushnir, 2010), International Trade Centre and World Trade Organization (ITC, 1998).

The South African National Small Business (NSB) Act of 1996, as amended in 2003, defines a small business as:

> *"… a separate and distinct business entity, including cooperative enterprises and non-governmental organizations, managed by one owner or more which, including its branches or subsidiaries, if any, is predominantly carried on in any sector or subsector of the economy … and satisfies the criteria mentioned in schedule"* – (Republic of South Africa, 1996, p. 2).

The NSB Act schedule of sizes is presented in Table 1 below. NSB Act further categorises small businesses into micro, very small, small and medium enterprises (SMME). According to a report by the Department of Trade and Industry (DTI), the terms "small business", "SMME" and "SME" are often used interchangeably in South Africa (dti, 2008), and this study will adopt the same approach in using the terms.

| Enterprise Size | Number of Employee | Annual Turnover (ZAR) | Gross Asset Value (Excl. Fixed Property) |
|---|---|---|---|
| **Micro** | Less than 5 | Less than R150 000 | Less than R100 000 |
| **Very Small** | Less than 20 (Less than 10 in some industries) | Less than R500 000 (Less than R200 000 in some industries) | Less than R500 000 (Less than R150 000 in some industries) |
| **Small** | Less than 50 | Less than R25m (less than R2 m in some industries) | Less than R4.5m (less than R2m in some industries) |
| **Medium** | Less than 200 (Less than 100 in some industries) | Less than R50m (Less than R4m in some industries) | Less than R18m (Less than R2m in some industries) |

*Table 1: South African SME Categories (The Schedule)*

Firms in different sectors differ in sales, capitalization and employment. As such, measurable indicators such as number of employees and annual turnover that are used to define SMEs could lead to all firms being classified as small when applied to one sector, while the same indicator size could yield completely different results when applied to a different sector (NCR, 2011). To address this, the NSB Act defines different thresholds for firms in different sectors, as indicated in the schedule of sizes in Table 1 above.

### 2.2.2. The South African SME Landscape

SMEs have globally been attributed as the driving force of sustainable economic growth and development in both developed and developing countries, which is particularly important for economic inclusion and poverty alleviation in developing economies (Jili, Masuku, & Selepe, 2017; Blackburn & Athayde, 2000). SMEs make up over 90% of companies in Africa and contribute about 50% of the Gross Domestic Product (GDP) (Kamunge, Njeru, & Tirimba, 2014). In South Africa, formal SMEs make over 90% of the total companies and contribute an estimated 38% of the total GDP (SEDA, 2019). There are significant disparities in the percentage of employment that is accounted for by the SME sector in South Africa, with some studies reporting this number to be as low as 28% (SBI, 2018) whilst others report numbers that are

consistently in the region of 60% and above (SEDA, 2019; Doyle, 2019), with estimates as high as 66% being reported (SEDA, 2019). These disparities indicate lack of consistent measures on the contributions that SMEs have in addressing socio-economic challenges and poverty alleviation in South Africa.

Environmental factors such as political, social and economic factors are important in creating perceived opportunities and the stimulation of entrepreneurial intentions (EI). As such, the South African government has a number of initiatives to support and enhance entrepreneurial activities including access to entrepreneurial finance, government regulations and policies as well as provision of the necessary infrastructure (GEM, 2014). Despite this, a recent study revealed that only 6% of South African SMEs have indicated that they received funding from government, which poses a major challenge for small businesses particularly start-ups (SME South Africa, 2018). According to the 2017/2018 Global Entrepreneurship Monitoring (GEM) report, South Africa's Total Early-stage Entrepreneurial Activity (TEA) increased to 11% whilst the EI also increased to 11.7% (GEM, 2018). Notwithstanding these reported increases in TEA and EI, South Africa still has one of the lowest rates of small businesses in comparison to other developing economies (Herrington, Kew, & Mwanga, 2016).

| | WC | EC | NC | FS | KZN | NW | GP | MP | L |
|---|---|---|---|---|---|---|---|---|---|
| **Agriculture** | 17.7 % | 11.7 % | 6.2 % | 14.1 % | 17.3 % | 3 % | 6.4 % | 15 % | 8.6 % |
| **Mining** | 0 % | 0 % | 0 % | 0 % | 0 % | 0 % | 0 % | 0 % | 0 % |
| **Manufacturing** | 12 % | 6.1 % | 2.1 % | 5.6 % | 14.1 % | 4.6 % | 32.2 % | 6.6 % | 16.8 % |
| **Elec, Gas & Water** | 0 % | 0 % | 0 % | 0 % | 100 % | 0 % | 0 % | 0 % | 0 % |
| **Construction** | 8.3 % | 7.5 % | 0.9 % | 5.4 % | 17.9 % | 4.7 % | 30.9 % | 9.7 % | 14.7 % |
| **Trade & Accommodation** | 9.5 % | 7.2 % | 0.8 % | 5.3 % | 16.4 % | 5.6 % | 32.1 % | 9.7 % | 13.6 % |
| **Transport & Communication** | 10.8 % | 10.6 % | 1.7 % | 3.0 % | 15.9 % | 7.1 % | 35.4 % | 5.7 % | 9.8 % |
| **Financial & Business Services** | 14.2 % | 4.9 % | 0.3 % | 2.8 % | 11.5 % | 3.4 % | 53.9 % | 6.3 % | 2.7 % |
| **Community Services** | 16.9 % | 6.1 % | 0.7 % | 3.7 % | 13.2 % | 4.4 % | 37.8 % | 8.9 % | 8.4 % |
| **Other** | 0 % | 13.2 % | | | | | | | |
| **Total** | **11.3 %** | **7.1 %** | **1 %** | **4.8 %** | **15.3 %** | **5 %** | **35.4 %** | **8.6 %** | **11.6 %** |

*Table 2: South African SME Landscape (with focus on Eastern Cape SMEs)*

In the first quarter of 2019, the number of SMEs in South Africa was reported to be 2.55 million with a year-on-year growth of 4.4% since 2014. A little over 34% of these SMEs are employers, where the SME employs at least one person other than the owner. The rest of the SMEs being own account businesses, where only the owner is the employee of that particular business. Furthermore, there is a large number of SMEs that are concentrated in the highly urban province of Gauteng, which makes up 35.4% of the total SMEs. This is followed by an even distribution in provinces such as Kwazulu-Natal with 15.3%, Limpopo with 11.6% and the Western Cape with 11.3%. Provinces that are mostly rural record the lowest number of SMEs, with the Eastern Cape recording third lowest with a mere 7.1% of the total SMEs (SEDA, 2019). Table 2 above depicts South African SMEs by industry and province as of the first quarter of 2019, with more emphasis on SMEs in the Eastern Cape Province.

In 2015, the Eastern Cape Province accounted for 7.5% of the country's GDP with a sharp decline in the GDP growth rate from a high of 5.4% in 2007 to a low of 0.4% in 2016. Like the rest of South Africa, the Eastern Cape Province is characterized by a dual economy with both underdeveloped and developed regions. The rural regions, particularly the former homeland of Transkei, is characterized by poverty and underdevelopment while the two metro regions – Buffalo City Metropolitan Municipality and Nelson Mandela Bay Metropolitan Municipality – have near first world infrastructure and facilities and are producing higher Regional Gross Value Added (GVA-R) relative to other Eastern Cape regions (DEDEAT, 2017).

Many rural SMEs in South Africa still face a number of challenges such as lack of reliable Internet connectivity, lack of access to electricity and lack of skills and capabilities to use technology. In instances where Internet is available in these regions, it is often used for information gathering and communication and seldom used for electronic transactions and other business related activities (Lekhanya L. M., 2016). An international study on internationalization of SMES cited incompatibility with the target market as an impediment in the use of electronic marketing technologies in rural SMEs. This, and the perceived lack of competences to internationalize rural SMEs could mean that these SMEs are limited to their small local markets (Achtenhagen, 2011), which may partially explain the low GDP contributions from provinces that are mostly rural such as the Eastern Cape.

### 2.2.3. Challenges Faced by South African SMEs

The survival rate of African SMEs remains very low. As high as five out of seven small businesses in Africa fail within the first year of operations, and South Africa is no exception to this. In South Africa, the rate of small businesses that do not survive beyond the first year of operations falls between 50% and 95%, depending on the SME industry (Muriithi, 2017). Furthermore, the rate of businesses that survive beyond the 3.5 year mark – the length of time that is identified by GEM as required for a business to become established – is similarly poor, with South Africa recording one of the lowest rates of established businesses compared to other Sub-Saharan countries (GEM, 2018; GEM, 2014). There are a number of challenges that contribute to the low small business survival rate in South Africa. Some of these common challenges are discussed below:

*Access to Market (MRK)*

Globalization processes such as advancements in communications, technology and transportation have eased some trade barriers and brought about changes in the value chain activities, resulting in a number of firms expanding their operations internationally. This also offers small businesses an opportunity to grow by participating in regional and international trade (Covin & Miller, 2014).

Since ICTs are drivers of globalization, low levels of ICT adoption in SMEs means access to markets is one of the major obstacles in their competitiveness and growth. This is partly due to big multinational corporations accessing traditional SME local markets as a result of globalisation, through the use of technology. SMEs' limited access to market information and trends makes them less aware of growth opportunities, thus limiting them to narrow local markets that are often saturated and characterised by fierce competition from both local small competitors to big multinationals. Their ability to survive in the increasingly competitive global economy lies in their ability to leverage on information as a resource and technology as a tool (Kiveu, 2013).

*Access to Finance (FIN)*

One of the most important factors that affect SME survival and growth is access to finance. Financing is important at all stages of small businesses' development, in order to enable the business to start-up, develop and grow before it can generate its own revenue and become financially self-sufficient (OECD, 2018). It has been noted that, in middle and low-income economies, access to finance is often one of the prevalent barriers to small business formalisation which limits growth opportunities (IFC, 2013).

Finance for small businesses can theoretically be accessed through a number of sources both from the government and the private sector. The South African government has a number of funding initiatives that they undertake to support SMEs. These source of government funds include government grants, the Department of Trade and Industry (DTI), the National Youth Development Agency (NYDA), the Small Enterprise Development Agency (SEDA), the Small Enterprise Finance Agency (SEFA) and the National Empowerment Fund (NEF) amongst others (SME South Africa, 2018). Despite these government initiatives, studies have reported that a number of SMEs have difficulty in accessing entrepreneurial funding. A study by SME South Africa (2018) shows that 94% of SMEs indicated that they never received any funding from government, with only 6% indicating having received government funding. Furthermore, another study reveals that the majority of rural small businesses are not even informed of the existence of such government initiatives (Jili, Masuku, & Selepe, 2017).

SMEs in provinces that have higher GDPs such as Gauteng and the Western Cape have higher access to formal credit than SMEs that operate in provinces with lower GDPs such as the Eastern Cape (Makina, Fanta, Mutsonziwa, Khumalo, & Maposa, 2015). It has been noted that a number of small businesses often lack collateral, formal business plans and financial records, such as formal financial statements, that are normally mandatory from commercial banks in order to grant small businesses loans. This, therefore, has a negative effect on small businesses' access to finance and is evident in the high number of loan applications that are rejected by commercial banks (Cant, Erdis, & Sephapo, 2014; SME South Africa, 2018).

There are a number of other reasons that have been noted to contribute to SMEs being refused funding, ranging from: insufficient operating history, limited collateral, inadequate cash flow and poor business plans to name but a few (SME South Africa, 2018). This could be owing to a number of factors, such as lack of skill required to obtain business finance and lack of access to relevant information. Due to lack of access to finance for most rural SMEs, these businesses rely heavily on internal finance which is often not enough to facilitate expansion and growth and may thus lead to stagnation.

*Supporting Infrastructure (INF)*

Lack of supporting physical infrastructure can add in the costs of doing business, which can impact the performance and growth of small businesses. Transportation and communication infrastructure investment by local governments can result in higher availability of required production inputs for small businesses at lower costs, thus resulting in higher productivity and welfare of these small businesses (Renkowa, Hallstrom, & Karanjab, 2004). Thus, investment in both physical and communication infrastructure by government has a positive impact on SMEs and their connections to vendors, customers and other stakeholders (Rakicevic, Omerbegovic-Bijelovic, & Lecic-Cvetkovic, 2016). This type of government support is particularly important for rural communities that are generally categorised by underdevelopment.

While South African has one of the best developed infrastructure in Sub-Sahara Africa across categories, most South African rural communities are still underdeveloped and lack the necessary public infrastructure that is conducive for SME growth and development (Lekhanya & Mason, 2014). These inadequacies in infrastructural components such transportation, telecommunications and power supply have a negative effect on SME growth and competitiveness. The GEM South African 2014 report also notes the lack of supporting infrastructure as one of the key factors that negatively affect SME growth in South Africa (GEM, 2014). Therefore, accessible communication infrastructure, availability of transportation, and other related utilities is vital in the survival and growth of rural SMEs.

*Other Challenges*

Businesses require skilled, qualified and motivated employees in order to perform well and ensure sustained growth. Human resources become more expensive as they acquire new qualifications and skills. It often becomes a challenge for SMEs to acquire and/or retain the necessary skilled resources in order to be competitive (Chimucheka, 2013). Lack of necessary skills such as development of business plans, preparations of financial statements, determining credit risks and the interpretation of market dynamics in order to better position service offerings are often sources of other major challenges that SMEs are faced with (Smit & Watkins, 2012). Business owner-managers that have higher qualifications and necessary training are thus in a better position to succeed than those that lack the necessary education and skill.

## 2.3. ICTs in South African SMEs

The emergence of new ICTs in recent years has had a significant contribution in the way in which companies conduct business. ICTs have become an integral part of business operations and a source of competitive advantage. It is thus imperative for SMEs to adopt and use technology in order to become competitive and ensure sustained growth (Oliveira & Martins, 2011).

SMEs in developing economies are faced with many challenges in order to survive in the global markets. ICTs, as one of the driving forces of globalization, can offer SMEs a number of opportunities such as making information and knowledge available, reducing operational costs, enabling better decision-making, improving flexibility and responsiveness as well as facilitation of better business related communication (Mbuyisa & Leonard, 2016). Despite this, SMEs in developing economies have not fully realized some of these benefits due to a number of factors such as lack of supporting infrastructure, lack of access to finance and lack of ICT and business skills amongst others (Ismail, Jeffery, & Van Belle, 2011).

### 2.3.1. ICT Adoption and Usage in SMEs

World Wide Worx conducted studies to establish adoption of ICTs by South African SMEs and established that there is a strong relationship between online presence and profitability as well as profitability and sustainability. About 79% of the SMEs that had websites reported profitability, compared to 59% that reported profitability without the online presence (DTPS, 2017).

Even though a significant number of established and emerging South African SMEs have access to Internet based ICTs, there is still a large number that is not connected. According to the SME South Africa survey, only 20% of the SMEs that were surveyed use e-commerce on a regular basis and only 22% make regular use of cloud-based services. Furthermore, there was a 50/50 split on whether technological limitations were an impeding obstacle on SME growth. Of the 50% that cited technology as an impeding obstacle to SME grown, a significant number cited Internet access as a major obstacle. Lack of technical skills from SME management as well as supporting ICT infrastructure were amongst other challenges that were cited as obstacles to SME growth (SME South Africa, 2018).

### 2.3.2. ICT Adoption Challenges in SMEs

Another research study showed that over half (52%) of South African SMEs that are using ICTs have admitted to just barely keeping up with technology and a further 45% acknowledged that they could be doing more in terms of technology adoption for competitive advantage. Those SMEs that have adopted cloud computing have indicated that they have done so because it saves them time and money. The study also noted that many businesses were still using Excel spreadsheets, printing invoices, and using flash drives to transfer documents from one workstation to another. Furthermore, whilst some small businesses are open to the idea of using new Internet-based technologies, the study found that poor Internet connectivity is holding them back (Xero, 2018).

Ismail *et al.* (2011) found that South African SMEs do perceive adopting ICTs as beneficial with the potential to add value. However, whilst they perceive adoption of ICT as beneficial, these SMEs experience barriers in the adoption and use of ICTs.

Another study conducted in the manufacturing and logistics industry found that South African SMEs had to contract external expertise to assist with the implementation of ICTs due to the vast majority of their respondents lacking the necessary skills and knowledge. This indicates lack of ICT skills amongst SME owner-managers (Gono, Harindranath, & Özcan, 2014). The study further found that SME supply chain partners were drivers of SME technology adoption as they required these small businesses to stay current with technological developments in order to facilitate business.

Similarly to the findings by Gono *et al.* (2014), where supply chain partners were found to be significant drivers of ICT adoption by SMEs in the manufacturing and logistics industry, another study found stakeholders such as suppliers, customers and competitors to significantly influence ICT adoption for small hotel establishments (Mpofu, Milne, & Watkins-Mathys, 2013). Mpofu *et al.* (2013) also emphasized the importance of owner-manager's knowledge and support of ICT adoption. This is also supported by the findings of Modimogale and Kroeze (2011) who explained that the limitations of ICT adoptions are both socio-economic and technological. Their argument is that the majority of the SMEs' strategic decisions are taken by the owners which result in their limitations on ICT knowledge becoming business limitations (Modimogale & Kroeze, 2011).

With the vast majority of the Eastern Cape Province regions being rural and peri-urban, facilitating conditions such as relevant infrastructure and reliable Internet connection would even be of higher significance in impeding technology adoption by SMEs. Typical challenges that South African rural areas face in comparison to urban areas include low tele-connectivity, poor roads and underdeveloped market facilities (Naude & Khumalo, 2001). Ismail *et al.* (2011) also indicated lack of supporting infrastructure for rural South African SMEs such as telecommunications and electricity as contributing impediment to technology adoption.

## 2.4. Cloud Computing

### 2.4.1. Definition of Cloud Computing

Various attempts have been made to have a standardized definition of cloud computing over the years. Generally, cloud computing is related to Information Technology Services that can be provided from a remote location. This may include

both applications that are delivered over the Internet as a service, as well as hardware and infrastructure provided on demand by cloud service provides (Zhang, Cheng, & Boutaba, 2010).

The majority of the literature reviewed has adopted the definition of cloud computing by The National Institute of Standards and Technology (NIST), which has gained popularity with scholars in recent years (Mell & Grance, 2011). For this reason, this is also the cloud computing definition that has been adoption for this study. NIST 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"*

NIST also further provides three cloud computing service models, four cloud computing deployment models as well as essential characteristics that are associated with cloud computing (Mell & Grance, 2011).

### 2.4.2. Cloud Computing Service Models

The cloud computing architecture can be categorized into four layers: Hardware, Infrastructure, Platform and Application layers. These layers are grouped into three service models, which are offered to the end user as Infrastructure as a Service (IaaS), Platform as a Service (PaaS) and Software as a Service (SaaS) (Zhang, Cheng, & Boutaba, 2010). These cloud computing layers and service models are depicted in Figure 1, and a brief description of each service model follows below.

**Software as a Service**: This model provides to users an application that is running on the cloud and accessible on various devices through client interfaces such as web browsers and other program interfaces.

**Platform as a Service**: This models provides capability to consumers to deploy their applications to the cloud without having to manage or control the underlying infrastructure that the applications is deployed on.

**Infrastructure as a Service**: This model provides capability to the consumer to utilise fundamental computing resources such as operating systems, processing and storage as per their need.

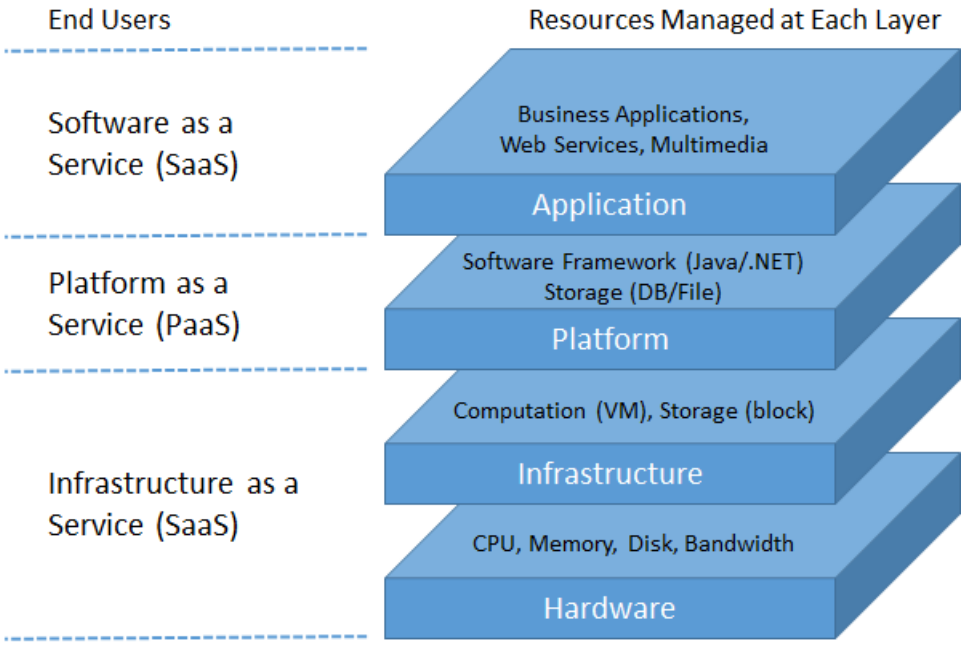


*Figure 1: Cloud Computing Service Models*

### 2.4.3. Cloud Computing Deployment Models

There are a number of factors that influence enterprises to adopt cloud services. Some are interested in reducing cost, whilst others are more concerned about reliability and security. As such, the way that cloud services are delivered is further categorized into four models by NIST, each of which has its own benefits and drawbacks. These cloud deployment model are: Public Cloud, Private Cloud, Community Cloud and Hybrid Cloud (Mell & Grance, 2011). These types of cloud deployments are depicted in Figure 2 below.

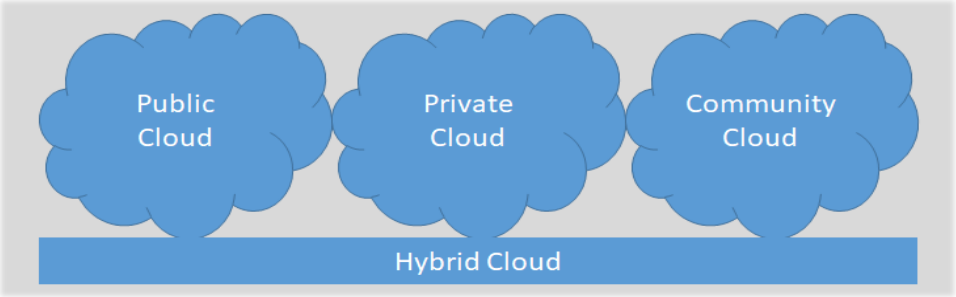


*Figure 2: Could Computing Deployment Models*

**Public Could**: In this delivery model, cloud service providers offer their services to the general public. The service providers manage the infrastructure, operations and security of the cloud services that they offer (Mell & Grance, 2011). One of the biggest advantages associated with the public cloud is that there are no initial capital investments required for consumers of the cloud services and it is the most popular amongst SMEs (Zhang, Cheng, & Boutaba, 2010). Whilst this model is the most cost effective, it also has its drawbacks as consumers of the cloud have little control of security and availability of the services (Aleem & Sprott, 2012).

**Private Cloud**: This delivery model is also referred to as the internal cloud and is designed for exclusive use by a single organization. The cloud can be designed, built and managed internally by the organization or by an external service provider. Furthermore, this can be deployed on premise or off premise as per organizational needs (Zhang, Cheng, & Boutaba, 2010). Private clouds offer organizations more control over security, performance and reliability. However, this type of cloud is often criticized for being too similar to the traditional forms of proprietary server farms and lacks the benefits of no upfront capital investment.

**Community Cloud**: In this model, the cloud infrastructure is used exclusively by a group of companies from the same community that share common goals such as mission, security requirements and policy compliance. It may be operated, managed and hosted by one or more organizations within this community or by a third party service provider, and may be hosted on or off premise (Mell & Grance, 2011). This model allows cloud service provider to design strict security settings and firewall rules as per their needs and leverages off Virtual Private Network (VPN) technology.

**Hybrid Cloud**: A Hybrid cloud is a combination of both the private and the public cloud. It tries to address the limitations of each approach whilst retaining most advantages of each of these individual models. This is achieved by running certain parts of the service on a private cloud, such as applications that are considered critical by the firm, whilst keeping some on the public cloud (Mell & Grance, 2011). One of the drawbacks of hybrid cloud is that they require carefully determining on how to best split between the components that run on the private cloud and those that remain on the public cloud (Zhang, Cheng, & Boutaba, 2010).

### 2.4.4. Essential Characteristics

There are five characteristics of cloud computing, as listed by the NIST definition adopted by this study (Mell & Grance, 2011).

**On-demand self-service**: The consumer is able to provision computing capabilities unilaterally as needed, without any human interaction from the service provider. This eliminates the need for upfront commitment on resources that are going to be used by the consumer, thus helping companies to start small and increase resources as the demand increases.

**Broad network access**: Computing capabilities are accessible over a network using standard mechanisms that promote usage of diverse thin or thick client platforms such as workstations, laptops, tables and mobile phones.

**Resource pooling**: Computing resources are pooled to serve multiple cloud computing consumers using multi-tenant model, where physical and virtual resources are dynamically assigned as per consumer demands.

**Rapid elasticity**: The services can be scaled accordingly, either outwards or inwards, as and when required in accordance with demand. According to the consumer, the computing capabilities that can be provisioned appeared to be unlimited and can be requested any anytime, in any quantity.

**Measured service**: Cloud services leverage off metering capabilities to control and optimize resource usage. Therefore, resource usage can be monitored, controlled and reported on, thus providing transparency for both the cloud consumer and the cloud service provider.

## 2.5. Cloud Computing in South African SMEs

Technology innovation attracts considerable attention in organizational strategies which strive to attain competitive advantage in the market. One such innovation that has become an integral part of business operations is the use of Internet-based technologies to conduct business, through employment if virtual IT resources that are provisioned on demand and is referred to as cloud computing. Many benefits may be realized by SMEs through the use of cloud computing, such as reduced IT cost by scaling resources up or down as per varying organizational needs (Tutunea, 2014).

### 2.5.1. Cloud Computing Adoption in SMEs

A rise in cloud computing and its increasingly evident benefits has attracted a number of businesses and resulted in increased adoption by medium to large South African firms. According to the Cloud Report by World Wide Worx, about 90% of South African medium to large businesses have reported that they have increased the budget for cloud-based services, and over 80% of these businesses have indicated in commitments to continue increasing budgets for cloud services in the coming years (World Wide Worx, 2018). However, the numbers are not looking as good for small businesses as they also need to adopt new innovations in order to stay competitive.

Many South African SMEs acknowledge that technology is important for their businesses and are eager to adopt it in order to survive and be competitive in this information economy. However, awareness does not count for much if it does not lead to behavioural intention and actual usage. Statistics on of cloud-based services amongst South African small businesses reflect disappointingly low usage. According to a report by Xero (2018), whilst 44% of surveyed South Africa SMEs are using cloud computing and are reaping its benefits, an overwhelming 56% were reported as not making use of cloud-based services.

As the Internet enables access to cloud-based services, it is also important that companies have reliable access to Internet. SME South Africa (2018) reported that 87% of SMEs use LTE mobile networks (3G/4G/5G), whilst 58% makes use of fixed line Internet (ADSL and Fiber). Furthermore, 42% have indicated that they make use of e-commerce services whilst 46% have indicated that they make use of some form of cloud-based services, which is consistent to the findings of Xero (2018). Of the 50% that indicated technology as a challenge to SME growth, 60% of them cited Internet reliable Internet connection as a principal obstacle, with 45% citing the availability of technical skills as one of the technological impediments. Other reasons advanced by SMEs that cited technology as a challenge are software related (57%) and hardware related (44%), which can be addressed by the adoption of cloud-based services (SME South Africa, 2018).

Cloud-based services that are mostly used by SMEs are web hosting and email hosting, which are the most basic Internet-based services. This could be due to the fact that these are considered as mature services as they have been offered since the

Internet boom in the early 1990's by global brands such as Microsoft and Google (Gumbi & Mnkandla, 2015). Surveys further indicated that businesses that had an online presence in the form of websites were more profitable than the ones without web-presence. This solidifies the importance of web-presence for small businesses as they enable customer interaction and efficient communication, as well as showcasing of available products with a reach beyond the traditional local market (DTPS, 2017; Gumbi & Mnkandla, 2015). In addition to this, readily available cloud-based services (SaaS) has been found to be the first step towards cloud computing adoption by South African SMEs, even though adoption and usage by small businesses is now expanding beyond SaaS to other service models (Osembe & Padayachee, 2016).

However, many small businesses are still using excel spreadsheets, hardcopy invoice printouts for customers, and flash drives as means of moving information between devices. A further 42% of SME respondents indicated that they have not made any provisions for the use of cloud-based services in the next year of operations. This has partly been attributed to these small businesses being unaware of the benefits that are associated with cloud computing (Xero, 2018).

It has been noted that SME owner-managers of firms that have adopted cloud-based services are generally technically savvy to some degree and drive cloud-based services adoption in their small businesses. Furthermore, studies have found that the majority of SMEs that have adopted cloud computing fit a particular profile: the majority operate in the IT industry and have owners who are IT specialists or who are at least technologically savvy to drive the adoption of cloud computing themselves (Gumbi & Mnkandla, 2015).

### 2.5.2. Challenges of Cloud Computing Adoption

As is the case with many African countries, South African has its own unique challenges when it comes to the adoption of cloud computing. Geographical issues as well as political isolation have a negative effect on the adoption of cloud computing for some small businesses, over and above the internal organizational challenges that they need to overcome in this regard (Adendorff & Smuts, 2019).

Awareness of the cloud computing concept and its associated benefits is important in developing an intention towards use of this innovation. One of the key challenges that are found to impede the adoption of cloud computing is familiarity with the concept of cloud computing amongst small business decision makers. A study on the critical success factors on cloud adoption in South African reported that only a quarter of their respondents indicated that they were familiar with the cloud computing concept. Similarly, even though some indicated to be familiar with the concept, only 20% rated their awareness to be above basic (Adendorff & Smuts, 2019). The majority of large corporations employ IT specialist to drive such innovations. For SMEs, this has a significantly negative impact towards the adoption of cloud computing as the majority of decisions are made by owner-managers, whose limitations on cloud computing awareness becomes those of the firm (Modimogale & Kroeze, 2011).

Lack of availability of skilled resources to champion cloud computing adoption is also a significant challenge for small businesses (Adendorff & Smuts, 2019). This is also evident in the fact that the profile of the majority of firms that have adopted cloud computing operate in the IT industry where owner-managers are often technologically savvy to drive the adoption of cloud computing themselves (Gumbi & Mnkandla, 2015). In support of this assertion, Gono *et al.* (2014) also found that small businesses in the manufacturing and logistics industry had to contract external expertise to assist with the implementation of ICTs due to lack of internal skills and knowledge. In cases where sourcing external expertise is met with financial constraints in SMEs, this will impede the adoption of cloud-based services.

One key aspect that the definition of cloud computing does not highlight explicitly is the dependency of cloud-based services on reliable Internet connectivity (Garrison, Wakefield, & Kim, 2015; Adendorff & Smuts, 2019). Even though broadband connectivity in South Africa has improved in recent years, last-mile connectivity issues is still a major challenge (Gillwald & Moyo, 2017). Availability of broadband infrastructure is inequitable in South Africa and the country was ranked 76 out of 200 in terms of broadband speeds (Xero, 2019).

Xero (2019) reported that 53% of SMEs feel that broadband connectivity issues are hindering them from adopting cloud services. There is also a perception that the cost of data is excessively higher in South Africa compared to other countries, which may

be another barrier to the adoption of cloud-based services in a country where mobile broadband connectivity is dominant. Research ICT Africa noted that governments' policy implementation would be the best way to level the playing field with regards to broadband connectivity and related data affordability.

There is generally better access and broadband speed in larger cities such as Johannesburg and Cape Town than in smaller cities found in mostly rural provinces such as the Eastern Cape. Thus, poor Internet connectivity which is prevalent in mostly rural and peri-urban communities in South Africa can affect productivity and profitability for businesses that heavily rely on cloud-based services in these regions or hinder the adoption of such technology innovation. This results in inconsistent levels of adoption of cloud computing across the country as some regions do not have the underlying communication infrastructure required to deploy or adopt cloud computing. In response to this challenge, the South African Government has embarked on a plan – SA Connect, which aims to deliver broadband access to 90% of the population – to try and address the challenges of broadband access across South African regions (Gillwald & Moyo, 2017).

## 2.6. Models, Theories and Frameworks of Technology Adoption

Adoption of technology can play a significant role in gaining competitive advantage as it contributes to cost savings, improved decision making, improved efficiency, improved product delivery and enhanced customer satisfaction (Mbuyisa & Leonard, 2016). There are a number of theories and frameworks in the field of Information Technology that model technology acceptance and adoption, including: The Technology Acceptance Model, the Diffusing of Innovation Theory, the Unified Theory of Acceptance and Use of Technology and the Technology-Organization-Environment Framework. The above theories, models and frameworks are some of the widely used theories in technology acceptance and use and have been selected for review in order to understand the adoption of cloud computing by South African SMEs and the determinants thereof.

### 2.6.1. Technology Acceptance Model

Technology Acceptance Model (TAM) originated from psychology-based Theory of Reasoned Action (TRA) and Theory of Planned Behavior (TPB) and was introduced by Fred Davis in 1989. It has evolved over the years to become a dominant model in predicting an individual's behavior towards acceptance or rejection of new technology innovation, and has received extensive empirical support over the past decades (Rad, Nilashi, & Dahlan, 2018).

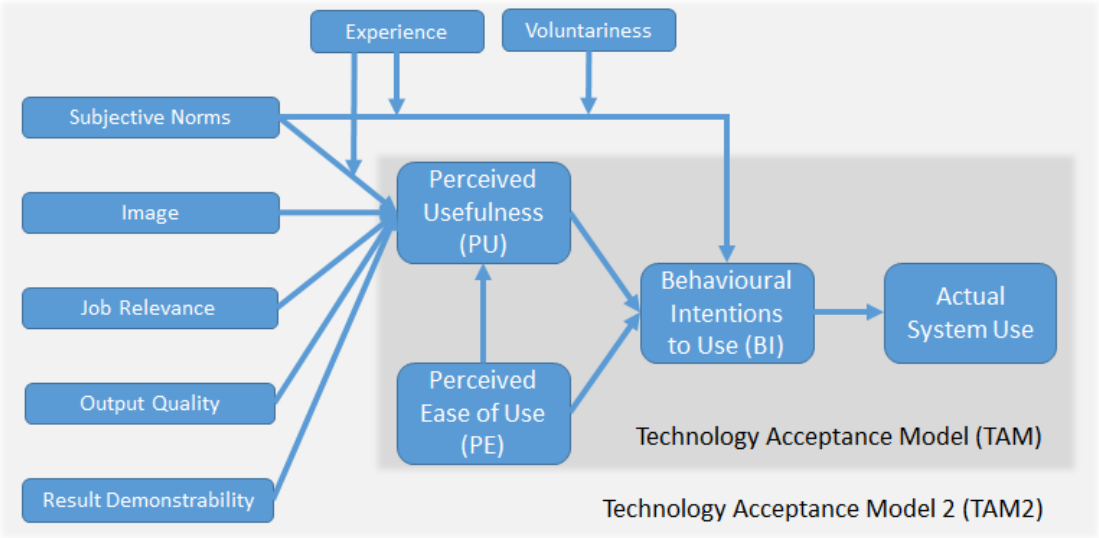


*Figure 3: Technology Acceptance Model*

TAM uses two main constructs (as depicted in Figure 4 above) – perceived usefulness (PU) and perceived ease of use (PE) – to explain a person's motivation (behavioral intention – BI) to adopt and use technology. Perceived usefulness is defined as the degree to which one believes that using a particular technology would enhance their job performance, whilst perceived ease of use is defined as the degree to which one believes using a particular technology would be free of effort (Davis, 1989).

TAM has however been cited to ignore some important factors such as a user's opinion about implementing specific technology as well as social influence, which may also impact adoption and use of technology (Taherdoost, 2018; Ghazizadeh, Lee, & Boyle, 2012). Moreover, TAM is also criticized for only taking into considerations internal organizational variables such as PU and PE, and does not take into account variables that are external to the firm, which may be significant in the acceptance and adoption of technology, and more specifically cloud computing, by organizations.

Subsequent studies have extended on the model by including additional variables which might influence beliefs (PU and PE) of a person towards use of technology, to ensure more consistent results when predicting acceptance and use of technology (Holden & Karsh, 2010). As a result of consistent findings that PU was a major determinant of BI, an extended TAM was proposed and named Technology Acceptance Model 2 (TAM2), which sought to identify external variables that influence PU (Venkatesh & Davis, 2000). These variables are (also refer to Figure 3 above): subjective norm, image, job relevance, output quality and result demonstrability. Subjective norms are further moderated by experience and voluntariness.

### 2.6.2. Diffusion of Innovation Theory

Diffusion of Innovation Theory (DOI) is concerned with the phenomenon of the diffusion and adoption of technology both at an individual and organizational level. DOI sees innovation as being communicated over time through different channels to the members of a social system. There are five key elements in the DOI theory – innovation itself, adopters of innovation, communication channels, time and the social system. The population that adopts innovation is seen to be normally distributed over time, with the adopters broken down into five categories: innovators, early adopters, early majority, late majority and laggards (Rogers, 2003).

Rogers (2003) notes five characteristics that influence adoption of innovation: relative advantage – the degree to which an innovation is perceived to be better; compatibility– the degree to which an innovation is perceived to be consistent with the needs and values of potential adopters; complexity – the degree to which an innovation is perceived to be difficult to use; trialability – the degree to which potential customers can try a new product or service; and observability – the degree to which innovation results are visible to others. However, a study on the adoption of Internet banking in rural South Africa found observability to have no significant impact, with all other four constructs showing significant impact on the adoption of Internet banking (Ramavhona & Mokwena, 2016). Other studies have also found observability to have no significant influence on the adoption of innovation (Zhai, 2011).

One of the major limitations cited about DOI theory is that it does not show the relationship between acceptance or rejection of innovation and the individual's attitudes towards use. Furthermore, studies argue that the link between innovation decision process and the characteristics is not clear (Gillenson & Sherrell, 2002; Lyytinen & Damsgaard, 2001).

### 2.6.3. Unified Theory of Acceptance and Use of Technology

Venkatesh *et al.* (2003) noted that researchers were often faced with a number of theories to choose from, many with similar constructs, and found that they sometimes "pick and choose" constructs from these models or simply pick one model resulting in other constructs being ignored. Based on comparison and systematic analysis of eight previous technology acceptance models and frameworks, they proposed the Unified Theory of Acceptance and Use of Technology (UTAUT), which explains 70% of the variance in behavioral intention and use.

UTAUT defines four antecedents of user's behavioral intentions and subsequent acceptance and use of technology, namely: performance expectancy, effort expectancy, social influence and facilitating conditions. Furthermore, the model contains four moderators of the antecedents of behavioral intention and technology use, namely: gender, age, experience and voluntariness to use technology to further enhance the predictive power of the model (Venkatesh, Morris, Davis, & Davis, 2003).

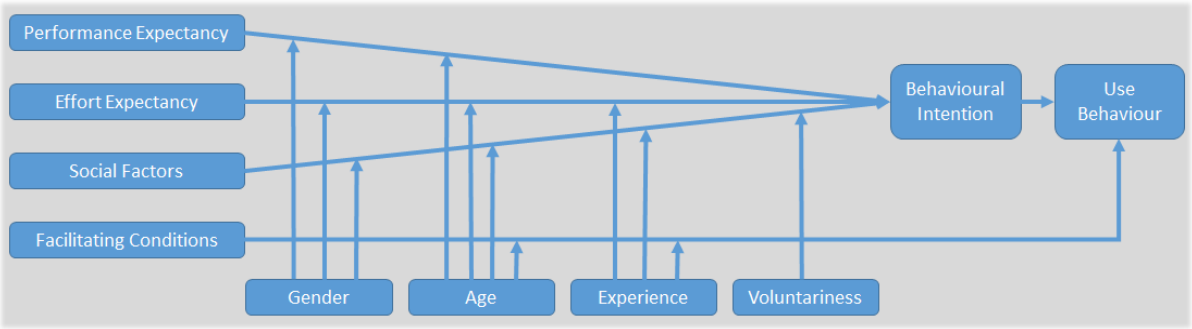


*Figure 4: Unified Theory of Acceptance and Use of Technology*

Despite UTAUT proving a good and detailed model for technology acceptance and adoption, it has not been without criticism. Some studies that have applied the UTAUT have only used a subset of the model, where moderators were typically dropped

(Venkatesh, Thong, & Xu, 2012). A potential reason for dropping moderators in the application of the model may be a result of lack of variation in the moderator towards the acceptance and use of technology. One particular example would be lack of variation in voluntariness when a particular technology is imposed by environmental factors such as government regulations.

Another key element that has been noted to be missing in the UTAUT model is the "individual" characteristics such as self-efficacy and personal innovativeness, which may be influential in behavioral intentions towards technology use (Dwivedi, Rana, Jeyaraj, Clement, & Williams , 2019). This is particularly important for SMEs as the majority of the decision making rests with the owner-manager of the firm. This lead to the model being further extended to Unified Theory of Acceptance and Use of Technology 2 (UTAUT2), which added three more constructs to the original model: hedonic motivation, price value and habit (Venkatesh, Thong, & Xu, 2012).

### 2.6.4. Technology-Organization-Environment Framework

The Technology-Organization-Environment (TOE) Framework is an organizational-level framework which states that three elements of an organization context influence the decision to adopt new technology. These elements are *technological*, *organizational* and *environmental* context (Angeles, 2011).

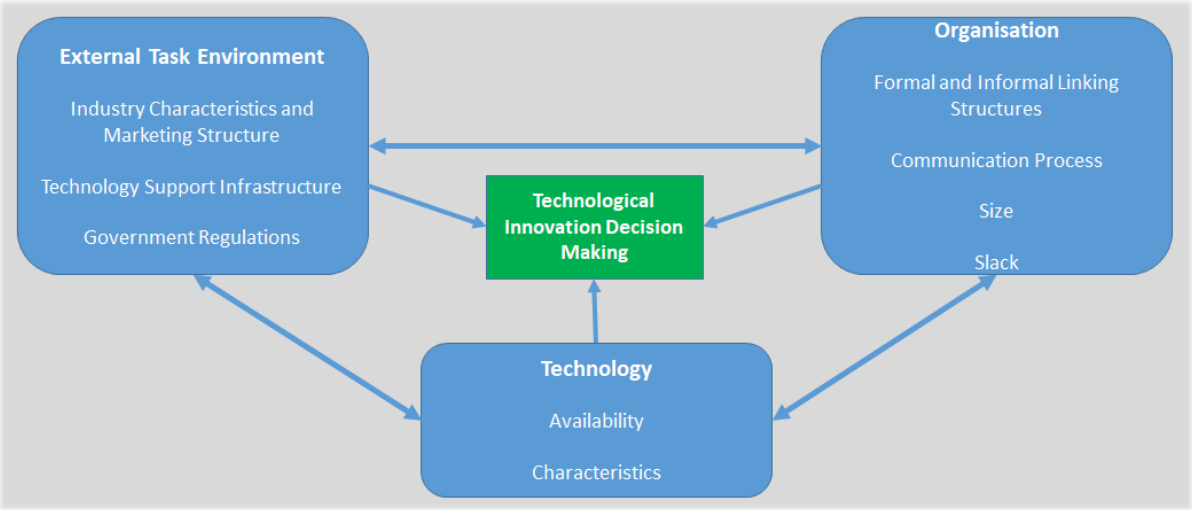


*Figure 5: Technology-Organization-Environment Framework*

## Technological Context

*Technological context* includes all technologies that are of relevance to the organization. This includes technologies that are currently in use by the organization and those that are available in the marketplace but not currently in use. Technologies that are currently in use in the firm are important in the firm's innovation and adoption of new technologies as they set limits on scope and boundaries of technological changes that an organization can undertake, particularly when this relates to issues of compatibility between new innovation and technologies currently in use. Technologies that are available in the market place but not currently in use by the firm also influence a firm's innovation as they can indicate technological ways in which a firm can adapt and evolve with changing market demands (Angeles, 2011).

Innovations that exist outside the firm are of three types: incremental, synthetic and discontinuous. Incremental innovations introduce new features or new versions of technologies that are currently in use by the organization. Synthetic are moderate changes where existing technologies within a firm are combined in an interestingly new and unusual way to improve efficiency. Discontinues or radical innovations represent significant departure from current processes and technologies and introduce completely new ways of doing things (Cao, Baker, Wetherbe, & Gu, 2012).

## Organizational Context

*Organization context* refers to the resources and characteristics of an organization, including formal and informal linking structures between employees, organizations' communication processes, organization size and resource slack (Angeles, 2011). Leadership and technological drive from management can promote innovation and technology adoption in a firm, where executives – or owner-managers in cases of small businesses – can set out clear strategy, role, importance and benefits of technology within and outside the firm (Low, Chen, & Wu, 2011; Angeles, 2011).

## Environmental Context

According to Angeles (2011), *environmental context* includes the firm's industry structure, availability of technology service provides and government's regulatory

environment. These inform how a firm interprets the need to innovate, its ability to acquire resources and capabilities to deploy the innovation. A firm's industry dynamics such as intense competition can stimulate innovation and technology adoption. Other value chain partners can also be influenced by a dominant firm in the value chain to innovate and adopt new technologies to comply with requirements.

Supporting infrastructure can also stimulate or impede innovation and technology adoption, particularly in underdeveloped regions. Development of Information Technology Infrastructure has lagged behind in developing economies, resulting in expensive telecommunication services and low Internet access levels. The significance and severity of these challenges differ from country to country, depending on the level of a country's development. In cases where infrastructure and affordable access to Internet is available, it is usually concentrated in large cities that are usually economic hubs of their respective countries (Ejiaku, 2014).

## 2.7. Research Theoretical Framework

The models, theories and frameworks discussed in the preceding section are some of the most widely used theories in the field of technology acceptance and have proven their effectiveness over the years in predicting human and organizational behavior in various scenarios. What appears to be common factors in the theories is the perceived level of effort when modeling a person's behavioral intentions to adopt and use technology. This may result in SMEs that are led by technologically savvy managers becoming more accepting of new technological innovations in comparison to those that are led by managers who perceive themselves to lack the necessary skill or knowledge to drive adoption of a particular innovation.

It is also worth noting that perceived gains of using new technology (or lack of) is also noted in a number of models. This is proposed as "perceived benefits" in TAM, "relative advantage" in DOI and "performance expectancy" in UTAUT. UTAUT and TOE also include facilitating conditions as constructs, which may particularly be significant for SMEs that operate in rural areas where lack of underlying technological infrastructure to support innovations is mostly prevalent.

Each of these models have their own advantages and disadvantages as outlined in the preceding section, and some are more suited in specific scenarios than others. The proposed theoretical model for this study is underpinned by the TOE framework, where three elements of organizational context – Technology, Environment and Organizational – influence the SMEs adoption of cloud computing. This proposed model is depicted in Figure 6 below. The factors that form part of the elements of the proposed theoretical model are derived from literature based general SME challenges, ICT challenges and cloud adoption challenges.

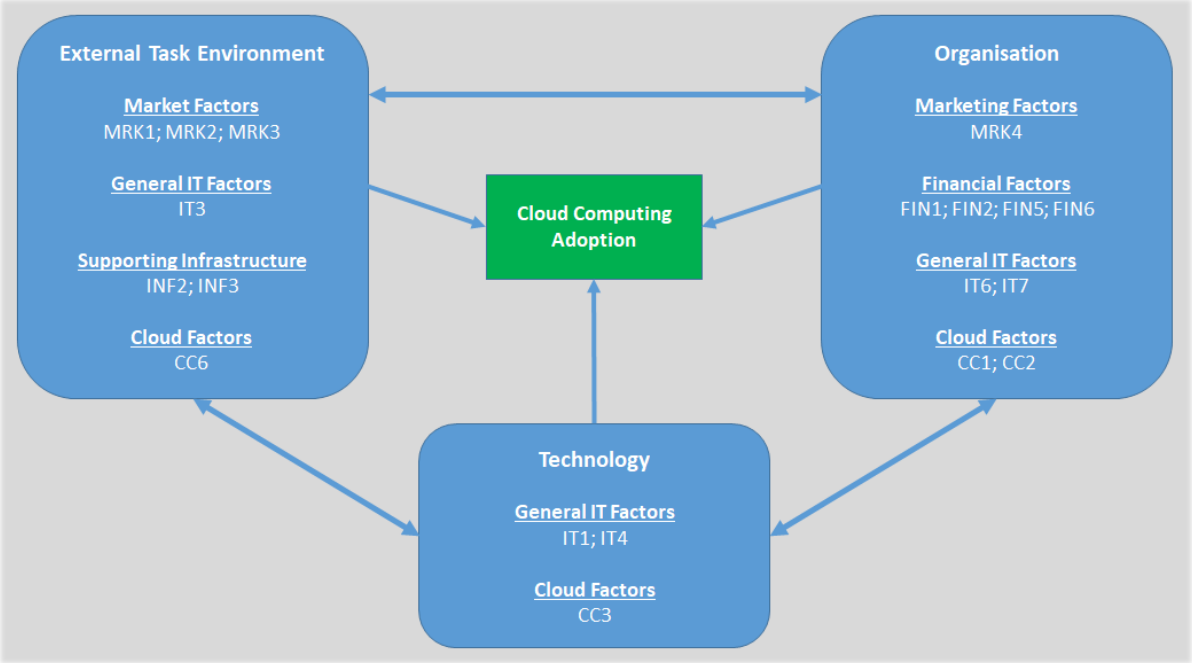


*Figure 6: Proposed Research Theoretical Framework*

The proposed research theoretical framework elements – Technology, Environment and Organization – consist of a number of factors which are generally grouped into four categories: Market, Finance, IT, Infrastructure and Cloud Computing. These factors are hypothesized to have a positive impact on the adoption and use of cloud computing and are outlined below:

*Marketing Factors*

- $H_1$: MRK1 – Local demand for products and services will have a positive impact on adoption of cloud-based services
- $H_2$: MRK2 – Competition with big nationals and multinationals for local market will have a positive impact on adoption of cloud-based services

- $H_3$: MRK3 – Target market Internet presence will have a positive impact on adoption of cloud-based services
- $H_4$: MRK4 – Use of online-based marketing tools and services will have a positive impact on adoption of cloud-based services

*Financial Factors*

- $H_5$: FIN1 – Having a formal documented business plan will have a positive impact on adoption of cloud-based services
- $H_6$: FIN2 – Ability to produce formal financial statements will have a positive impact on adoption of cloud-based services
- $H_7$: FIN5 – Use of electronic banking channels will have a positive impact on adoption of cloud-based services
- $H_8$: FIN6 – Skills and knowledge to secure business finance will have a positive impact on adoption of cloud-based services

*Information Technology*

- $H_9$: IT1 – Electronic management and sharing of business documents will have a positive impact on adoption of cloud-based services
- $H_{10}$: IT3 – Perceived use of technology for competitive advantage by competitors will have a positive impact on adoption of cloud-based services competitors
- $H_{11}$: IT4 – Having a clearly defined and adopted IT strategy will have a positive impact on adoption of cloud-based services
- $H_{12}$: IT6 – Perceived employee tech literacy will have a positive impact on adoption of cloud-based services
- $H_{13}$: IT7 – Management technological skills will have a positive impact on adoption of cloud-based services

*Supporting Infrastructure*

- $H_{14}$: INF2 – Reliability of electricity supply will have a positive impact on adoption of cloud-based services
- $H_{15}$: INF3 – Reliability of Internet connection will have a positive impact on adoption of cloud-based services

*Cloud Computing*

- $H_{16}$: CC1 – Understanding of cloud computing concepts and associated benefits will have a positive impact on adoption of cloud-based services
- $H_{17}$: CC2 – Understanding of applications delivered over the Internet as a service will have a positive impact on adoption of cloud-based services
- $H_{18}$: CC3 – Use of basic Internet-based services such as email and websites will have a positive impact on adoption of cloud-based services
- $H_{19}$: CC6 – Internet costs as a factor when deciding on usage of cloud-based systems will have a positive impact on adoption of cloud-based services

## 2.8. Chapter Summary

In order to review and understand literature on the challenges that South African SMEs face, this chapter started by outlining the definition of SMEs within the South African context. This was then followed by detailing the SME landscape where South African SME industry growth was compared to that of other developing economies, as well as examining the local SME landscape by sector with focus on the Eastern Cape province. Use of ICT has become imperative for small businesses in order to stay profitable and grow in the highly competitive global market. South African SMEs currently face a number of challenges, including access to market and finance, many of which can be addressed through adoption and use of innovative ICTs such as cloud computing.

The concept of could computing was then introduced and discussed, detailing the service and deployment models that are available to small businesses when adopting and using cloud computing. In order to understand the adoption of cloud computing by SMEs, a few prominent models and frameworks on the adoption and use of technology were discussed, followed by a review of cloud computing adoption challenges within South African SMEs. The level of adoption of cloud-based services is growing, but small businesses acknowledge that they should be doing more in terms of adopting these innovative ICTs for competitive advantage.

# Chapter 3: Research Design and Methodology

## 3.1. Introduction

Research studies are based on underlying philosophical assumptions on what constitutes valid research and which research methods are suitable for discovering or gathering knowledge for a particular study. It is thus important to understand these underlying philosophical assumptions in order to conduct and/or evaluate research studies.

The purpose of this chapter is to discuss philosophical assumptions underpinning this research study and outline the research design and the methodology that is used to address the research question. The chapter begins by outlining the most common research paradigms in academic studies, after which the location of this study within these paradigms is discussed. The three classifications of research design – exploratory, descriptive and explanatory – are discussed briefly before outlining the research design process that is adopted for this study.

Different research methodologies are then presented, followed by the rationale for the selected methodology. A discussion on the population of the study, the sampling method and criteria, data collection and analysis, voluntary participation and confidentiality and the selected data instrument is also presented in this chapter. The chapter then closes off by discussing ethical considerations, limitations of the study as well as suggestions on areas that can be explored further.

## 3.2. Research Paradigm

Researchers normally have their own understanding of the beliefs about the nature of reality, what can be known about reality and how to go about getting that knowledge about reality. These are elements of a research paradigm, which is a researcher's way of understanding and studying reality. The research paradigm is categorized into three main components: ontology, epistemology and methodology. Ontology refers to the beliefs about the nature of reality. Epistemology is concerned with the nature and forms of knowledge. Methodology, on the other hand, refers to the approach and

processes including strategy, design and research plan that is followed to acquire knowledge (Rehman & Alharthi, 2016).

Whilst there are a number of research paradigms in academic research, the most widely used are positivism and interpretivism (Kim, 2003). When conducting research that seeks to understand a particular phenomenon, researchers often adopt a particular paradigm to ensure credibility of the research as well as to improve generalization of their research findings (Kankam, 2019). In order to locate the philosophical assumptions and select an appropriate research methodology for this study, it is imperative that we first discuss and understand these most commonly used research paradigms.

### 3.2.1. Positivism Paradigm

The ontological perspective of the positivism paradigm is that there is existing reality that is isolated from the observer. This implies that the researcher is not part of – or does not actively influence – the reality that they wish to study. This paradigm puts forth that there is only one objective reality that exists for a particular situation or research phenomenon regardless of the belief system of the researcher. It advocates for a view that science is the only basis of true knowledge (Wagner, Kawulich, & Garner, 2012). In order to better understand a phenomenon that is being studied, the researcher controls procedures and validates explanations of that particular phenomenon.

The epistemological position that is assumed by positivist research is that of objectivism. In order to ensure that objectivism is maintained, researchers often create distance between themselves and the participants of the study to ensure that they remain emotionally neutral and that there is clear distinction between emotion and reason. Positivist researchers often use quantitative research methods such as surveys, closed-ended questionnaires, field studies and experiments when conducting their studies (Rehman & Alharthi, 2016).

Positivists treat the social world the same way as they treat the natural world, where they assume the same cause-effect relationship on social phenomena as they would for natural phenomena and that once this cause-effect relationship is established, it

should be predicted with certainty in future. Positivist research involves obtaining facts by testing theories. The objective is mainly to predict results and find strengths of relationships between variables in order to understand the underlying laws and principles that determine the social and natural world. Theoretical assumptions hold little value for positivists until such time that they are tested and proven. In testing these theoretical assumptions, the researcher must remain objective and unbiased throughout (Wagner, Kawulich, & Garner, 2012).

The positivist approach has had its fair share of criticism amongst scholars. While scientific and objective methods may be useful in studying natural objects, some scholars have argued that these might not be as successful when studying social phenomena. They note that the complexity of laws that govern individuals, characteristics that are prevalent in a particular social context, relationships amongst individuals and institutions within their social context differ significantly with the predictability and order of the natural world. These criticism lead to the emergence of post-positivism paradigm, which attempts to address the weaknesses of positivism.

As with the positivist paradigm, the ontological position of post-positivism assumes a reality that exists that is isolated from the observer, but which cannot be comprehended perfectly due to complexities of social phenomena. It further acknowledges the possibility of the researcher's own values and beliefs as potentially influencing the reality that is being observed. Thus, post-positivism advances that perfect objectivity cannot be achieved but can be approximated at best (Grix, 2018). Positivism and post-positivism share some common traits and are generally treated as belonging to the same family. However, most research studies in modern days fit the post-positivism paradigm more than the traditional positivism paradigm.

### 3.2.2. Interpretivism Paradigm

Contrary to the positivism paradigm, the interpretivism paradigm allows researchers to draw concepts from a particular context and apply their own values and meanings in studying reality. This means that the researcher's role cannot be separated from reality that is being studied. Interpretivism rejects the notion of a single verifiable reality that is applicable to all contexts. The ontological perspective of interpretivism

is that there are socially constructed multiple realities and that truth and reality is created and not discovered (Guba & Lincoln, 2005). Unique individuals and communities have their own belief systems and values, and their definitions of reality is based on language, culture and the different types of tools and literature relevant to those individuals or communities. According to interpretivism paradigm, it can thus be said that individuals and communities create their own reality that is associated with their unique belief systems and values (Wagner, Kawulich, & Garner, 2012).

The epistemological position that is assumed by interpretivism research is that of subjectivism. With interpretivism studies, the emphasis is on understanding the complex human and social variables in which the research phenomenon is located. Researchers cannot be detached from the subject(s) being studied and are part of the social reality that is being researched. The goal of interpretivist research is not to discover context free universal knowledge or truth, but to understand subject's interpretation of the social phenomenon that they interact with (Grix, 2018).

Whilst quantitative research methods are sometimes used in interpretivist studies, qualitative research methods are often used for the type of studies where data is collected mostly using methods such as open-ended interviews, case studies and observations. The researcher normally employs intense inquiry processes of analyzing and understanding since the variables are normally difficult to measure. They then interpret the results that are acquired through these inquiry and data-collection processes. The researcher's individual belief systems, values and knowledge may thus impact the interpreted understanding of study participants (Rehman & Alharthi, 2016).

In interpretivist studies, if there exist well-argued different interpretations of the same issue, one is not preferred or favored over the other. It is instead recognized that multiple realities exist and acknowledged that different scholars may have different perspectives of the same phenomenon. Researcher's past experiences and discipline specific knowledge could therefore contribute significantly to the extent of the gap between collected data and the purported reality. Furthermore, interpretivist research has also been criticized for lack of objectivity due to the researcher's involvement with participants and its incapability of yielding theories that are generalizable to larger populations (Grix, 2018).

### 3.2.3. Location of Study Paradigm

The study explores how rural SMEs in the Eastern Cape Province of South Africa can leverage on the capabilities of cloud computing for competitive advantage. The primary objective of the study is to gain understanding on the antecedents and impediments of cloud computing adoption for competitive advantage by rural SMEs in the Eastern Cape Province of South Africa. There are unique challenges that rural SMEs face that are not necessarily as prevalent among their urban counter parts. The study seeks to explore these challenges that may impede or enhance adoption of cloud computing in rural SMEs so that they can be addressed in order to support and improve the rural SME ecosystem. These variables, identified through review of literature, are then tested using statistical methods and techniques to establish their significance and are used to develop a model that can serve as the basis for driving adoption and implementation of cloud computing by rural Eastern Cape SMEs.

This study's philosophical assumptions fit that of interpretivism. The researcher will collect data from participants using variables that are based on trends that have been identified through review of literature on rural SME challenges, ICT adoption challenges and use of cloud computing by rural SMEs to better understand how these rural SMEs can leverage on the benefits of cloud computing for competitive advantage. Whilst the data is collected using Likert-scale based questionnaire, responses are subjective experiences of research participants. The researcher therefore analyses data based on subjective experiences as presented by research participants. Noting that researchers seldom strictly apply a particular research paradigm (Collis & Hussey, 2013), the researcher will lean towards the interpretivism paradigm in order to achieve the research objectives of this study.

## 3.3. Research Design

Research design refers to the overall research plan for collecting, analyzing, interpreting and reporting data in research studies in order to address the research problem. It is a comprehensive plan for the connection of the conceptual research problem with the empirical research. Research design provides guidelines and instructions to be followed during planning and implementation of the research study.

It is associated with the structural framework and is concerned with the planning for the implementation of the study in order to achieve the ultimate research goal. The controls provided by the research design improve the probability that the results are an accurate reflection of the real phenomenon (Creswell, 2003).

Research design can be classified into three possible forms: exploratory research, descriptive research and explanatory research. Each of these classifications are based on the purpose of the research, as each serve contrasting purpose. For example, the purpose of a descriptive research study is to outline a picture of a particular situation, person or event and to show how things or aspects of a phenomenon are related to each other. Descriptive research focuses more on the "what" aspects of the research subject rather than the "how" aspects. This type of research design is suitable for exploration of relatively new research areas as it does not explain how an event occurred (Burns & Grove, 2005). Thus, alternatives such as exploratory or explanatory research designs would be better suited or advised in situations where there is abundance of descriptive information.

Exploratory research study is also conducted when little is known about a particular phenomenon, or when a problem is not yet clearly defined. However, is does not seek to find conclusive and final answers to research questions, but merely to explore these questions or phenomenon in varying degrees of depth to provide a better understanding. It's underlying theme is thus to tackle research problems where little or no previous knowledge have been found, and serve as a basis for more conclusive research (Saunders, Lewis, & Thornbill, 2007).

Explanatory research study on the other hand seeks to explain and account for descriptive information. It builds on descriptive and/or exploratory studies to identify reasons why and how a phenomenon occurs. Explanatory research presents evidence that supports or refute a prediction or explanation by investigating and providing reasons and causes of a phenomenon. This method is thus useful when the researcher wants to discover and report on associations that exist between different aspects of a phenomenon that is being studied (Burns & Grove, 2005).

This study seeks to uncover, explore and present ways in which rural SMEs can leverage on the benefits of cloud computing for competitive advantage. The researcher has opted to adopt a positivist descriptive quantitative study to fulfill the

research objective. Primary data will be collected through use of this questionnaire and will be analyzed using various statistical techniques to establish cause-effect relationships between these pre-defined variables and their significance on the adoption of cloud computing by rural SMEs. Figure 6 below outlines a series of sequential steps that the study followed in order to achieve the research objective.

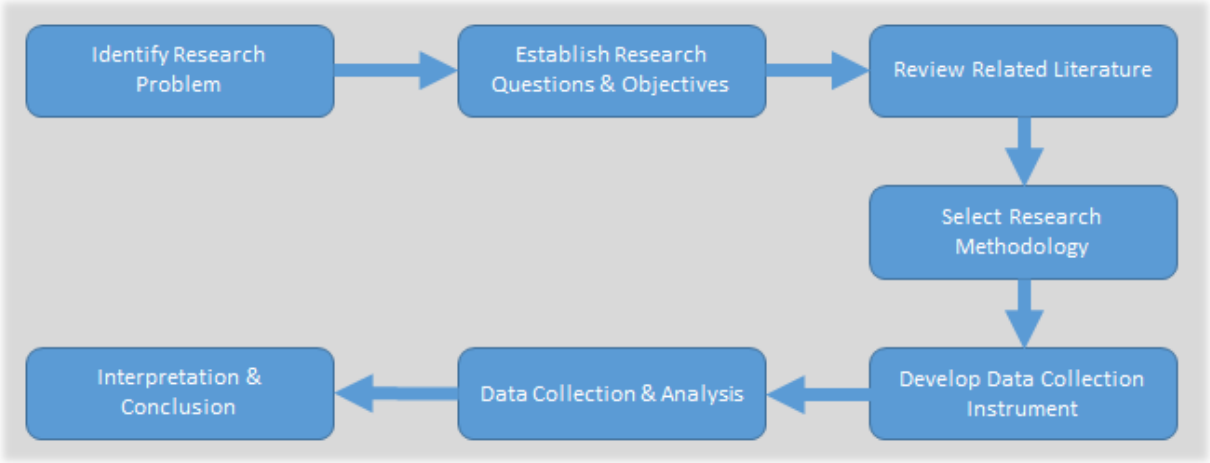


*Figure 7: Research Design*

After the research problem was identified and the research questions and objectives established, the researcher conducted a comprehensive review of literature on challenges faced by rural SMEs, how ICTs can be used to meet these challenges, challenges in ICT adoption by these rural SMEs as well as current use of cloud computing amongst rural SMEs. From this, the researcher was able to identify a set of variables that could potentially contribute to driving cloud computing adoption in rural SMEs. This, in turn, guided the development of the data collection instrument used to collect data from rural SMEs for statistical analysis and interpretation. A detailed methodology for the study is discussed in the following section.

## 3.4. Research Methodology

Research methodology refers to the steps, procedures and strategies that are followed in order to gather and analyze data during the research investigation (Myers, 2009). Whilst there are a number of distinctions in research methods, the most common are qualitative and quantitative. These terms refer to the research methods which relate to the way in which data is collected and analyzed, and the types of representations

and generalizations that are derived from the data. Qualitative methods were originally developed in social sciences to enable researchers to study cultural and social phenomenon, whilst quantitative methods were originally developed in natural sciences to enable researchers to study natural phenomenon (Gobo, 2005).

These methods are both extensively used in educational research and neither can be claimed to be better than the other. The most suitable method to use is dependent on the context of the study, as well as the purpose and nature of the research. Some researchers even opt to employ a mixed methods approach which combines these two approaches depending on the nature of the study, to take advantage of the distinct benefits offered by quantitative and qualitative methods and offset the shortcomings experienced by adopting one or the other.

### 3.4.1. Qualitative Research Method

Qualitative study is naturalistic and attempts to study day-to-day life of different people, groups and communities in their native settings. It assumes an interpretative and naturalistic approach to the subject matter, and attempts to interpret and make sense of the phenomenon as per the meaning brought about by the subject matter (Rabionet, 2009). Qualitative research attempts to explore and uncover issues about problems at hand where there is very little knowledge about what is being studied. It is normally employed when there's uncertainty about the characteristics and dimensions of the research problem. According to Myers (2009), qualitative research is designed in such a way that assist researchers to understand people as well as their cultural and social context in which they exist.

A qualitative study allows differences and complexities of the studies to be explored and presented. Different enquiry strategies, knowledge claims, and data collection methods are used in qualitative studies. Qualitative data sources include interviews and (usually open ended) questionnaires, observations, fieldwork, review of existing text and documents, and impressions and reactions of the researcher that is involved in the study. This data can be derived from written opinions of others, direct observations of behaviors of the group being studied, public documents and direct

interviews with study participants (Myers, 2009). A combination of these data sources can also be used in qualitative studies.

Qualitative research employs an inductive data analysis and allows for the design to evolve as opposed to having a fixed design at the beginning of the study. This is owing to the fact that it is almost impossible to predict the outcome of the interaction between the participants and the researcher due to diverse value systems and perspectives, differences in cultural and social contexts, and their differing interpretations and influences on what constitutes reality.

### 3.4.2. Quantitative Research Method

There are three main differences between quantitative and qualitative research, which are categorized as: distinction between understanding for qualitative and explanation for quantitative as the main purpose of the study, impersonal (detached) role for quantitative and personal (attached) role of the researcher in the study for qualitative, and knowledge discovery for quantitative versus knowledge construction for qualitative. Quantitative research utilizes surveys, questionnaires and experiments to collect data that is tabulated and revised in numbers. This enables data to be characterized by statistical analysis to draw conclusions. This research method measures variable from a population sample of subjects and demonstrate associations between the variables using statistics such as difference between means, correlations, and relative frequencies.

Another significant difference between quantitative and qualitative research method is that quantitative research is deductive whilst qualitative is inductive. Whilst qualitative research does not require hypothesis before the study can commence, since it employs inductive approach to better understand and explain the interaction between the participant and research, quantitative research needs a hypothesis before a research can commence (Stake, 1995).

### 3.4.3. Rationale for Quantitative Method

As indicated in the previous sections, the main objective of the study is to identify and explore variables that significantly contribute to – or impede – the adoption of cloud computing in rural Eastern Cape SMEs. To achieve this, data will be collected through use of questionnaires and analyzed using various statistical techniques to establish

cause-effect relationships between these variables and the adoption of cloud computing by rural SMEs. While qualitative research presents data as descriptive narration with words and attempts to understand phenomenon in within a social context, quantitative research presents statistical results represented by numerical or statistical data. Thus, the quantitative research method has been selected for this study as it will assist in identifying enablers and barriers to cloud computing adoption and help better understand their significance through use of various statistical methods and techniques.

### 3.4.4. Research Population

A study population is a totality or an aggregate of all subjects, members or objects that conform to a particular set of specifications, about which information needs to be discovered or collected (Banerjee & Chaudhury, 2010). In this study, the targeted population is all SMEs that operate in the rural and peri-urban areas of the Eastern Cape Province of South Africa. There has notably been a lack of standardization of what constitutes urban and non-urban areas which has hindered comparative research by urbanization scholars, particularly within the African context (Collinson, Tollman, & Kahn, 2007). In South African, there is a varying range of types of settlements, which conclude: 1) Metropolitan formal settlements, which normally include big cities and associated townships; 2) Non-metropolitan urban areas, such as big towns that may also have significant townships; 3) Urban informal, including peri-urban; 4) Former homeland areas, which are generally categorized by small to medium-sized towns, townships and rural settlements; and 5) Commercial agriculture, often in the forms of rural farms with a small settlements of farm workers (Atkinson, 2014).

Some of these settlement categories bestride the “urban” and “rural” classifications, where some small towns are referred to as urban in some instances and rural towns in other instances. The Eastern Cape Province is no different to this type of settlement and categorization. For the purpose of this study, the research population is defined as all the SMEs that operate outside the two metropolitan regions of the Eastern Cape Province – Buffalo City Metropolitan Municipality and Nelson Mandela Bay Metropolitan Municipality – as these two major areas contribute significantly to the

province's annual GPD. The Majority of the towns in the target population region lie in the former homelands of Transkei and Ciskei, where underdevelopment and infrastructure challenges are still prevalent.

### 3.4.5. Sampling Design

It is often not practical to include all subjects, members or objects of a population in a study. In such a case, a sample of the population is used. The method or technique of selecting a sample that is a representation of the study population is known as sampling. There are a number of different sampling techniques that researchers use to collect data for their studies. These techniques are categorized into two groups: probability (random) sampling and non-probability sampling. In probability sampling, each and every member from the study population has a known equal chance of being selected. In non-probability sampling on the other hand, the odds of a member of the population being selected cannot be calculated. Probability sampling involves random selection of participants, whilst non-probability sampling relies more on the judgment of the researcher in selecting participants. Non-probability sampling techniques are generally more time and cost-effective compared to probability sampling techniques. Probability sampling techniques, however, give a better chance of creating a sample that is more representative of the actual population that is being studied (Showkat & Parveen, 2017).

Due to time constraints, cost limitations as well as limited access to the population being studied, this study has adopted non-probability sampling techniques as means of collecting data from participants. More specifically, the study will use a combination of convenience and snowball sampling techniques. The convenience sampling technique will involve collaboration with all local municipal authorities who will be requested to assist in disseminating the questionnaire link to SMEs within the study areas. Contact details of these municipal authorities will be collected from information that is publicly available on the World Wide Web. From there, a snowballing technique is used where the participants will be encouraged to also distribute the questionnaire link to their business contacts and/or associates.

The researcher will further identify potential participants through online search and disseminate the questionnaire links to those participants that fall within the study population. The sources of SMEs will include those contained in the South African Business Directory, the SME Info Directory and the African Growth Institute amongst other sources. Further to this, as with the local municipal strategy, SME owner-managers that have participated in the research through this approach will be encouraged to recruit other SME owner-managers within their circles, in a snowball fashion, to partake in the study.

The Eastern Cape province accounts for 179 908 of the South African SMEs (SEDA, 2019). The majority of SMEs in the Eastern Cape are concentrated in the two metropolitans within the province, with a smaller number falling within the target region outside the two metropolitan municipalities. The study targets to get a minimum of 80 SME responses from the target group. As the literature has alluded to varying behavior towards the adoption of cloud computing by SMEs in different sectors, it is important that balance with regards to SME sector representation is achieved from the respondents, in order to off-set these variations is cross-sector behaviors.

### 3.4.6. Data Collection

Data collection is defined as the systematic gathering of data from various sources for a particular purpose. These sources of data may include observations, questionnaires, interviews documents and electronic sources (Kabir, 2016). The source to be used for a particular study depends on the research design. The exercise of data collection then provides source data for analysis and interpretation.

A survey is one of the most common and cost-effective means of collecting primary data (Zikmund & Carr, 2013). A structured questionnaire will be developed using a five-point Likert scale, which will be guided by the variables identified during the review of literature. Primary quantitative data will be collected through this structured self-administered questionnaire designed to be completed online at the participants convenience, however within a limited period of time.' The questionnaire link to the online survey (QuestionPro) will be distributed via email to potential participants, which include SME owners within the identified population group.

### 3.4.7. Data Analysis

Data analysis is the process in which statistical methods and techniques are applied to the collected data in order to develop summaries and identify trends (Zikmund & Carr, 2013). Microsoft Power BI will be used to visually present demographic information as well as descriptive statistics of the factors included in the proposed research model. IBM SPSS 22 was used for correlation and linear regression analysis. To determine factors that significantly contribute to the adoption of cloud computing in rural SMEs, correlation and regression analysis will be used. Results obtained will also be presented using graphs and tables and analyzed accordingly in order to satisfy the research objective, which will then be followed by recommendations and conclusions.

## 3.5. Ethical Considerations

As the study deals with organizations IT strategies which may include proprietary information that gives them competitive advantage, confidentiality promised to participants has to be strictly adhered to. 'As such, anonymity of the participants and their organizations will be prioritised. In order to achieve this, codes will be used to refer to SMEs and managers that have participated in the study, such as S1 and M1 for SME 1 and Manager 1 respectively. The researcher ensures that the participants fully understand that participation in the research is voluntary and that they can withdraw their participation partially or completely at any time during the study. Ethical clearance will also be applied for through the Nelson Mandela University (NMU) Business School before data is collected from the participants.

## 3.6. Research Limitations

There are a few limitations that have been identified by the researcher. Firstly, as the population of the study is all the SMEs in the Eastern Cape Province that operate outside the two metropolitans, the sample size that will be used for the study may be too small to provide a good fit for the population being studied. This study may thus be used as a foundation for further studies to build on. Secondly, cost limitations and

time frames mean the research can only be limited to a certain number of factors identified during literature review that influence adoption and implementation of cloud computing by rural SMEs in the Eastern Cape Province of South Africa. However, these limitations have not been deemed to significantly influence the findings of the study in any way.

## 3.7. Chapter Summary

The purpose of this chapter was to discuss philosophical assumptions underpinning this research study and outline the research design and the methodology that was used to address the research question. The most common research paradigms in academic studies were outlined and the location of this study within the positivist paradigm discussed. The researcher has opted to adopt a positivist descriptive quantitative study to fulfill the research objective. Qualitative research presents data as descriptive narration with words and attempts to understand phenomenon in within a social context, whilst quantitative research presents statistical results represented by numerical or statistical data. The quantitative research method has been selected for this study as it will assist in identifying enablers and barriers in cloud computing adoption and help better understand their significance towards the adoption.

For the purpose of this study, the research population is defined as all the SMEs that operate outside the two metropolitan regions of the Eastern Cape as these metros contribute significantly to the province's annual GPD. Majority of the towns in the target population region lie in the former homelands of Transkei and Ciskei, where underdevelopment and infrastructure challenges are still prevalent. Due to time constraints, cost limitations and limited access to the population, this study has adopted non-probability sampling techniques in the form of convenience and snowball sampling, with a target of 80 SME responses.

Before commencing with data collection, the researcher has applied for ethics clearance from the Business School. Data will be collected using self-administered questionnaire and Statistical Package for Social Science (SPSS) will be used for data analysis and to test research hypothesis. The chapter closes off by outlining

researcher limitations have been identified.  However, these limitations have not been deemed to significantly influence the findings of this research study.

# Chapter 4: Data Analysis and Results

## 4.1. Introduction

Chapter 3 presented the research methodology and design and detailed the design of the data collection instrument. This chapter presents the data that was collected using the data collection instrument detailed in the previous chapter. This data is presented in the form of descriptive statistics, correlation analysis and linear regression analysis.

Microsoft Power BI was used for descriptive statistics to visually present respondent demographics, firm demographics as well as visual presentation of all the questions relating to access to markets, access to finance, IT usage, infrastructure and cloud computing. IBM SPSS 22 was used for correlation and linear regression analysis. Correlation and regression analysis were used to determine the significant predictors and direction of the relationship between cloud adoption and various independent variables.

## 4.2. Respondent Demographics

A total of 81 responses were received from the survey that was distributed online and accessible via a link. The respondent demographic is depicted in Figure 8 below. The survey responses show that 63% of the respondents were female whilst 37% were male respondents. Furthermore, 70% of respondents were Black, 21% White and the remaining 9% of the respondents were Coloured.

The demographic age group of the respondents show that majority fall between the ages of 35 to 44 years (43%), followed by the age group between 45 to 54 years (19%) and the age group between 25 to 34 years (17%). The age group between 55 to 64 years accounted for 10%, whilst age groups from 18 to 24 and 65 to 74 accounted for 6% and 5% respectively.

The reported educational levels of the respondents indicate that 26% have a bachelor's degree, 21% have a national diploma, 20% have an honours degree and 10 % have a master's degree. Another 10 % of the respondents reported to have matric certificate as their highest qualification, and a further 9% indicated that they have a post matric certificate. Only 5% of the respondents indicated to have less than matric as their highest qualification. From the above, it can be noted that a total of

85% of the respondents have indicated to have some form of post matric education as their highest qualification level.

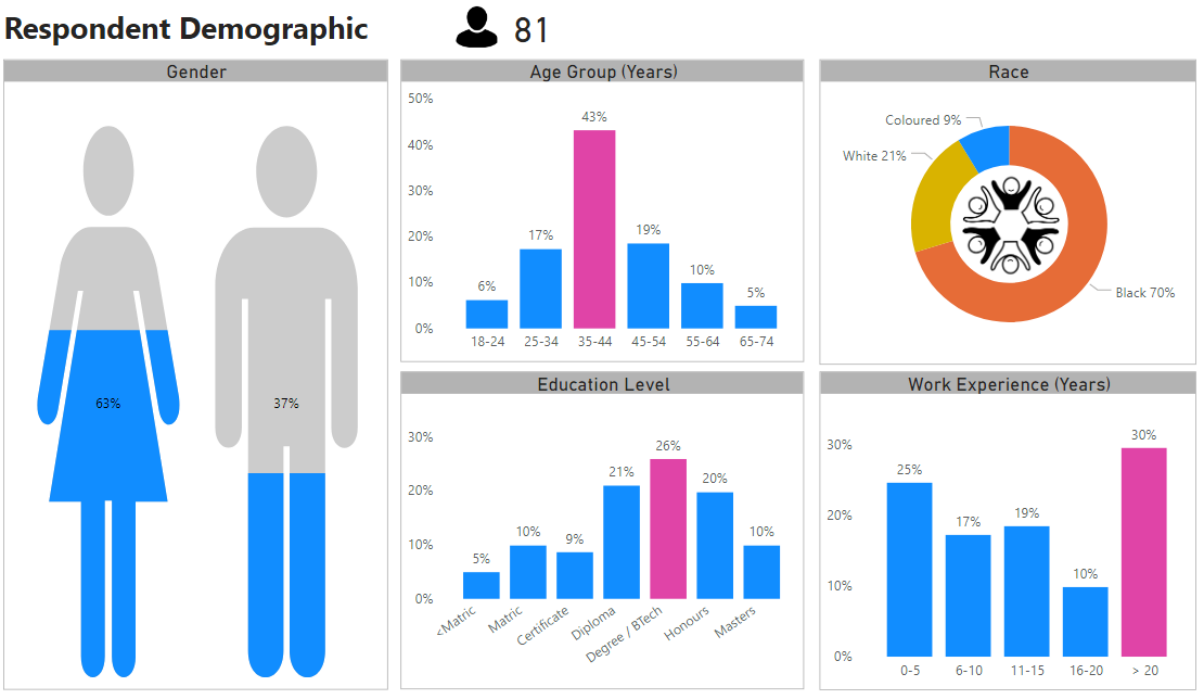


*Figure 8: Respondent Demographics*

The demographic work experience shows that 30% of the respondents have more than 20 years post-school work experience, followed by 25% who indicated that they have 0 to 5 years work experience and 19% indicating that they have between 11 to 15 years of work experience. A further 17% reported that they have between 6 to 10 years work experience, with the remaining 10% indicating that they have between 16 to 20 years work experience.

## 4.3. Firm Demographics

In addition to the respondent demographic information, respondents were also requested to provide demographic information about their firms. The firms demographic results are depicted in Figure 9 below.

The demographic firm sector shows that 23% of the respondents are in the Construction sector, followed by 15% in Financial Services and another 15% in the Wholesale and Commercial Agents sector. A further 7% of the firm selected Agriculture, 7% in Social and Personal Services as well as 5% each for the Catering

and Accommodation, Manufacturing as well as Transport and Storage sectors. The "Other" sector category catered for the remaining 19% of the firms.

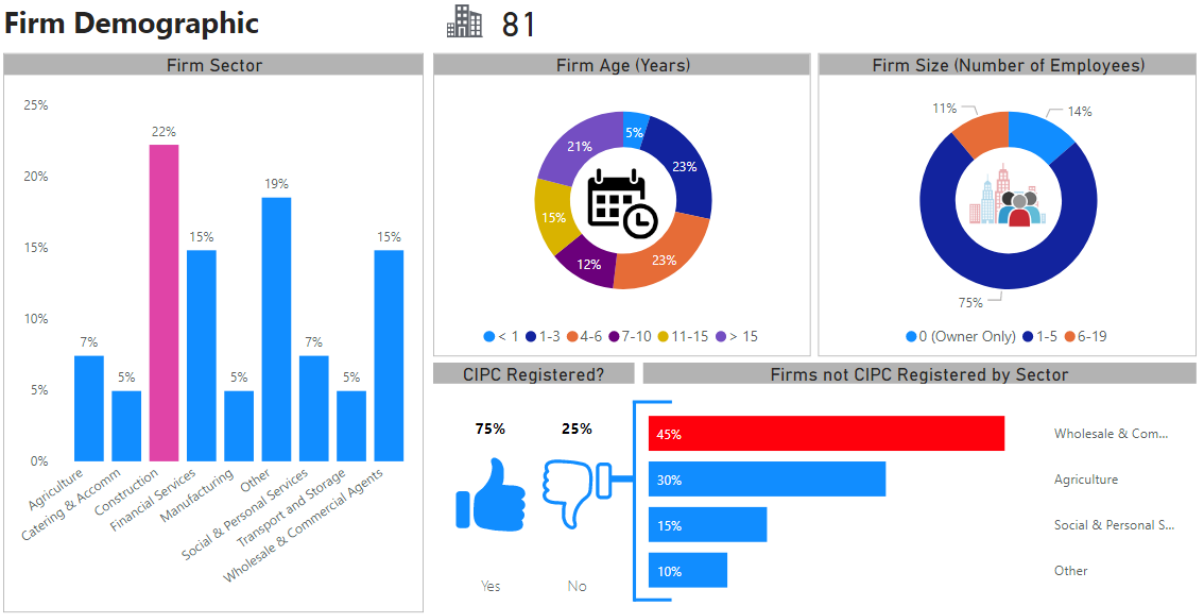


*Figure 9: Firm Demographics*

The demographic firm age was fairly distributed with 23% reporting their firm to be between 1 to 3 years, and another 23% stating their firm to be between 4 to 6 years. A further 21% said their firm was more than 15 years old, 15% indicating their firm to be between 11 to 15 years old, and 12% between 7 to 10 years old. The remaining 5% of the firms was less than a year old.

The firm size demographics indicate that 14% of the firms were non-employer, where the firm has the owner as their only employee, with 75% reporting to have 1 to 5 employees whilst the remaining 11% reported having 6 to 19 employees. Furthermore, 75% of the firms were registered with the Companies and Intellectual Property Commission (CIPC) whilst the other 25% were not registered with CIPC. Of the 25% of the firms that were not registered with CIPC, 45% of them operated in the Wholesale and Commercial Agents sector, 30% in Agriculture, 15% in Social and Personal Services and the remaining 10% falling in the "Other" category.

## 4.4. Market Related

This section provides descriptive statistics of perceptions and knowledge of the respondents based on questions relating to the firm's access to markets, and other customer and potential customer related questions.

### 4.4.1. MRK1: Local Market Demand

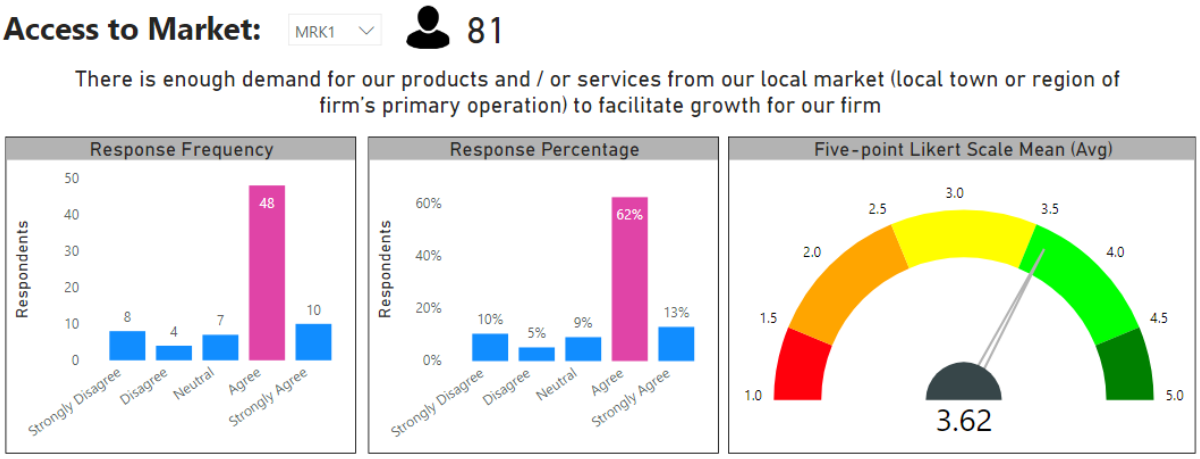


*Figure 10: Local Market Demand*

This question investigates whether respondents perceive that there is enough local demand for their products and/or services to facilitate their company growth. Figure 10 above shows that 10% and 5% of the respondents strongly disagree and disagree respectively that there is enough local demand for their products and/services to facilitate their company's growth, which totals to 15% of respondents that believe their local market demand is not sufficient to facilitate their firm's growth. Figure 10 further shows that 62% and 13% of respondents agree and strongly agree respectively that there is enough local demand for their products and/or services to facilitate their firms' growth, which totals to 75% of respondents who indicated that local demand is sufficient to facilitate their company growth. The remaining 9% of the respondents were neutral. The average response is 3.62 ~ 4 (Agree).

### 4.4.2. MRK2: Competition with Multinationals

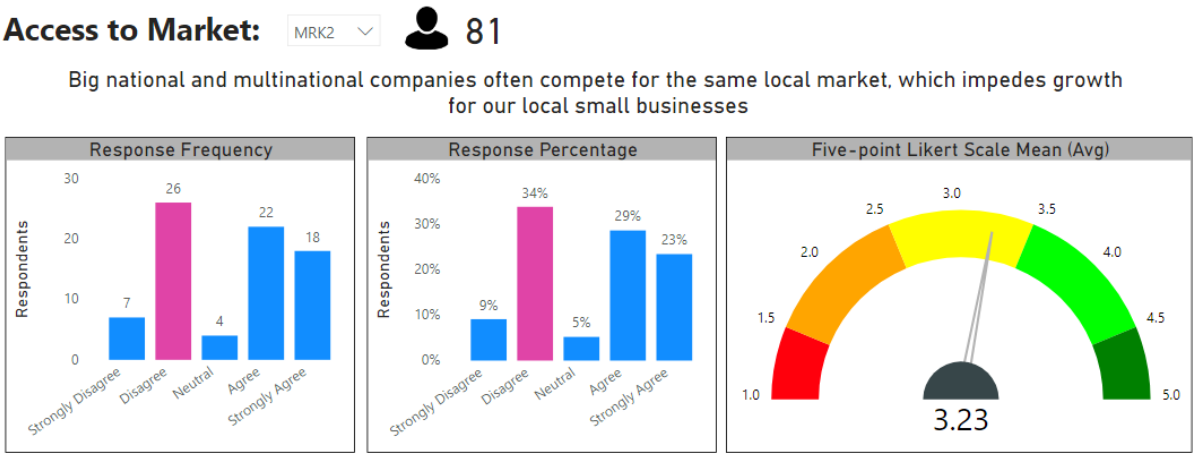


*Figure 11: Competition with Multinationals*

This question investigates whether local SMEs perceive national and multinational companies to be competing for the same local market, which could impede growth for local small businesses. Figure 11 above shows that 9% and 34% of the respondents strongly disagree and disagree respectively that national and multinational companies compete for the same local market, which totals to 43% of respondents who do not think that national and multinational companies compete for the same local market as local small businesses. Figure 11 further shows that 29% and 23% of respondents agree and strongly agree respectively that national and multinational companies compete for the same local market which impedes local SME growth. This totals to 53% of respondents who indicated that national and multinational companies compete for the same SME local market. The remaining 5% of the respondents were neutral. The average response is 3.23 ~ 3 (Neutral).

### 4.4.3. MKR3: Target Market and Internet Presence

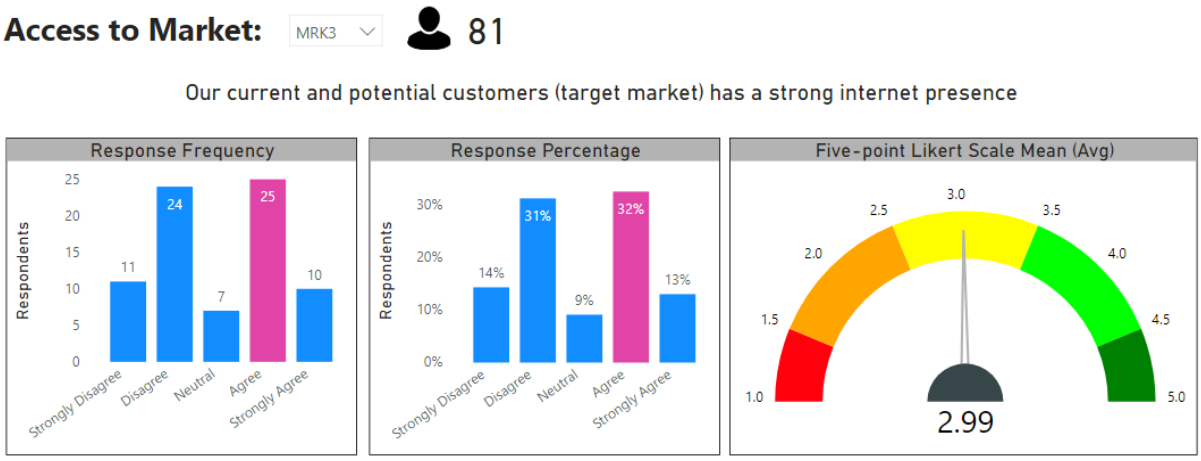


*Figure 12: Target Market and Internet Presence*

This question investigates whether SMEs perceive their target market to have strong Internet presence. Figure 12 above shows that 14% and 31% of the respondents strongly disagree and disagree respectively that their target market has a strong Internet presence, which totals to 45% of respondents who do not think that their target market has a strong Internet presence. Figure 12 further shows that 32% and 13% of respondents agree and strongly agree respectively that their target market has a strong Internet presence, which totals to 45% of respondents who believe that their target market has a strong Internet presence. The remaining 9% of the respondents were neutral. The average response is 2.99 ~ 3 (Neutral).

### 4.4.4. MRK4: Online-Based Marketing

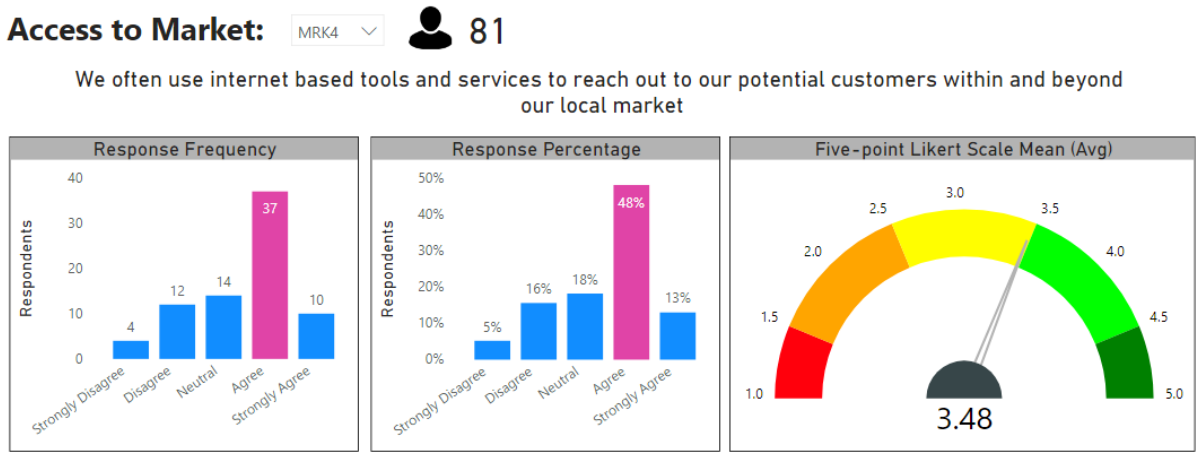


*Figure 13: Online-Based Marketing*

This question investigates whether the firms often use online marketing tools to reach out to their potential customers both locally and beyond. Figure 13 above shows that 5% and 16% of the respondents strongly disagree and disagree respectively that they often use Internet based tools and services for marketing purposes to reach out to their potential customers, which totals to 21% of respondents who do not often use Internet based marketing tools and services. Figure 13 further shows that 48% and 13% of respondents agree and strongly agree respectively that they often use Internet based tools and services to reach out to their potential customers. This totals to 61% of respondents who have indicated that they often use Internet based tools and services for marketing purposes. The remaining 18% of the respondents were neutral. The average response is 3.48 ~ 3.5 ~ 4 (Agree).

### 4.4.5. MRK5: National and International Customer Base

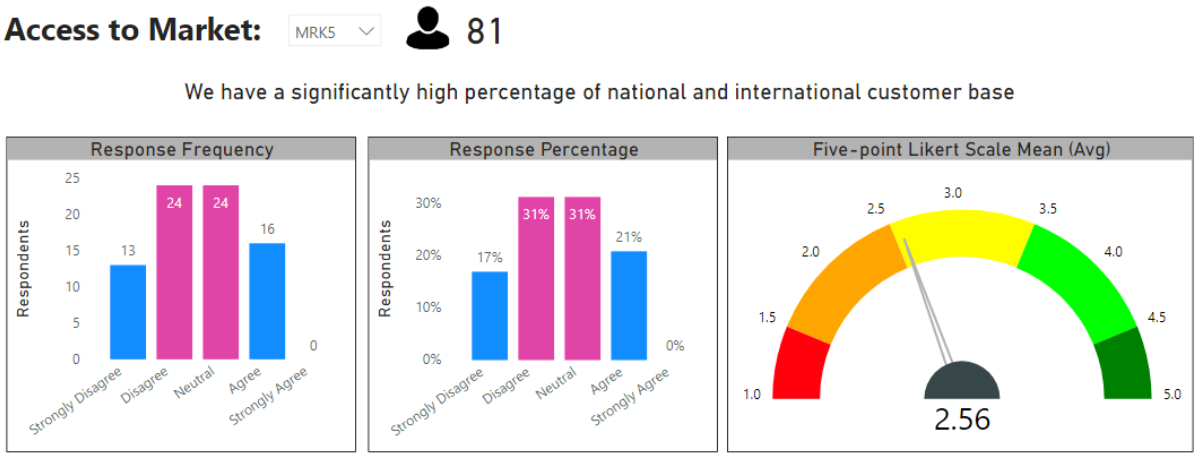


*Figure 14: National and International Customer Base*

This question investigates whether a firm has a significant percentage of national and/or international customer base. Figure 14 above shows that 17% and 31% of the respondents strongly disagree and disagree respectively to having a significant percentage of national and/or international customer base, which totals to 48% of respondents who have indicated that they do not have a significant national and/or international customer base. Figure 14 further shows that 21% agree that they have a significant national and/or international customer base. The remaining 31% of the respondents were neutral. The average response is 2.56 ~ 3 (Neutral).

## 4.5. Financial Related

This section provides descriptive statistics of perceptions and knowledge of the respondents based on questions relating to the firm's access to finance, and other finance related questions with regards to documentation that is usually required in order to access private finance.

### 4.5.1. FIN1: Formal Business Plan

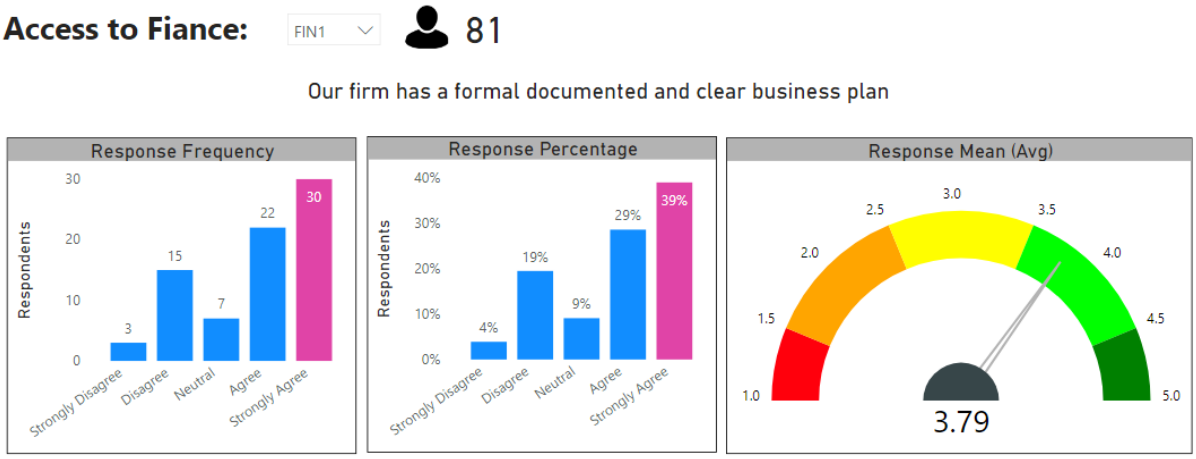


*Figure 15: Formal Business Plan*

This question investigates whether firms have formal documented businesses plans, which are often a requirement when businesses seek financial assistance from both the private sector and government. Figure 15 above shows that 4% and 19% of the respondents strongly disagree and disagree respectively on having formal business plans, which totals to 23% of respondents that have indicated they do not have a formal business plan. Figure 15 further shows that 29% and 39% of respondents agree and strongly agree respectively that they have a formal business plan, which totals to 68% of respondents that have indicated they have a formal business plan. The remaining 9% of the respondents were neutral. The average response is 3.79 ~ 4 (Agree).

### 4.5.2. FIN2: Formal Financial Statements

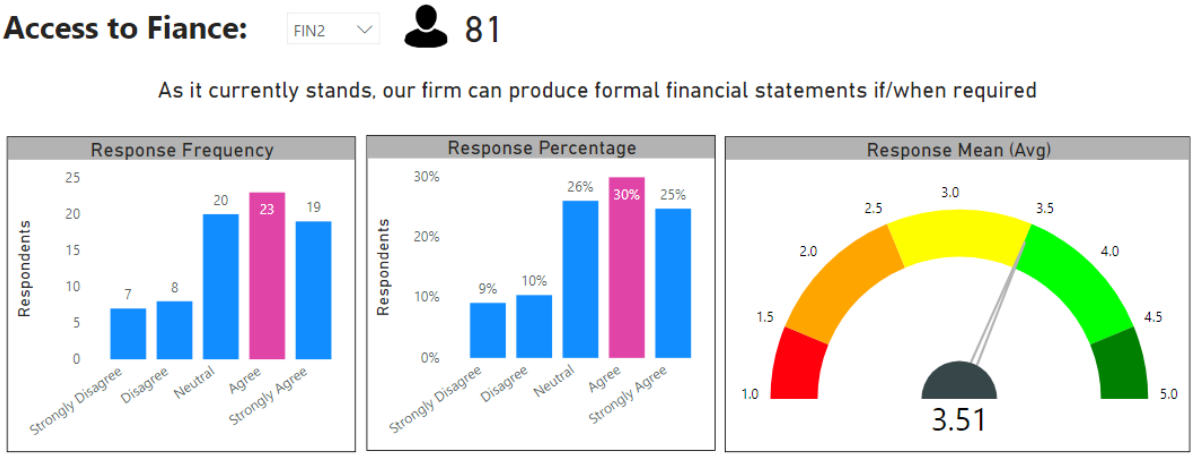


*Figure 16: Formal Financial Statements*

This question investigates whether respondents can produce formal financial statements for their firms if / or when required. Figure 16 above shows that 9% and 10% of the respondents strongly disagree and disagree respectively that they can produce formal financial statements, which totals to 19% of respondents that have indicated they cannot produce formal financial statements if / or required. Figure 16 further shows that 30% and 25% of respondents agree and strongly agree respectively that they can produce formal financial statements, which totals to 55% of respondents that have indicated they can produce formal financial statements. The remaining 26% of the respondents were neutral. The average response is 3.51 ~ 4 (Agree).

### 4.5.3. FIN3: Access to Private Finance

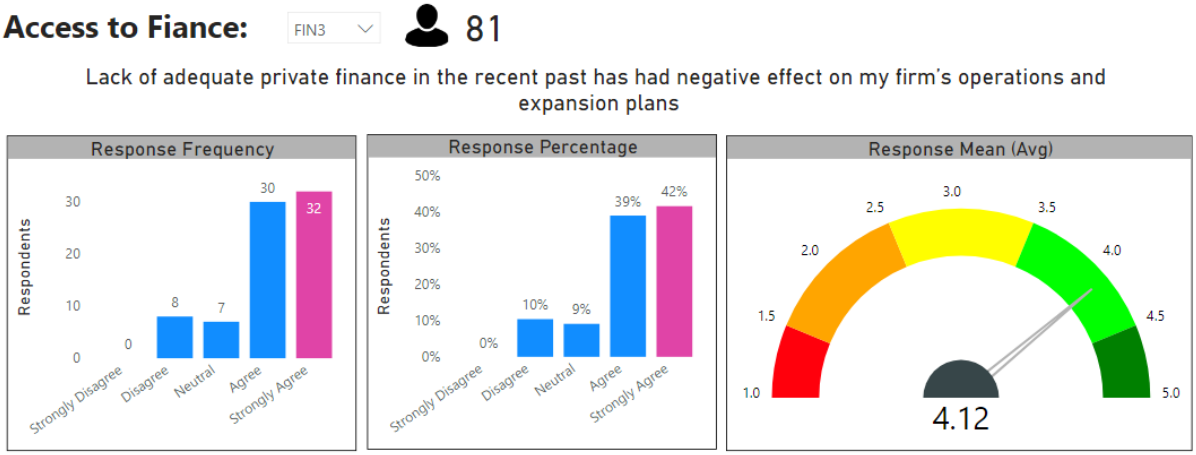


*Figure 17: Access to Private Finance*

This question investigates whether lack of adequate private finance has had a negative effect on a firm's operations and expansion plans in the recent past. Figure 17 above shows that 10% of the respondents disagree that lack of adequate finance had a negative effect on their firm's operations and expansion plans in the recent past. Figure 17 further shows that 39% and 42% of respondents agree and strongly agree respectively that lack of private finance in the recent past has negatively affected their operations and expansion plans, which totals to 81% of respondents that have indicated that lack of private finance affected their operations and expansion plans. The remaining 9% of the respondents were neutral. The average response is 4.12 ~ 4 (Agree).

### 4.5.4. FIN4: Government Financial Support

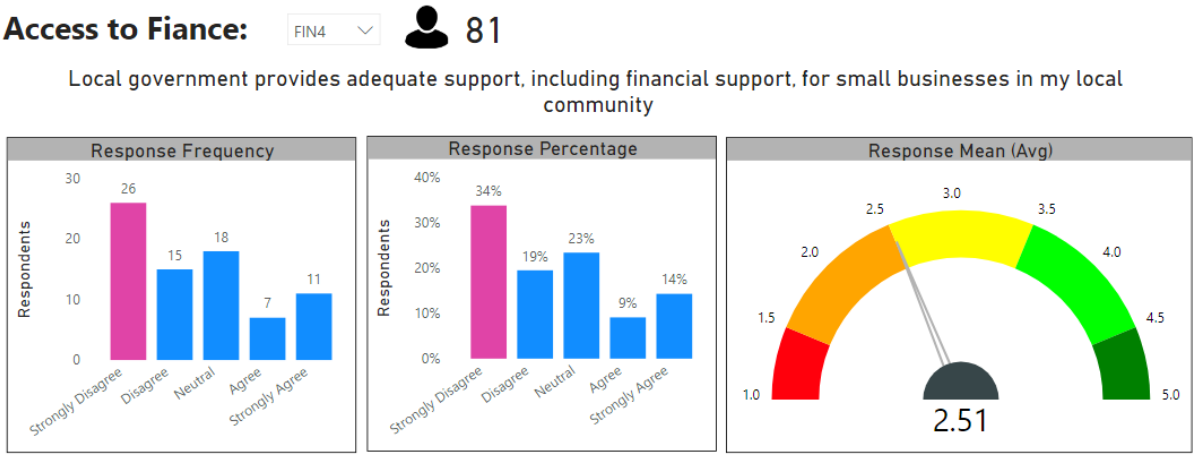


*Figure 18: Government Financial Support*

This question investigates whether local government is perceived to provide adequate financial and other support for local SMEs. Figure 18 above shows that 34% and 19% of the respondents strongly disagree and disagree respectively that local government provides adequate financial and other SME support for local small businesses, which totals to 53% of respondents that have indicated that local government does not provide adequate financial and other SME support to local small businesses. Figure 18 further shows that 9% and 14% of respondents agree and strongly agree respectively that local government provides adequate financial and other support to local small businesses, which totals to 23% of respondents that have indicated that local government provides adequate financial and other SME support to local small

businesses. The other remaining 23% of the respondents were neutral. The average response is 2.51 ~ 3 (Neutral).

### 4.5.5. FIN5: Use of Electronic Banking Channels

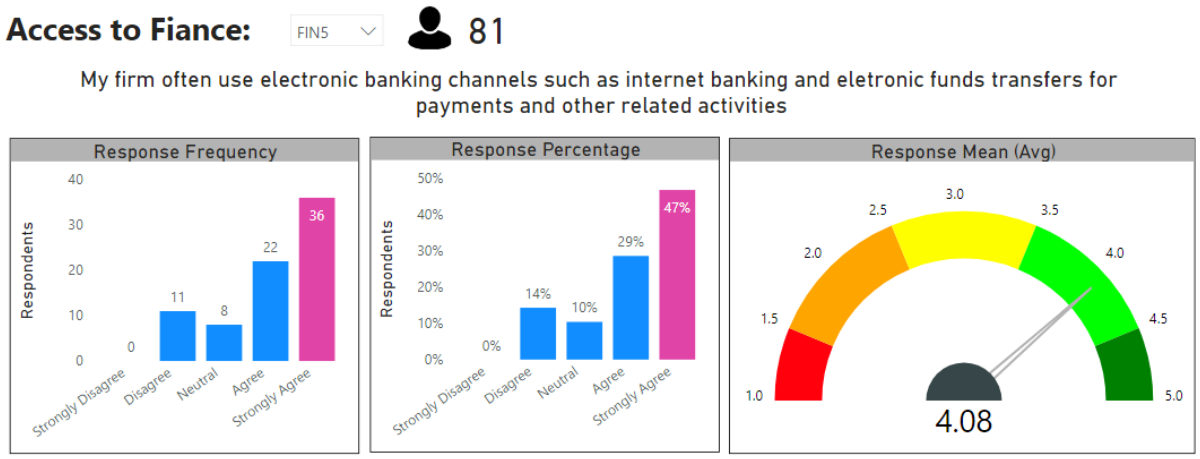


*Figure 19: Use of Electronic Banking Channels*

This question investigates whether respondents often use electronic banking channels for payments and other related financial activities. Figure 19 above shows that 14% disagree that they often use electronic banking channels such as Internet banking and electronic funds transfer for payments and other financial related activities. Figure 19 further shows that 29% and 47% of respondents agree and strongly agree respectively that they often use electronic banking channels such as Internet banking and electronic funds transfer for payments and other financial activities, which totals to 76% of respondents that have indicated to often use electronic banking channels for payments and other financial related activities. The remaining 10% of the respondents were neutral. The average response is 4.08 ~ 4 (Agree).

### 4.5.6. FIN6: Skills and Knowledge to Secure Business Finance

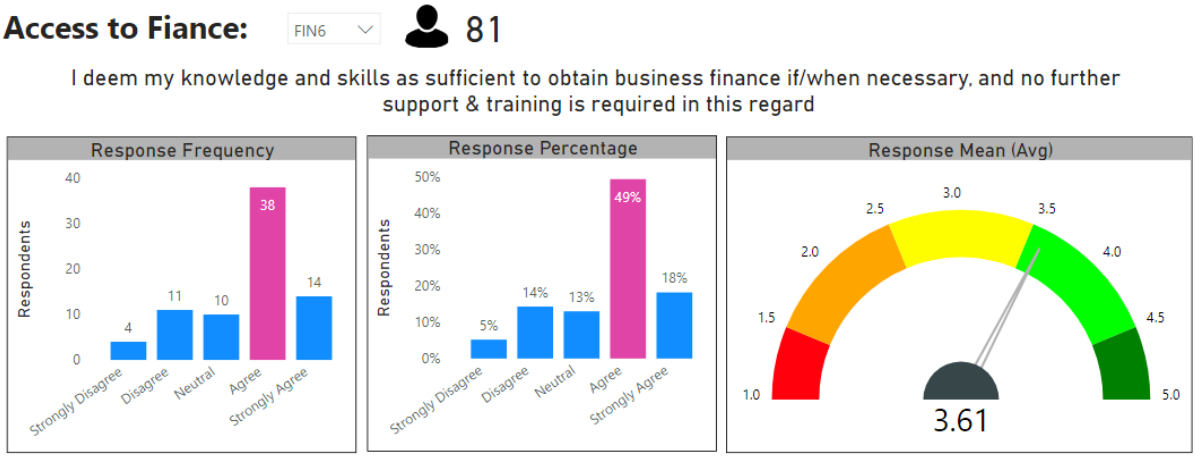


*Figure 20: Skills and Knowledge to Secure Business Finance*

This question investigates whether respondents deem their knowledge and skills enough to obtain business funding if necessary, without any external support or further training. Figure 20 above shows that 5% and 14% of the respondents strongly disagree and disagree respectively that their knowledge and skill is sufficient to secure business finance without external support or additional training, which totals to 19% of respondents that deem their knowledge and skill as insufficient to secure business finance. Figure 20 further shows that 49% and 18% of respondents agree and strongly agree respectively that their knowledge and skill is sufficient to secure business finance without external support or any further training, which totals to 67% of respondents that have indicated that their knowledge and skill is sufficient to secure business finance without any interventions. The remaining 13% of the respondents were neutral. The average response is 3.61 ~ 4 (Agree).

### 4.5.7. FIN7: Accessing Finance Through Use of IT

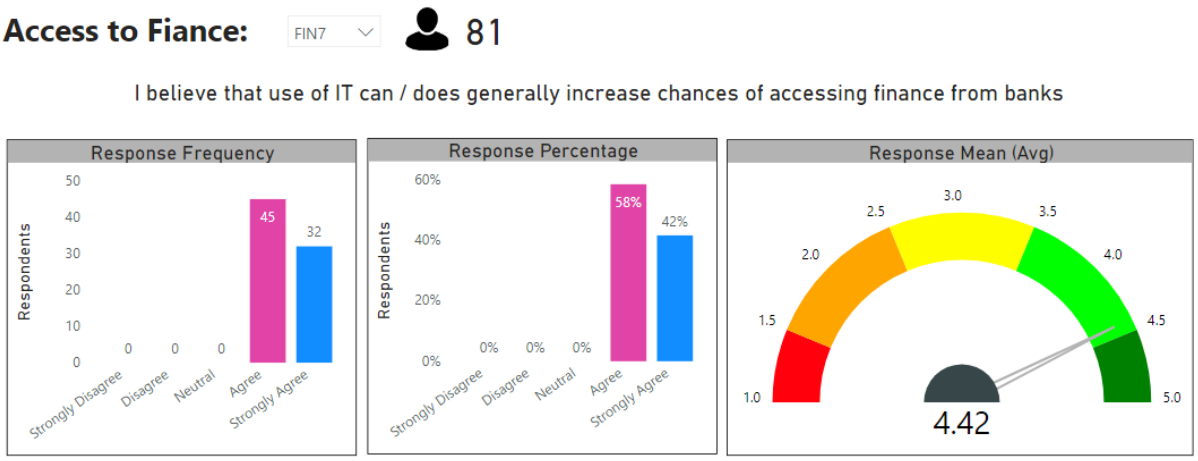


*Figure 21: Accessing Finance Through Use of IT*

This question investigates whether respondents believe that use of IT can increase chances of accessing private finance from the banks. Figure 21 shows that 58% and 42% of respondents agree and strongly agree respectively that use of IT can increase chances of accessing private finance from the banks, which totals to 100% of respondents that have indicated that use of IT can increase chances of accessing private finance from the banks. The average response is 4.42 ~ 4 (Agree).

## 4.6. Information Technology Use

This section provides descriptive statistics of perceptions and knowledge of the respondents based on questions relating to the firm's use of technology and/or the intentions thereof.

### 4.6.1. IT1: Management and Sharing of Business Documentation

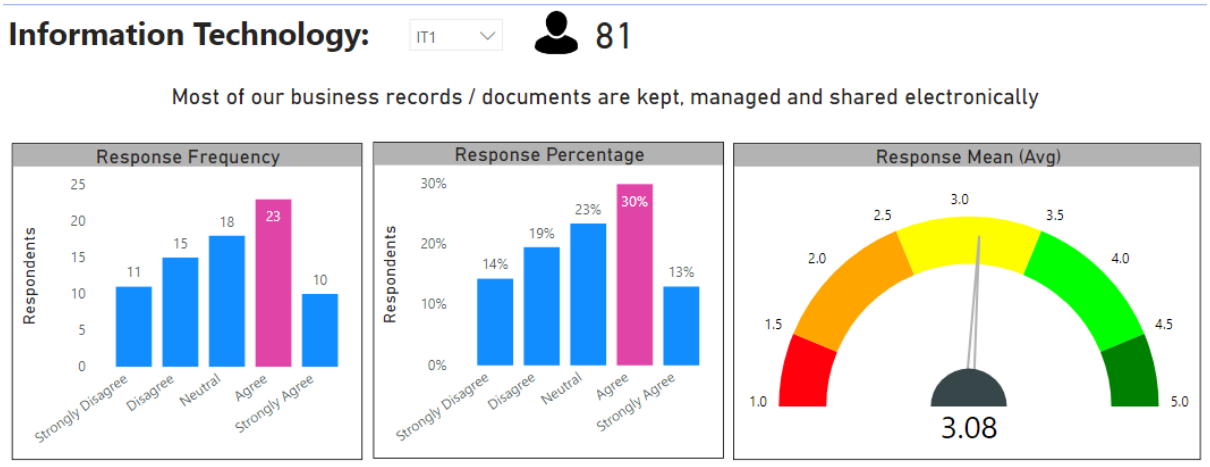


*Figure 22: Management and Sharing of Business Documentation*

This question investigates whether most of the firm's records or documents are managed and shared electronically as opposed to paper-based processes. Figure 22 above shows that 14% and 19% of the respondents strongly disagree and disagree respectively that most of their records or documents are stored and shared electronically, which totals to 33% of respondents who do not store and/or share their documents electronically. Figure 22 further shows that 33% and 13% of respondents agree and strongly agree respectively that their records or documents are stored and shared electronically, which totals to 46% of respondents who have indicated that they store and/or share documents electronically. The remaining 23% of the respondents were neutral. The average response is 3.08 ~ 3 (Neutral).

### 4.6.2. IT2: Technology and Operations Efficiency

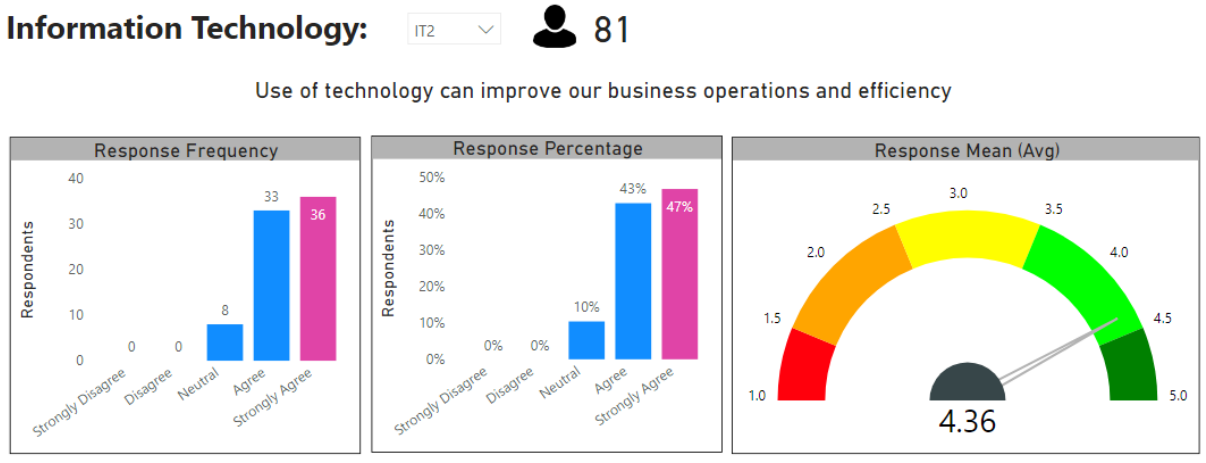


*Figure 23: Technology and Operations Efficiency*

This question investigates the firm's perceptions on whether use technology can improve their business operations and efficiency. Figure 23 shows that 43% and 47% of respondents agree and strongly agree respectively that use of technology can improve their business operations and efficiency, which totals to 90% of respondents who believe that use of technology can improve business operations and efficiency. The remaining 10% of the respondents were neutral. The average response is 4.36 ~ 4 (Agree).

### 4.6.3. IT3: Perceived Technology Adoption by Competitors

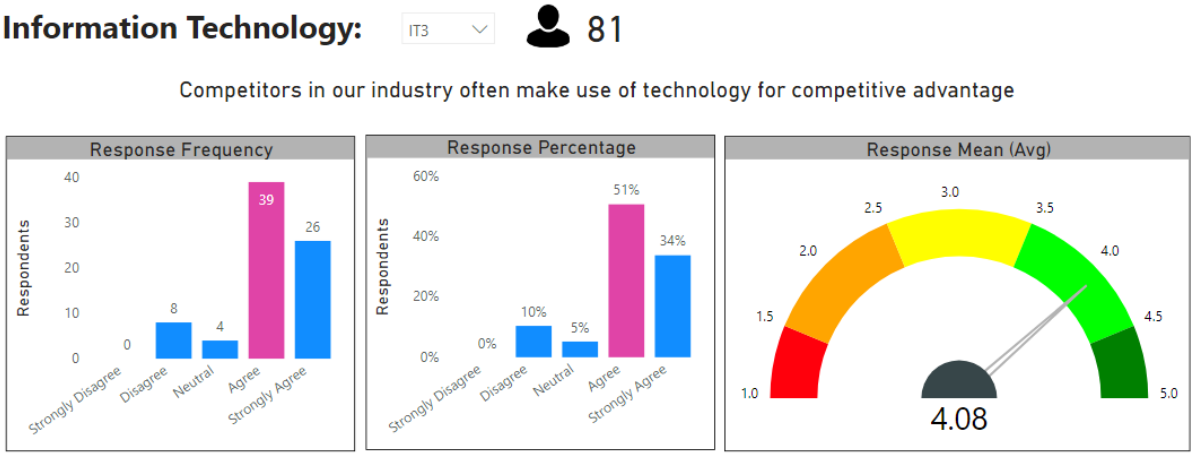


*Figure 24: Perceived Technology Adoption by Competitors*

This question investigates whether firms believe that their competitors often use technology for competitive advantage. Figure 24 above shows that 10% of the respondents disagree that their competitors in the industry use technology for competitive advantage. Figure 24 further shows that 51% and 34% of respondents agree and strongly agree respectively that competitors in their industry often use technology for competitive advantage, which totals to 85% of respondents who believe that their competitors use technology for competitive advantage. The remaining 5% of the respondents were neutral. The average response is 4.08 ~ 4 (Agree).

### 4.6.4. IT4: Business IT Strategy

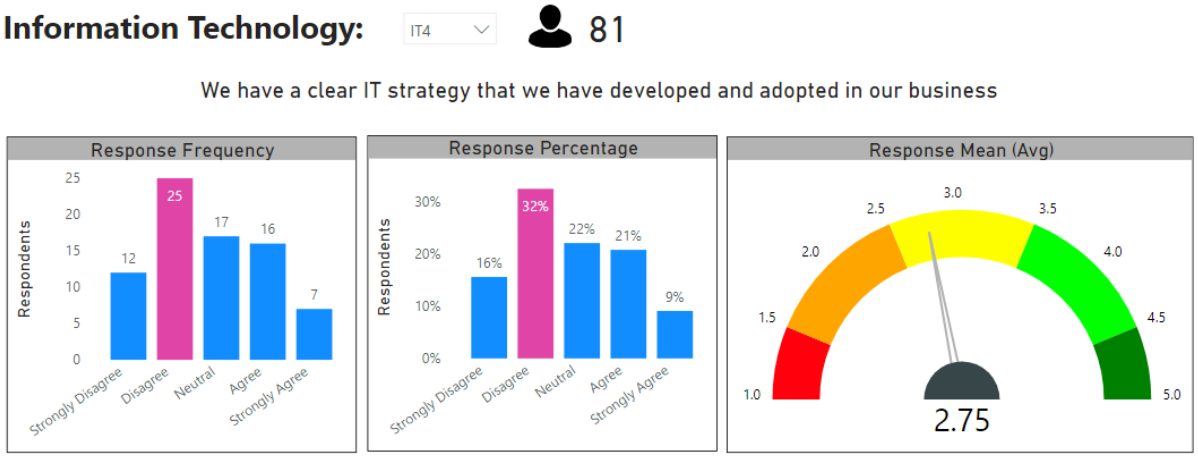


*Figure 25: Business IT Strategy*

This question investigates whether firms have a clear IT strategy that they have developed and adopted for their businesses. Figure 25 above shows that 16% and 32% of the respondents strongly disagree and disagree respectively that they have a clear IT strategy they have developed and adopted for their businesses, which totals to 48% of respondents who have indicated that they do not have a clear IT strategy that is adopted by their businesses. Figure 25 further shows that 21% and 9% of respondents agree and strongly agree respectively that they have a clear IT strategy that they have developed and adopted for their businesses, which totals to 30% of respondents who indicated that they have a clear IT strategy adopted by their businesses. The remaining 22% of the respondents were neutral. The average response is 2.75 ~ 3 (Neutral).

### 4.6.5. IT5: Future IT Adoption Readiness

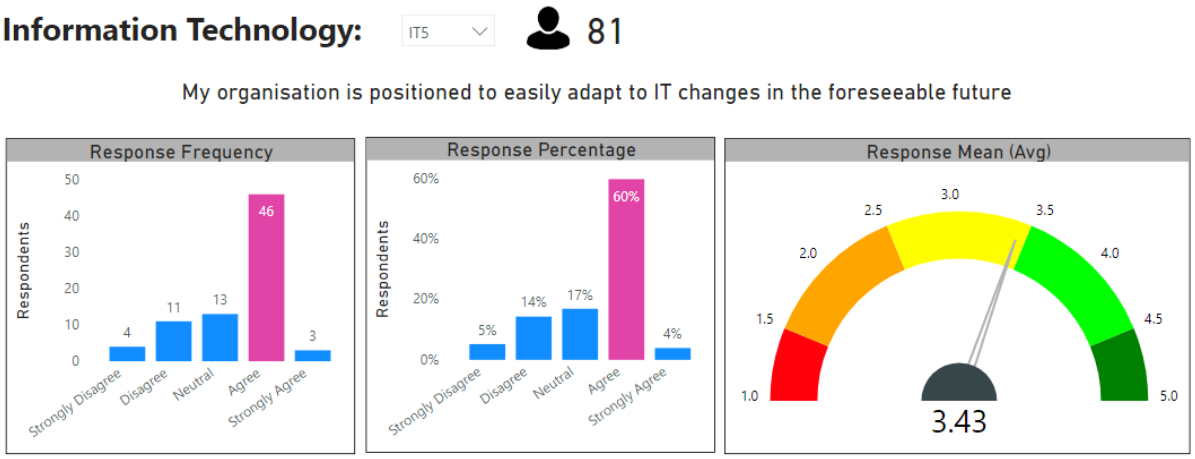


*Figure 26: Future IT Adoption Readiness*

This question investigates whether respondents believe that their small businesses are positioned to easily adapt to IT changes in the foreseeable future. Figure 26 above shows that 5% and 14% of the respondents strongly disagree and disagree respectively that their small businesses are positioned to easily adapt to IT changes in the foreseeable future, which totals to 19% of respondents who have indicated that they are not positioned to adapt to IT changes. Figure 26 further shows that 60% and 4% of respondents agree and strongly agree respectively that their businesses are positioned to adopt to IT changes, which totals to 64% of respondents who believe that their companies can easily adapt to IT changes. The remaining 14% of the respondents were neutral. The average response is 3.43 ~ 3 (Neutral).

### 4.6.6. IT6: Employee IT Literacy

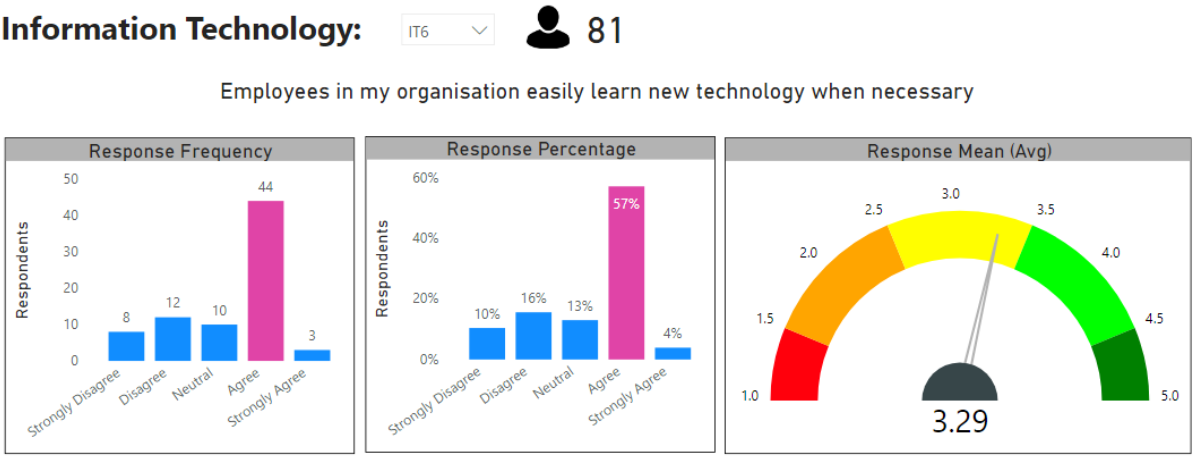


*Figure 27: Employee IT Literacy*

This question investigates whether respondents believe that their company's employees can easily learn new technologies when necessary, such as in cases where new systems and processes were to be introduced. Figure 27 above shows that 10% and 16% of the respondents strongly disagree and disagree respectively that their company's employees can easily learn new technologies when necessary, which totals to 26% of respondents who have indicated that they do not believe that their company employees can easily learn new technologies. Figure 27 further shows that 57% and 4% of respondents agree and strongly agree respectively that their company employees can easily learn new technologies when necessary, which totals to 61% of respondents who believe their company employees can easily learn new technologies if / when necessary. The remaining 16% of the respondents were neutral. The average response is 3.29 ~ 3 (Neutral).

### 4.6.7. IT7: Availability of Tech Skills to Drive Adoption

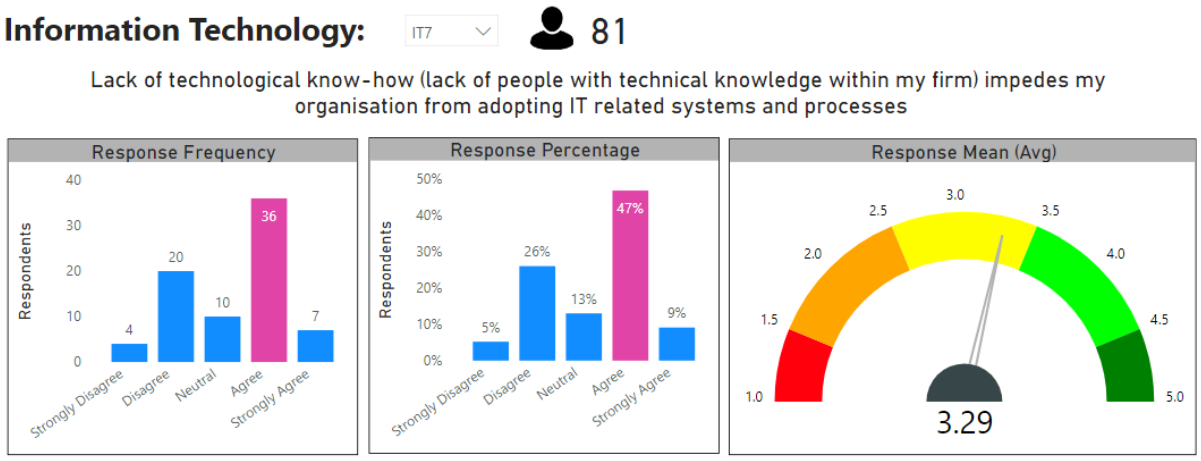


*Figure 28: Availability of Tech Skills to Drive Adoption*

This question investigates whether lack of technological know-how impedes the company from adopting IT related systems and processes. Figure 28 above shows that 5% and 26% of the respondents strongly disagree and disagree respectively that lack of technological know-how impedes the company from adopting IT related systems and processes, which totals to 31% of respondents who have indicated that lack technological know-how has not negatively affected adoption of IT related systems and processes. Figure 28 further shows that 47% and 9% of respondents agree and strongly agree respectively that lack of technological know-how impedes adoption of IT related systems and processes, which totals to 56% of respondents

who believe that lack of technological know-how impedes their companies from adopting IT related systems and processes. The remaining 13% of the respondents were neutral. The average response is 3.29 ~ 3 (Neutral).

## 4.7. Supporting Infrastructure

This section provides descriptive statistics of perceptions and knowledge of the respondents based on questions relating to the supporting infrastructure. These are factors that are normally external to the firm, where the firm has little to no control over.

### 4.7.1. INF1: Availability of Supporting Infrastructure

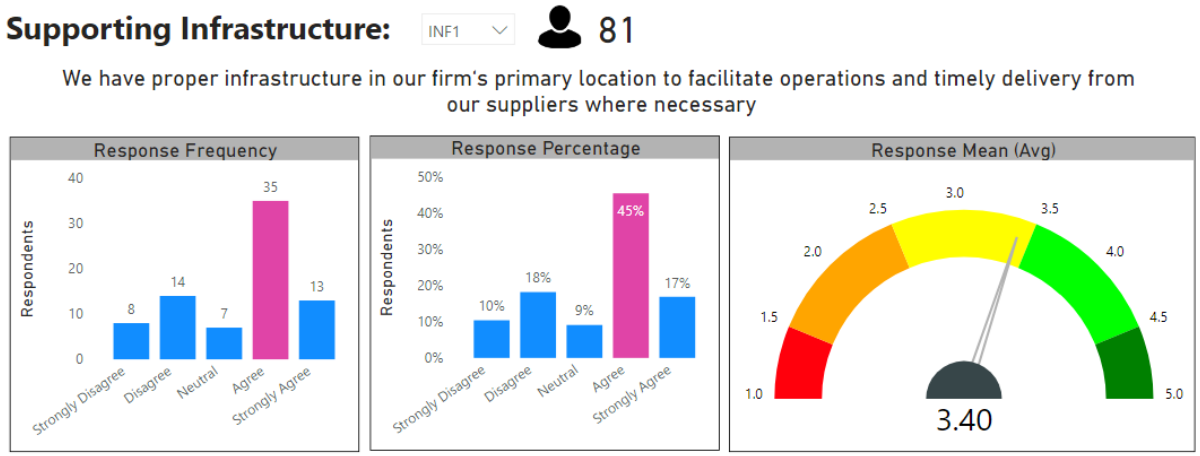


*Figure 29: Availability of Supporting Infrastructure*

This question investigates the availability of supporting infrastructures such as roads, transport and telecommunications to facilitate operations and delivery of services and / goods from suppliers. Figure 29 above shows that 10% and 18% of the respondents strongly disagree and disagree respectively that there is adequate supporting infrastructure in their firm's primary location to facilitate operations and timely deliveries from their suppliers, which totals to 28% of respondents who have indicated that there is lack of supporting infrastructure in their firms primary locations. Figure 29 further shows that 45% and 17% of respondents agree and strongly agree respectively that there is supporting infrastructure in their firm's primary location to facilitate operations and timely delivery of supplies, which totals to 62% of respondents who have indicated that there is adequate supporting infrastructure to facilitate operations and delivery of supplies. The remaining 9% of the respondents were neutral. The average response is 3.40 ~ 3 (Neutral).

### 4.7.2. INF2: Reliability of Electricity Supply

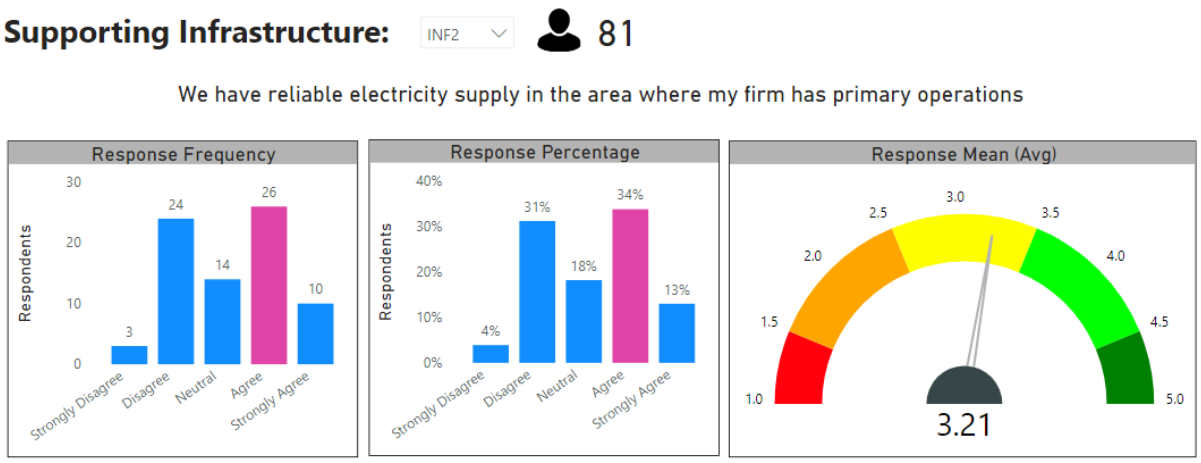


*Figure 30: Reliability of Electricity Supply*

This question investigates the availability of reliable electricity supply in the firms' primary location to facilitate operations. Figure 30 above shows that 4% and 31% of the respondents strongly disagree and disagree respectively to the availability of reliable electricity supply in their firm's primary location to facilitate operations, which totals to 35% of respondents who disagree to the availability of reliable electricity supply in their firm's primary locations. Figure 30 further shows that 34% and 13% of respondents agree and strongly agree respectively that that there is reliable electricity supply in their firm's primary location, which totals to 47% of respondents that have indicated that there is reliable electricity supply in their firm's primary location. The remaining 18% of the respondents were neutral. The average response is 3.21 ~ 3 (Neutral).

### 4.7.3. INF3: Reliability of Internet Connection

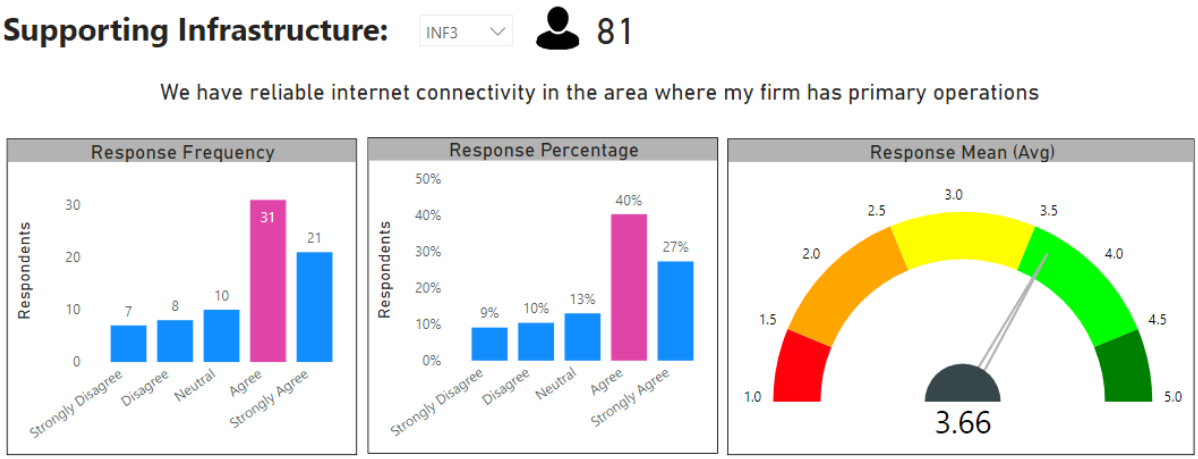


*Figure 31: Reliability of Internet Connection*

This question investigates the availability of reliable Internet connectivity in the firm's primary location. Figure 31 above shows that 9% and 10% of the respondents strongly disagree and disagree respectively that they have reliable Internet connectivity in the area where their firm has primary operations, which totals to 19% of respondents who disagree to the availability or reliable Internet connectivity in their firm's primary location. Figure 31 further shows that 40% and 27% of respondents agree and strongly agree respectively that they have reliable Internet connectivity in the area where their firm has primary operations, which totals to 67% of respondents who have indicated that there is reliable Internet connection in the area where their firm has primary operations. The remaining 13% of the respondents were neutral. The average response is 3.66 ~ 4 (Agree).

## 4.8. Cloud Computing

This section provides descriptive statistics of perceptions and knowledge of the respondents based on questions relating to the use cloud computing and other factors that may influence cloud adoption.

### 4.8.1. CC1: Understanding of Cloud Computing Concept

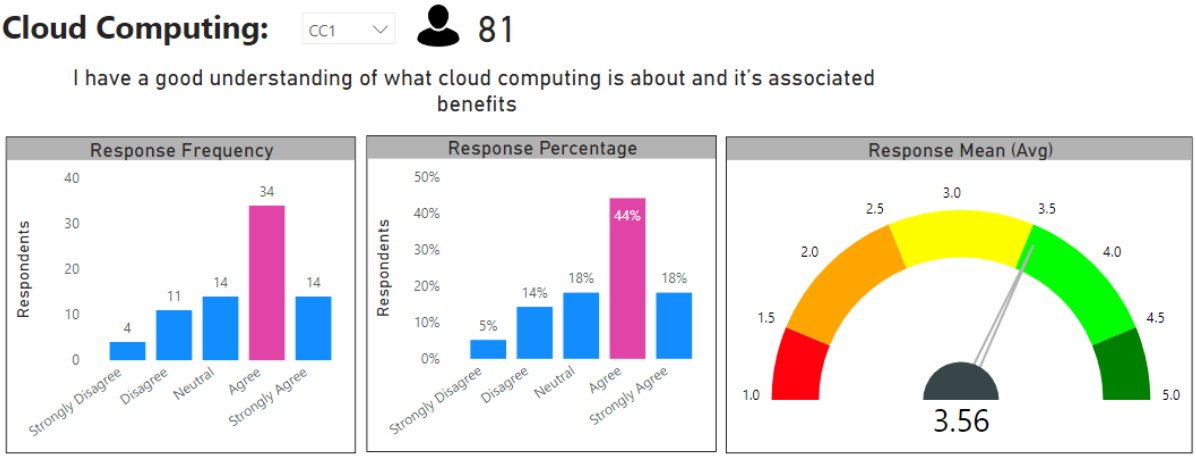


*Figure 32: Understanding of Cloud Computing Concept*

This question investigates whether the respondent believes they have a good understanding of the concept of cloud computing and its associated benefits. Figure 32 above shows that 5% and 14% of the respondents strongly disagree and disagree respectively that they have a good understanding of cloud computing and its associated benefits, which totals to 19% of respondents who have indicated that they do not have an understanding of cloud computing and its associated benefits. Figure 32 further shows that 44% and 18% of respondents agree and strongly agree respectively that they have a good understanding of cloud computing and its associate benefits, which totals to 62% of respondents who have indicated that they have a good understanding of cloud computing and its associated benefits. The remaining 18% of the respondents were neutral. The average response is 3.56 ~ 4 (Agree).

### 4.8.2. CC2: Understanding of SaaS

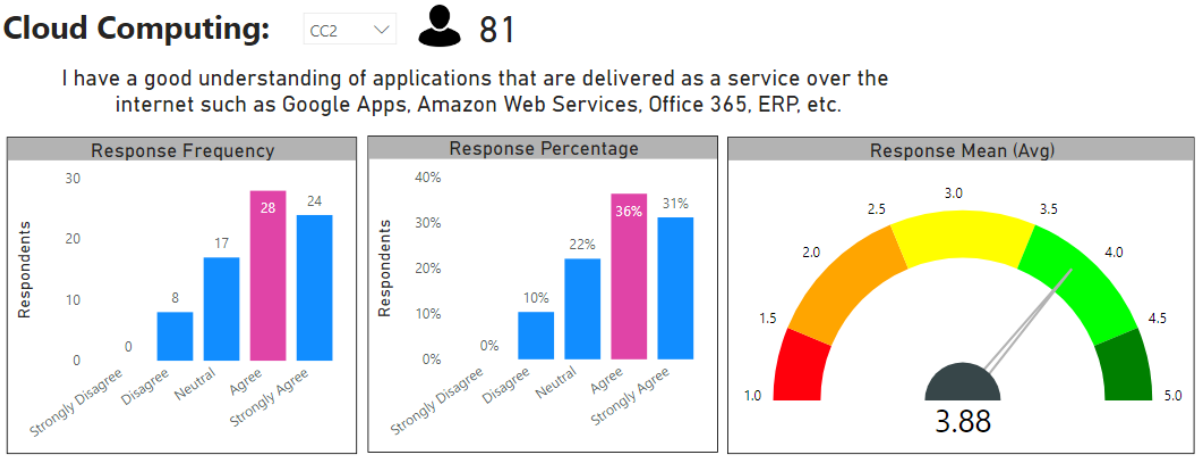


*Figure 33: Understanding of SaaS*

This question investigates whether respondents understand applications that are delivered as a service over the Internet, such as Google Apps, Amazon Web Service and others. Figure 33 above shows that 10% of the respondents indicated that they do not have a good understanding of the applications that are delivered over the Internet as a service. Figure 33 further shows that 36% and 31% of respondents agree and strongly agree respectively that they have a good understanding of the application that are delivered as a service over the Internet, which totals to 67% of respondents who have indicated to have a good understanding of applications that are delivered as a service over the Internet. The remaining 22% of the respondents were neutral. The average response is 3.88 ~ 4 (Agree).

### 4.8.3. CC3: Use of Basic Internet-Based Applications

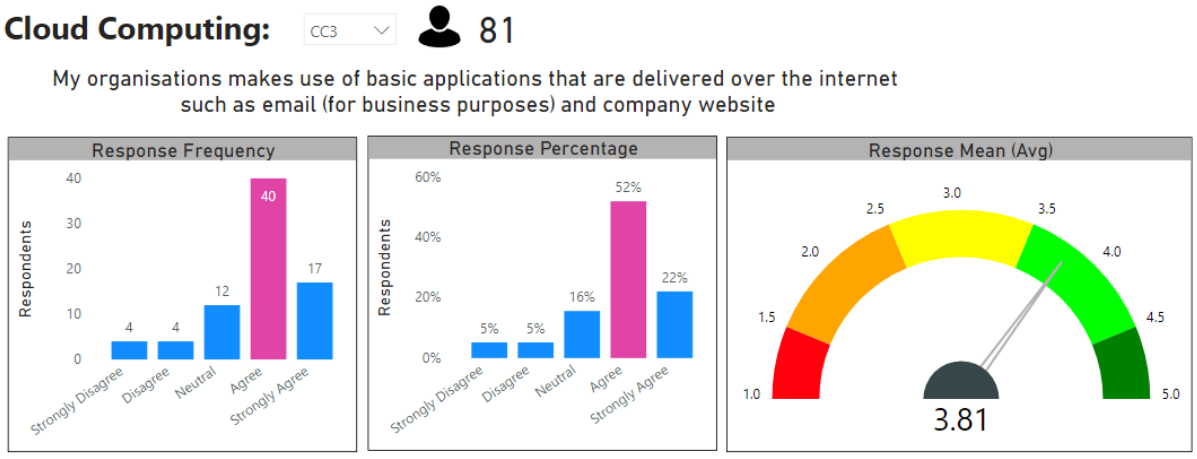


*Figure 34: Use of Basic Internet-Based Applications*

This question investigates whether firms make use of basic applications that are delivered over the Internet such as email and company websites. Figure 34 above shows that 5% and another 5% of the respondents strongly disagree and disagree respectively that they make use of basic applications that are delivered over the Internet such as email and company websites, which totals to 10% of respondents who have indicated that they do not make use of basic Internet-based applications such as emails and company websites. Figure 34 further shows that 52% and 22% of respondents agree and strongly agree respectively that they make use of basic applications that are delivered over the Internet such as email and company websites, which totals to 74% of respondents who have indicated that they make use of basic Internet-based applications such as email and company websites. The remaining 16% of the respondents were neutral. The average response is 3.81 ~ 4 (Agree).

### 4.8.4. CC4: Use of Complex Internet-Based Applications

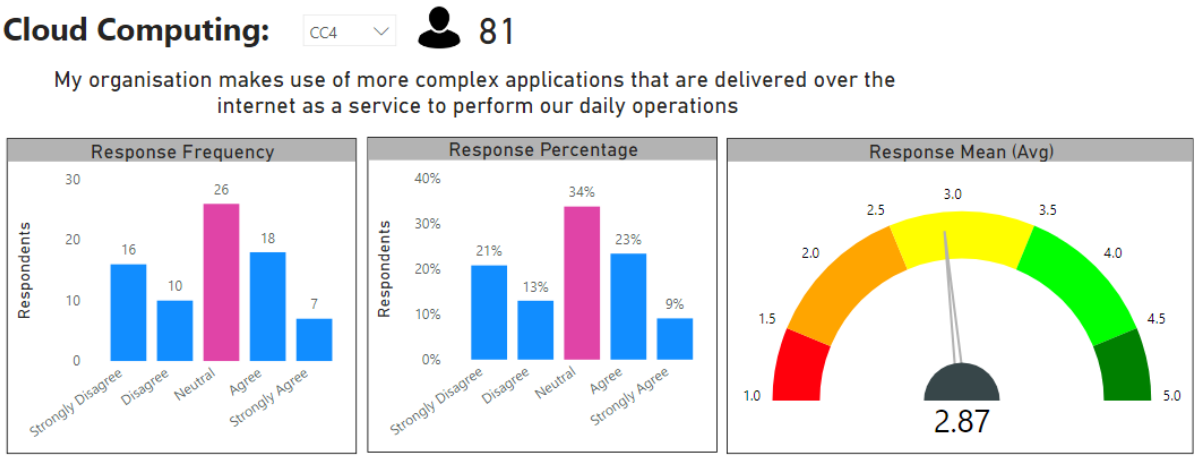


*Figure 35: Use of Complex Internet-Based Applications*

This question investigates whether firms make use of more complex applications that are delivered over the Internet as a service as part of their daily operational tasks. Figure 35 above shows that 21% and 13% of the respondents strongly disagree and disagree respectively to making use of more complex applications that are delivered over the Internet as part of their daily operational tasks, which totals to 34% of respondents who have indicated that they do not make use of more complex Internet-based applications as part of performing their daily operational tasks. Figure 35 further shows that 23% and 9% of respondents agree and strongly agree respectively that they make use of more complex applications that are delivered over the Internet in

their daily operational tasks, which totals to 32% of respondents who have indicated that they make use of more complex Internet-based applications to perform their daily operational tasks. The remaining 34% of the respondents were neutral. The average response is 2.87 ~ 3 (Neutral).

### 4.8.5. CC5: Intentions to Adopt Internet-Based Systems

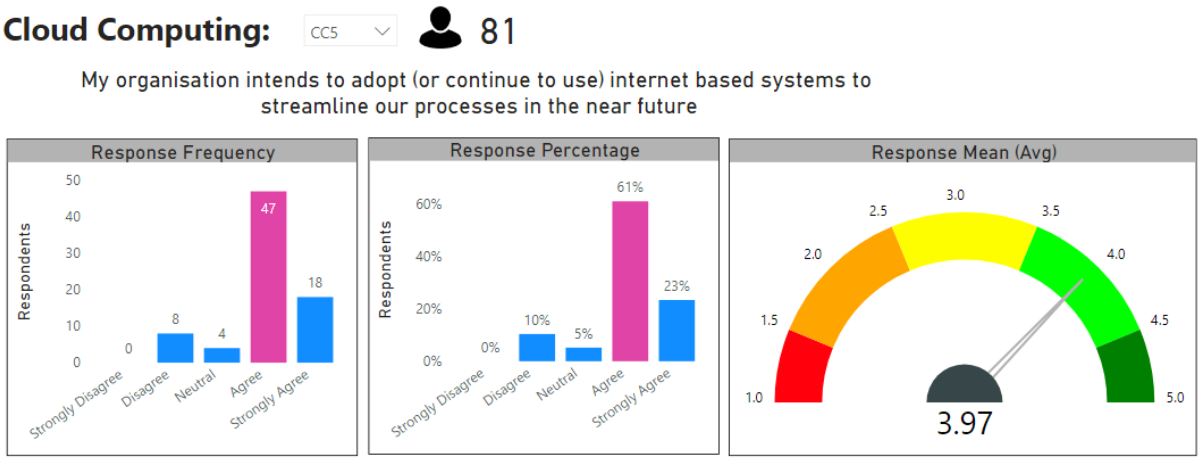


*Figure 36: Intentions to Adopt Internet-Based Systems*

This question investigates whether a firm intends to adopt Internet-based systems to streamline their processes in the near future, or if those that have already adopted these Internet-based systems intend to continue using them in the near future. Figure 36 above shows that 10% of the respondents disagree that they intend to adopt (or continue using) Internet-based systems to streamline their processes in the near future. Figure 36 further shows that 61% and 23% of respondents agree and strongly agree respectively that they intend to adopt (or continue using) Internet-based systems to streamline their processes in the near future, which totals to 84% of respondents who have indicated that they either intend to adopt or continue using Internet-based systems to streamline their processes in the near future. The remaining 5% of the respondents were neutral. The average response is 3.97 ~ 4 (Agree).

### 4.8.6. CC6: Internet Costs and Adoption of Internet Based Services

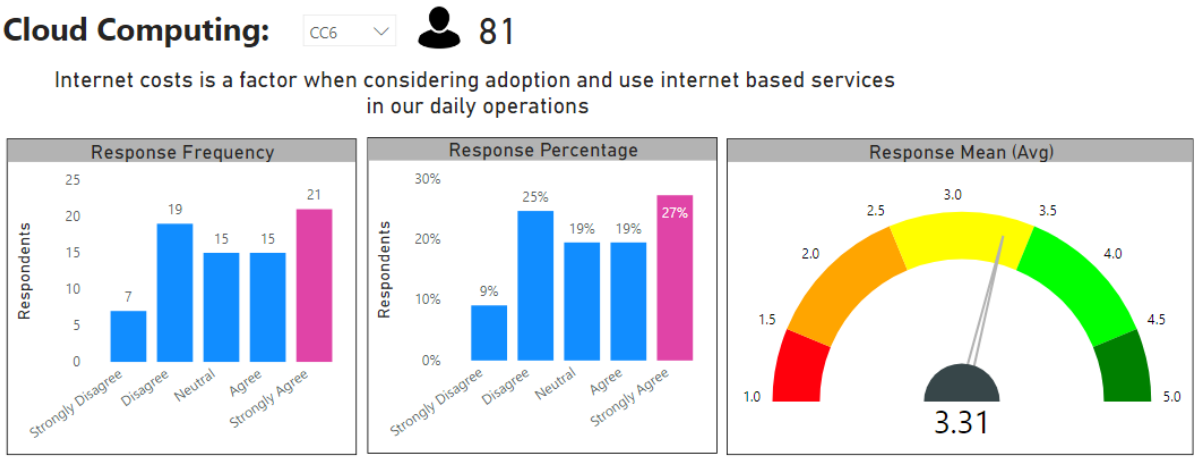


*Figure 37: Internet Costs and Adoption of Internet Based Services*

This question investigates whether respondents perceive Internet costs as a significant factor in the decision to adopt Internet-based systems and services. Figure 37 above shows that 9% and 23% of the respondents strongly disagree and disagree respectively that they consider Internet costs as a significant factor in the decision to adopt Internet based services, which totals to 32% of respondents who indicated that Internet cost is not a significant factor in the decision to adopt Internet based services. Figure 37 further shows that 19% and 27% of respondents agree and strongly agree respectively that Internet costs is a significant factor in the decision to adopt Internet based services, which totals to 46% of respondents who indicated that Internet costs is a significant factor in the decision to adopt Internet based services. The remaining 19% of the respondents were neutral. The average response is 3.31 ~ 3 (Neutral).

### 4.8.7. CC7: Electricity Supply and Adoption of Internet Based Services

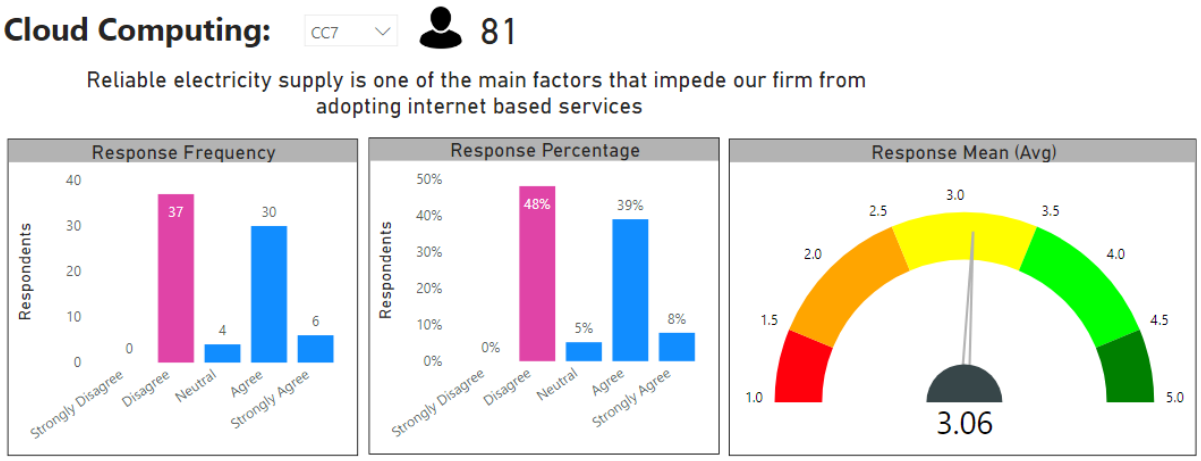


*Figure 38: Electricity Supply and Adoption of Internet Based Services*

This question investigates whether reliable electricity supply is one of the major factors that impede firms from adopting Internet-based services. Figure 38 above shows that 48% of the respondents disagree that reliable electricity supply is one of the major factors that impede firms from adopting Internet-based services. Figure 38 further shows that 39% and 8% of respondents agree and strongly agree respectively that reliable electricity supply is somewhat an impediment in the in the adoption of Internet based services, which totals to 47% of respondents who have indicated that reliable electricity supply is somewhat an impediment in the adoption of Internet-based services. The remaining 5% of the respondents were neutral. The average response is 3.06 ~ 3 (Neutral).

### 4.8.8. CC8: Internet Connectivity and Adoption of Internet Based Services

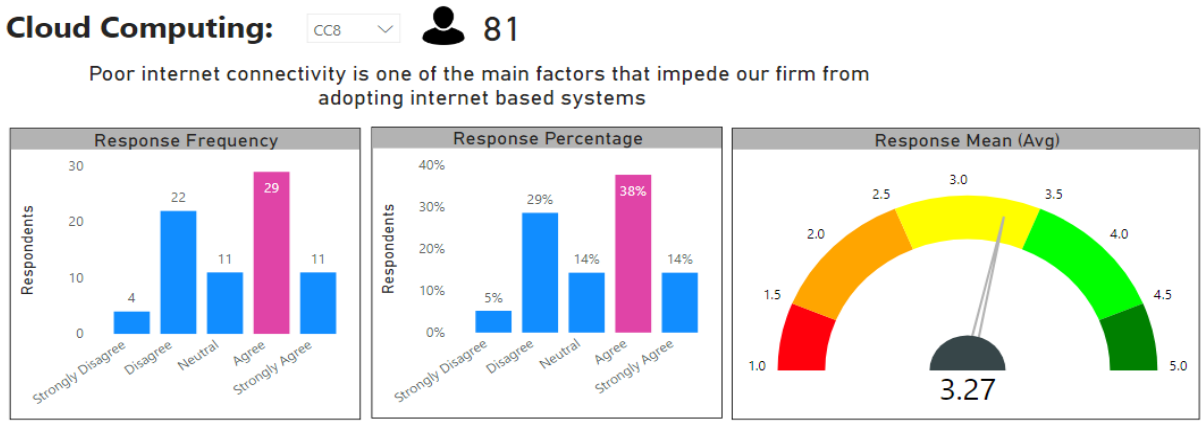


*Figure 39: Internet Connectivity and Adoption of Internet Based Services*

This question investigates whether poor Internet connectivity is an impediment in the adoption of Internet-based systems. Figure 39 above shows that 5% and 29% of the respondents strongly disagree and disagree respectively that poor Internet connectivity is one of the major impediments in the adoption of Internet based system, which totals to 34% of respondents who have indicated that Internet connectivity is not a major impediment in their firms' adoption of Internet-based services. Figure 39 further shows that 38% and 14% of respondents agree and strongly agree respectively that Internet connectivity is one of the major impediments in their firm's adoption of Internet-based services, which totals to 52% of respondents who have indicated that Internet connectivity is one of the major impediments in their firm's adoption of Internet based services. The remaining 14% of respondents were neutral. The average response is 3.27 ~ 3 (Neutral).

## 4.9. Correlation Analysis

Several questions that were asked, from various categories relating to Market, Finance, use of IT, Infrastructure and Cloud Computing, were tested for correlation against the one question that relates to the adoption and use of cloud-based systems and services. As the collected data is Likert scale based, and thus ordinal, the Spearman's rank correlation coefficient is selected for the correlation analysis. Spearman's rank-order correlation is a non-parametric statistical test of correlation between two variables and measures the strength and direction of a monotonic relationship between these variables.

The Spearman's rank-order correlation was performed on a sample dataset of 81 responses (N = 81). For the purpose of interpretation in this study, the correlation co-efficient strength is grouped as follows: -1 to -0.5 represents a strong negative relationship; -0.5 to -0.3 represents a moderate negative relationship; -0.3 to -0.1 represents a weak negative relationship; -0.1 to 0.1 represents a none to very weak relationship; 0.1 to 0.3 represents a weak positive relationship; 0.3 to 0.5 represents a moderate positive relationship; 0.5 to 1.0 represents a strong positive relationship.

### 4.9.1. Market Related

Table 3 below depicts the Spearman's correlation analysis results, detailing the evaluated strengths and direction of correlation that exists amongst the questions relating to access to market and the use of cloud computing.

| | | | CC4 |
|---|---|---|---|
| Spearman's rho | MRK1 | Correlation Coefficient | .382 |
| | | Sig. (2-tailed) | .000 |
| | MRK2 | Correlation Coefficient | .415 |
| | | Sig. (2-tailed) | .000 |
| | MRK3 | Correlation Coefficient | .246 |
| | | Sig. (2-tailed) | .027 |
| | MRK4 | Correlation Coefficient | .462 |
| | | Sig. (2-tailed) | .000 |

*Table 3: Spearman's Correlation for Market Related Questions*

***Relationship between the size of local market (MRK1) and use of cloud computing (CC4)***

The correlation analysis indicates that perceived local market demand has a moderate positive correlation with the adoption of cloud computing ($r = 0.382$; $p = 0.000$). The significance value of the correlation is 0.000 ($p < 0.01$) meaning that the probability of the correlation happening by chance is low. The stronger the perception that local market demand is sufficient for SME products and / services, the more likely the use of more complex applications that are delivered over the Internet as a service by SMEs as part of their daily operations.

***Relationship between competition from multinationals for local market (MRK2) and use of cloud competition (CC4)***

The correlation analysis indicates that perceived competition from nationals and multinationals for local market has a moderate positive correlation with the adoption of cloud computing ($r = 0.415$; $p = 0.000$). The significance value of the correlation is 0.000 ($p < 0.01$) meaning that the probability of the correlation happening by chance is low. The higher the perceived competition for local markets with nationals and multinationals, the more SMEs are likely to use more complex applications that are delivered over the Internet as a service as part of their daily operations.

***Relationship between perceived customer Internet presence (MRK3) and use of cloud computing (CC4)***

The correlation analysis indicates that perceived potential customer Internet presence has a weak positive correlation with the adoption of cloud computing ($r = 0.246$; $p = 0.000$). The significance value of the correlation is 0.246 ($p > 0.01$) meaning that the probability of the correlation happening by chance is high. Therefore, perceived potential customer Internet presence has little to no correlation to the use of more complex applications that are delivered over the Internet as a service as part of SME's daily operations.

***Relationship between use of Internet-based marketing tools (MRK4) and use of cloud computing (CC4)***

The correlation analysis indicates that use of online-based marketing has a moderate positive correlation with the adoption of cloud computing ($r = 0.462$; $p = 0.000$). The significance value of the correlation is 0.000 ($p < 0.01$) meaning that the probability of the correlation happening by chance is low. The more SMEs use online-based marketing, then more they are likely to use more complex applications that are delivered over the Internet as a service as part of their daily operations.

### 4.9.2. Financial Related

Table 4 below depicts the Spearman's correlation analysis results, detailing the evaluated strengths and direction of correlation that exists amongst the questions relating to finance and the use of cloud computing.

| | | | CC4 |
|---|---|---|---|
| Spearman's rho | FIN1 | Correlation Coefficient | .707 |
| | | Sig. (2-tailed) | .000 |
| | FIN2 | Correlation Coefficient | .309 |
| | | Sig. (2-tailed) | .005 |
| | FIN5 | Correlation Coefficient | .443 |
| | | Sig. (2-tailed) | .000 |
| | FIN6 | Correlation Coefficient | .296 |
| | | Sig. (2-tailed) | .007 |

*Table 4: Spearman's Correlation for Finance Related Questions*

***Relationship between having a documented business plan (FIN1) and use of cloud computing (CC4)***

The correlation analysis indicates that having a formal documented business plan has a strong positive correlation with the adoption of cloud computing ($r = 0.707$; $p = 0.000$). The significance value of the correlation is 0.000 ($p < 0.01$) meaning that the probability of the correlation happening by chance is low. SMEs with formal documented business plans are likely to use more complex applications that are delivered over the Internet as a service as part of their daily operations.

***Relationship between having formal financial statements (FIN2) and use of cloud computing (CC4)***

The correlation analysis indicates that being in possession of formal financial statements has a moderate positive correlation with the adoption of cloud computing ($r = 0.309$; $p = 0.005$). The significance value of the correlation is 0.005 ($p < 0.01$) meaning that the probability of the correlation happening by chance is low. SMEs that possess formal financial statements are likely to use more complex applications that are delivered over the Internet as a service as part of their daily operations.

***Relationship between use of Internet banking (FIN5) and use of cloud computing (CC4)***

The correlation analysis indicates that use electronic banking channels such as Internet banking and electronic funds transfer has a moderate positive correlation with the adoption of cloud computing ($r = 0.443$; $p = 0.000$). The significance value of the correlation is 0.000 ($p < 0.01$) meaning that the probability of the correlation happening by chance is low. The more SMEs use electronic banking channels such as Internet banking and electronic funds transfer, then more they are likely to use more complex applications that are delivered over the Internet as a service as part of their daily operations.

***Relationship between knowledge and skills to obtain business finance (FIN6) and use of cloud computing (CC4)***

The correlation analysis indicates that having enough knowledge and skill to obtain business finance has a moderate positive correlation with the adoption of cloud

computing (r = 0.296; p = 0.007). The significance value of the correlation is 0.007 (p < 0.01) meaning that the probability of the correlation happening by chance is low. The more SME owners deem their knowledge and skill as sufficient to obtain business finance, then more their SMEs are likely to use more complex applications that are delivered over the Internet as a service as part of their daily operations.

### 4.9.3. General IT Related

Table 5 below depicts the Spearman's correlation analysis results, detailing the evaluated strengths and direction of correlation that exists amongst the questions relating to the general use of IT and the use of cloud computing.

| | | | CC4 |
|---|---|---|---|
| Spearman's rho | IT1 | Correlation Coefficient | .611 |
| | | Sig. (2-tailed) | .000 |
| | IT3 | Correlation Coefficient | .119 |
| | | Sig. (2-tailed) | .290 |
| | IT4 | Correlation Coefficient | .420 |
| | | Sig. (2-tailed) | .000 |
| | IT6 | Correlation Coefficient | .118 |
| | | Sig. (2-tailed) | .294 |
| | IT7 | Correlation Coefficient | .319 |
| | | Sig. (2-tailed) | .004 |

*Table 5: Spearman's Correlation for General IT Related Questions*

***Relationship between managing business electronically (IT1) and use of cloud computing (CC4)***

The correlation analysis indicates that managing and sharing business records / documents electronically has a strong positive correlation with the adoption of cloud computing (r = 0.611; p = 0.000). The significance value of the correlation is 0.000 (p < 0.01) meaning that the probability of the correlation happening by chance is low. Therefore, managing and sharing business records and/or documents electronically increase the chances that SMEs would use more complex applications that are delivered over the Internet as a service as part of their daily operations.

***Relationship between perceived use of technology by competitors (IT3) and use of cloud computing (CC4)***

The correlation analysis indicates that perceived use of technology by competitors has a weak positive correlation with the adoption of cloud computing ($r = 0.119$; $p = 0.290$). The significance value of the correlation is 0.290 ($p > 0.01$) meaning that the probability of the correlation happening by chance is high. The perceived use of technology by competitors has little to no correlation on SME's use more complex applications that are delivered over the Internet as a service as part of their daily operations.

***Relationship between having IT strategy (IT4) and use of cloud computing (CC4)***

The correlation analysis indicates that having a clearly developed and adopted IT strategy has a moderate positive correlation with the adoption of cloud computing ($r = 0.420$; $p = 0.000$). The significance value of the correlation is 0.000 ($p < 0.01$) meaning that the probability of the correlation happening by chance is low. Having a clearly defined IT strategy increases the likelihood that SMEs would use more complex applications that are delivered over the Internet as a service as part of their daily operations.

***Relationship between perceived employee IT literacy (IT6) and use of cloud computing (CC4)***

The correlation analysis indicates that perceived employee IT literacy has a weak positive correlation with the adoption of cloud computing ($r = 0.118$; $p = 0.294$). The significance value of the correlation is 0.294 ($p > 0.01$) meaning that the probability of the correlation happening by chance is high. Therefore, perceived employee IT literacy has little to no correlation on the SMEs usage of more complex applications that are delivered over the Internet as a service as part of their daily operations.

***Relationship between technology know-how by management (IT7) and use of cloud computing (CC4)***

The correlation analysis indicates that lack of technological know-how within the organization to drive IT adoption has a moderate positive correlation with the adoption of cloud computing ($r = 0.319$; $p = 0.004$). The significance value of the correlation is 0. 004 ($p < 0.01$) meaning that the probability of the correlation happening by chance is low. Therefore, lack of technological know-how within the SMEs to drive IT adoption ultimately leads to SME's less usage of more complex applications that are delivered over the Internet as a service as part of their daily operations.

### 4.9.4. Infrastructure Related

Table 6 below depicts the Spearman's correlation analysis results, detailing the evaluated strengths and direction of correlation that exists amongst the questions relating to supporting infrastructure and the use of cloud computing.

| | | | CC4 |
|---|---|---|---|
| Spearman's rho | INF2 | Correlation Coefficient | .427 |
| | | Sig. (2-tailed) | .000 |
| | INF3 | Correlation Coefficient | -.027 |
| | | Sig. (2-tailed) | .812 |

*Table 6: Spearman's Correlation for Infrastructure Related Questions*

***Relationship between reliable electricity supply (INF2) and use of cloud computing (CC4)***

The correlation analysis indicates availability of reliable electricity supply has a moderate positive correlation with the adoption of cloud computing ($r = 0.427$; $p = 0.000$). The significance value of the correlation is 0. 000 ($p < 0.01$) meaning that the probability of the correlation happening by chance is low. Therefore, reliable electricity supply has a positive effect on SME's usage of more complex applications that are delivered over the Internet as a service as part of their daily operations.

***Relationship between reliable Internet access (INF3) and cloud computing adoption (CC4)***

The correlation analysis indicates that perceived reliable Internet connectivity has a weak negative correlation with the adoption of cloud computing ($r = -0.027$; $p = 0.812$). The significance value of the correlation is 0.812 ($p > 0.01$) meaning that the probability of the correlation happening by chance is high. Therefore, perceived reliable Internet connectivity has little to no correlation on SMEs usage of more complex applications that are delivered over the Internet as a service as part of their daily operations.

### 4.9.5. Cloud Related

Table 7 below depicts the Spearman's correlation analysis results, detailing the evaluated strengths and direction of correlation that exists amongst the questions relating to perceived enablers of cloud computing adoption and the actual use of cloud computing.

| | | | CC4 |
|---|---|---|---|
| Spearman's rho | CC1 | Correlation Coefficient | .034 |
| | | Sig. (2-tailed) | .764 |
| | CC2 | Correlation Coefficient | .459 |
| | | Sig. (2-tailed) | .000 |
| | CC3 | Correlation Coefficient | .603 |
| | | Sig. (2-tailed) | .000 |
| | CC6 | Correlation Coefficient | .562 |
| | | Sig. (2-tailed) | .000 |

*Table 7: Spearman's Correlation for Cloud Related Questions*

***Relationship between cloud computing awareness (CC1) and use of cloud computing (CC4)***

The correlation analysis indicates that understanding of cloud computing concepts and its associated benefits has a weak positive correlation with the adoption of cloud computing ($r = 0.034$; $p = 0.764$). The significance value of the correlation is 0.764 ($p > 0.01$) meaning that the probability of the correlation happening by chance is high. Therefore, understanding of cloud computing and its associated benefits has little to no correlation on SMEs usage of more complex applications that are delivered over the Internet as a service as part of their daily operations.

***Relationship between SaaS awareness (CC2) and use of cloud computing (CC4)***

The correlation analysis indicates that good understanding of more complex applications that are delivered over the Internet as a service has a moderate positive correlation with the adoption of cloud computing ($r = 0.459$; $p = 0.000$). The significance value of the correlation is 0. 000 ($p < 0.01$) meaning that the probability of the correlation happening by chance is very low. Good understanding of more complex applications that are delivered over the Internet as a service increases the likelihood of SME's usage of more complex applications that are delivered over the Internet as a service as part of their daily operations.

***Relationship between use of basic Internet-based services such as email and websites (CC3) and use of cloud computing (CC4)***

The correlation analysis indicates that making use of basic Internet-based services such as email and websites has a strong positive correlation with the adoption of cloud computing ($r = 0.603$; $p = 0.000$). The significance value of the correlation is 0. 000

($p < 0.01$) meaning that the probability of the correlation happening by chance is very low. Therefore, usage of basic Internet-based services such as email and websites increase chances of SME's usage of more complex applications that are delivered over the Internet as a service as part of their daily operations.

***Relationship between Internet costs (CC6) and cloud computing adoption (CC4)***

The correlation analysis indicates that high Internet costs has a strong positive correlation with the adoption of cloud computing ($r = 0.562$; $p = 0.000$). The significance value of the correlation is 0. 000 ($p < 0.01$) meaning that the probability of the correlation happening by chance is very low. Therefore, high Internet costs lead to SME's less usage of more complex applications that are delivered over the Internet as a service as part of their daily operations.

## 4.10. Regression Analysis

| Model | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. |
|---|---|---|---|---|---|
| | B | Std. Error | Beta | | |
| (Constant) | -2.773 | .463 | | -5.992 | .000 |
| MRK1 | .167 | .094 | .144 | 1.777 | .080 |
| MRK2 | .024 | .058 | .025 | .406 | .686 |
| MRK4 | .196 | .113 | .168 | 1.733 | .088 |
| FIN1 | .539 | .076 | .539 | 7.101 | .000 |
| FIN2 | -.068 | .075 | -.066 | -.911 | .366 |
| FIN5 | .022 | .112 | .019 | .196 | .845 |
| FIN6 | -.296 | .119 | -.253 | -2.481 | .016 |
| IT1 | -.039 | .109 | -.040 | -.363 | .718 |
| IT4 | .207 | .107 | .196 | 1.934 | .057 |
| IT7 | -.051 | .090 | -.045 | -.572 | .569 |
| INF2 | .220 | .074 | .197 | 2.961 | .004 |
| CC2 | .127 | .084 | .097 | 1.506 | .137 |
| CC3 | .385 | .123 | .302 | 3.136 | .003 |
| CC6 | .158 | .054 | .168 | 2.928 | .005 |
| Dependent Variable: CC4 | | | | | |

| R Square | Adjusted R Square | Change Statistics | | |
|---|---|---|---|---|
| | | F Change | | Sig. F Change |
| .896 | .873 | 40.405 | | .000 |

*Table 8: Initial Multivariate Linear Regression*

A multivariate linear regression model was used to determine the degree with which the various independent variables influence the adoption of cloud related systems and services. The variables that were used in the liner regression analysis included only those that showed a significant level of correlation with the use of complex applications that are delivered over the Internet as a service. The regression analysis results are depicted in Table 8 above.

The regression analysis results in Table 8 above show that there are several predictor variables in the model that are not statistically significant in the prediction of the dependent variable. In order to build a more effective model, a backward elimination technique was used with a significant level of 0.05. With this technique, each of the non-significant variables was removed one at a time until the model contained no non-significant predictors. The results of the backward elimination process are presented in Table 9 below.

| Model | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. |
|---|---|---|---|---|---|
| | B | Std. Error | Beta | | |
| (Constant) | -3.434 | .320 | | -10.745 | .000 |
| MRK1 | .236 | .053 | .204 | 4.493 | .000 |
| MRK4 | .305 | .057 | .262 | 5.342 | .000 |
| **FIN1** | **.467** | **.047** | **.466** | **9.851** | **.000** |
| INF2 | .150 | .056 | .134 | 2.675 | .009 |
| CC2 | .210 | .069 | .162 | 3.045 | .003 |
| CC3 | .177 | .077 | .139 | 2.294 | .025 |
| CC6 | .196 | .047 | .209 | 4.192 | .000 |
| Dependent Variable: CC4 | | | | | |

| R Square | Adjusted R Square | Change Statistics | | |
|---|---|---|---|---|
| | | F Change | | Sig. F Change |
| .879 | .867 | 75.688 | | .000 |

*Table 9: Final Multivariate Linear Regression*

The regression results indicated in Table 9 above show a statistical significance of 0.000, denoting that the regression model can be reliably used to make recommendations on the adoption and use of cloud-based systems and services. The model accounts for 87.9% (R-Square) of the variance in the adoption and use of complex cloud-based services, with the adjusted R-Square of 86.7%.

The most significant predictors of use of more complex applications that are delivered over the Internet as a service (CC4) has been identified as a firm having a formal documented and clear business plan (FIN1 with beta = 0.466 and sig. = 0.000), followed by firms making use of Internet-based marketing tools and services to reach their potential customers (MRK4 with beta = 0.262 and sig. = 0.000) and Internet costs (CC6 with beta = 0.209 and sig. = 0.00).

Perceptions of sufficient local market to support growth (MRK1 with beta = 0.204 and sig. = 0.00), an understanding of SaaS offerings (CC2 with beta = 0.162 and sig. = 0.003), making use of basic applications that are delivered over the Internet such as email and company website (CC3 with beta = 0.139 and sig. = 0.025), and reliable electricity supply (INF2 with beta = 0.134 and sig. = 0.009) were also found to be significant predictors of use of more complex applications that are delivered over the Internet as a service.

## 4.11. Chapter Summary

This chapter presented data analysis and results for the data that was collected using data collection instrument detailed in the previous chapter. The results were presented in the form of descriptive statistics outlining the respondent demographics, firm demographics as well as the frequencies and mean (average) for each of the Likert-scale questions on marketing, finance, general IT use, supporting infrastructure and cloud related questions.

Microsoft Power BI was used for visualization of the descriptive statistics of respondent demographics, firm demographics and Likert-scape responses for each of the questions relating to marketing, finance, IT use, infrastructure and cloud computing. Correlation and regression analysis were also performed using IBM SPSS 22 to determine the significant prediction and direction of the relationship between the adoption and use of cloud computing and various independent variables. In the next chapter, these results are summarized and conclusions and draw in relation to the research problem.

# Chapter 5: Conclusion and Recommendations

## 5.1. Introduction

Chapter 4 presented data that was collected using the data collection instrument outlined in Chapter 3. This chapter examine conclusions of the study in reference to the research problem. The research problem that the study was seeking to address is: ***How can rural SMEs in the Eastern Cape Province of South African leverage on the capabilities of cloud computing for competitive advantage.*** To address this question, the following sub questions were further outlined and will be reflected on in this chapter:

- What are the major challenges that rural SMEs face?
- How can ICTs be used to meet the challenges facing rural SMEs?
- What are the challenges that impede rural SMEs in adopting and using ICTs?
- How do rural SMEs perceive cloud computing and its associated benefits?
- What are the main drivers and impediments of could computing adoption by rural SMEs?
- How can cloud computing be adopted and used as a tool for competitive advantage by rural SMEs?

The significance of predictors in the proposed theoretical framework is also concluded in this chapter and an updated theoretical framework for predicting use of cloud-based services is presented.

### 5.1.1. Conclusion in Relation to Theoretical Framework

Correlation analysis on each of the factors in the proposed theoretical model revealed that five of the factors do not have a significant correlation with the adoption of cloud-based services. These factors are target market Internet presence (MRK3), perceived use of technology by competitors (IT3), perceived IT literacy of firm employees (IT6), reliable Internet connection (INF3) and understanding of cloud computing concepts and its associated benefits (CC1).

Multivariate linear regression analysis was performed using variables that had a significant correlation to the adoption of cloud-based services, with a backward elimination technique subsequently used in order to develop a more effective model to predict cloud adoption. Only seven of the variables were found to be significant predictors of the adoption of cloud-bases services.

***Marketing Factors***

$H_1$: MRK1 – Local demand for products and services was hypothesized to have a positive impact on adoption of cloud-based services. The findings of this study support this hypothesis. Thus, the greater the perception of a sufficient local market to facilitate local business growth, the likelier the small businesses are to adopt more complex applications delivered over the Internet as a service.

$H_2$: MRK2 – Competition with big nationals and multinationals for local market was hypothesized to have a positive impact on adoption of cloud-based services. The findings of this study reject this hypothesis, and competition with big nationals and multinationals for local market is not a significant predictor of the adoption of cloud-based services.

$H_3$: MRK3 – Target market Internet presence was hypothesized to have a positive impact on adoption of cloud-based services. The findings of this study reject this hypothesis, and target market presence is not a significant predictor of the adoption of cloud-based services.

$H_4$: MRK4 – Use of online-based marketing tools and services was hypothesized to have a positive impact on adoption of cloud-based services. The findings of this study support this hypothesis. Thus, use of online-based marketing tools and services is a significant predictor of the adoption of more complex applications delivered over the Internet as a service.

***Financial Factors***

$H_5$: FIN1 – Having a formal documented business plan was hypothesized to have a positive impact on adoption of cloud-based services. The findings of this study support this hypothesis. Thus, having a formal documented business plan is a significant

predictor of the adoption of more complex applications delivered over the Internet as a service.

$H_6$: FIN2 – Ability to produce formal financial statements was hypothesized to have a positive impact on adoption of cloud-based services. The findings of this study reject this hypothesis, and the ability to produce formal financial statements is not a significant predictor of the adoption of cloud-based services.

$H_7$: FIN5 – Use of electronic banking channels was hypothesized to have a positive impact on adoption of cloud-based services. The findings of this study reject this hypothesis and use of electronic banking channels such as Internet banking and electronic funds transfer is not a significant predictor of the adoption of cloud-based services.

$H_8$: FIN6 – Skills and knowledge to secure business finance was hypothesized to have a positive impact on adoption of cloud-based services. The findings of this study reject this hypothesis, and skills and knowledge to secure business finance is not a significant predictor of the adoption of cloud-based services.

***Information Technology***

$H_9$: IT1 – Electronic management and sharing of business documents was hypothesized to have a positive impact on adoption of cloud-based services. The findings of this study reject this hypothesis, and electronic management and sharing of business documents is not a significant predictor of the adoption of cloud-based services.

$H_{10}$: IT3 – Perceived use of technology for competitive advantage by competitors was hypothesized to have a positive impact on adoption of cloud-based services competitors. The findings of this study reject this hypothesis and perceived use of technology for competitive advantage by competitors is not a significant predictor of the adoption of cloud-based services.

$H_{11}$: IT4 – Having a clearly defined and adopted IT strategy was hypothesized to have a positive impact on adoption of cloud-based services. The findings of this study reject this hypothesis and having a clearly defined and adopted IT strategy is not a significant predictor of the adoption of cloud-based services.

$H_{12}$: IT6 – Perceived employee tech literacy was hypothesized to have a positive impact on adoption of cloud-based services. The findings of this study reject this hypothesis and perceptions of having technologically savvy employees is not a significant predictor of the adoption of cloud-based services.

$H_{13}$: IT7 – Management technological skills was hypothesized to have a positive impact on adoption of cloud-based services. The findings of this study reject this hypothesis and management technological skills is not a significant predictor of the adoption of cloud-based services.

***Supporting Infrastructure***

$H_{14}$: INF2 – Reliability of electricity supply was hypothesized to have a positive impact on adoption of cloud-based services. The findings of this study support this hypothesis. Thus, reliability of electricity supply is a significant predictor of the adoption of more complex applications delivered over the Internet as a service.

$H_{15}$: INF3 – Reliability of Internet connectivity was hypothesized to have a positive impact on adoption of cloud-based services. The findings of this study reject this hypothesis and reliability of Internet connectivity is not a significant predictor of the adoption of cloud-based services.

***Cloud Computing***

$H_{16}$: CC1 – Understanding of cloud computing concepts and associated benefits was hypothesized to have a positive impact on adoption of cloud-based services. The findings of this study reject this hypothesis and understanding cloud computing and its associated benefits is not a significant predictor of the adoption of cloud-based services.

$H_{17}$: CC2 – Understanding of applications delivered over the Internet as a service was hypothesized to have a positive impact on adoption of cloud-based services. The findings of this study support this hypothesis. Thus, understanding applications delivered over the Internet as a service is a significant predictor of the adoption of more complex applications delivered over the Internet as a service.

$H_{18}$: CC3 – Use of basic Internet-based services such as email and websites was hypothesized to have a positive impact on adoption of cloud-based services. The

findings of this study support this hypothesis. Thus, use of basic Internet-based services such as email and websites are a significant predictor of the adoption of more complex applications delivered over the Internet as a service.

$H_{19}$: CC6 – Internet costs as a factor when deciding on usage of cloud-based systems was hypothesized to have a positive impact on adoption of cloud-based services. The findings of this study support this hypothesis. Thus, Internet costs as a factor in the decision to adopt cloud computing is a significant predictor of the adoption of more complex applications delivered over the Internet as a service.

Figure 40 below presents a model that is based on the TOE framework, depicting factors that are supported by this study in each of the three elements.

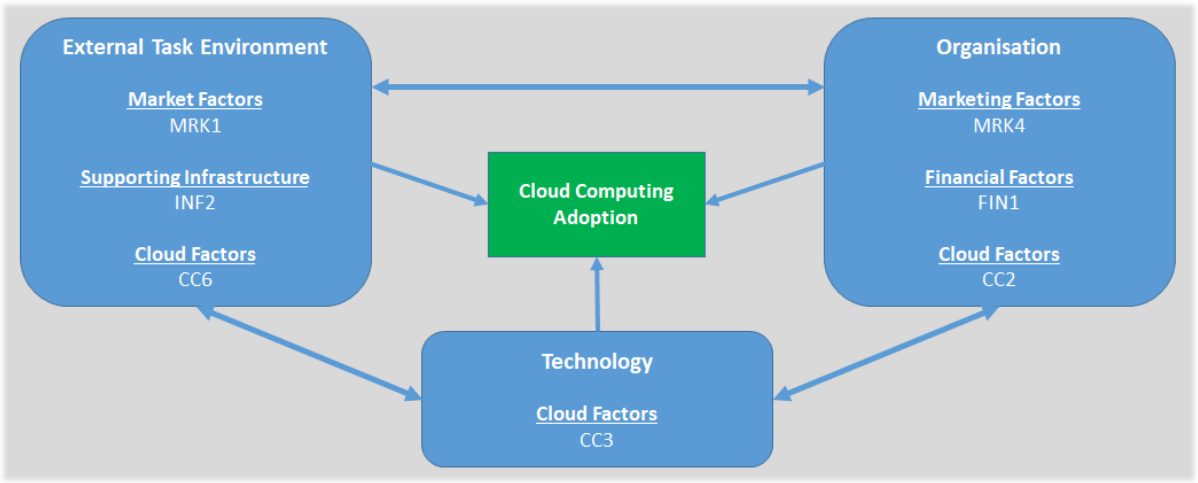


*Figure 40: Supported Theoretical Framework*

Availability of market demand for product and/or services, reliable electricity and Internet costs are all factors external to the firm that are significant in predicting adoption of cloud-related services. Internal to the firm, use of online-based marketing tools and services, having a formal documented business plan and a good understanding of applications that are delivered over the Internet as a service serve as significant predictors of adoption of cloud-related services. On the Technological element of the underpinning framework, adopting basic Internet-based services such as email and websites was also identified as a significant predictor of the adoption of more complex services that are delivered over the Internet as a service.

### 5.1.2. Conclusion in Relation to Research Problem

The study sought to determine how rural SMEs in the Eastern Cape Province of South African can leverage on the capabilities of cloud computing for competitive advantage. Based on the review of related literature as well as the findings of this study discussed in section 5.1.1, the following conclusions that address the sub questions can be made:

- Reviewed literature indicates that access to markets, access to finance, lack of public infrastructure and lack of skilled resources as some of the major challenges that rural SME's face.
- ICTs have become an integral part of business operations and a source of competitive advantage. In this study, all of the respondents either agreed or strongly agreed that use of IT can increase chances of accessing finance from banks, whilst 90% of the respondents believed that use of technology can improve their business operations and efficiency.
- The majority of South African rural communities are characterized by underdevelopment. Typical challenges that South African rural SMEs face, particularly in comparison to their urban counterparts, include low tele-connectivity and lack of skilled resources. In this study, 56% of the respondents indicated that lack of technological know-how impedes IT adoption.
- Xero (2018) suggests that SMEs that have adopted cloud computing indicate that it saves them money and time. This study also found that 84% of the respondents intend to adopt – or continue to use – Internet based systems in the near future to streamline their processes. However, there were striking disparities in responses in this study when two similar questions were posed to the participants: ranking their understanding of cloud computing versus ranking their understanding of Internet based systems and services. Further education on the term and concept of cloud computing may be required to further the understanding and possibly enhance adoption.
- There are seven factors that the study found to be significant predictors of cloud adoption in rural Eastern Cape SMEs. These are market demand, use of online-based marketing, existence of formal business plans, reliable electricity,

awareness of SaaS, use of basic Internet-based services such as email and websites as well as affordable Internet costs.

- Authorities must ensure that environmental factors that are beyond the control of SMEs such as access to reliable electricity and affordable Internet are put in place in order to create a conducive SME ecosystem. SMEs that already have an Internet presence in the form of emails, websites and online marketers are likelier to adopt cloud-based services, which presents an opportunity for cloud service providers to create targeted strategies for these potential adopters. Also, formalized small businesses that boast formal documented business plans are likelier to adopt cloud-based services, which is an aspect that can be fostered through business incubation.

## 5.2. Areas for Further Research

This study investigated the antecedents of cloud computing adoption by rural SMEs in the Eastern Cape province of South Africa. Whilst the study conducted in this research fills some of the gaps in the body of knowledge, it does not cover all the possible research areas. Thus, researchers can further attempt to analyze and compare data from different industries to try and establish if there are any significant differences in cloud computing adoption antecedents amongst different sectors.

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# Appendix

## 7.1. Research Ethics Approval

NELSON MANDELA
UNIVERSITY

PO Box 77000, Nelson Mandela University, Port Elizabeth, 6031, South Africa mandela.ac.za

Chairperson: Faculty Research Ethics Committee (Human)
Tel: +27 (0)41 504 2906

**Ref: [H20-BES-BUS-062] / Approval]**

26 June 2020

Prof C Arnolds
Department: Graduate School

Dear Prof Arnolds,

**TITLE OF STUDY: CLOUD COMPUTING FOR COMPETITIVE ADVANTAGE: A CASE OF RURAL SMEs IN THE EASTERN CAPE PROVINCE OF SOUTH AFRICA (MBA)**

PRP: Prof C Arnolds
PI: MM Mpongwana

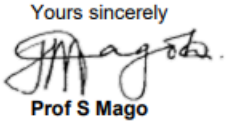
Your above-entitled application served at the *Faculty Ethics Committee of the Faculty of Business and Economic Science*, (*8 May 2020*) for approval. The study is classified as a negligible/low risk study. The ethics clearance reference number is **H20-BES-BUS-062** and approval is subject to the following conditions:

1. The immediate completion and return of the attached acknowledgement to Lindie@mandela.ac.za, the date of receipt of such returned acknowledgement determining the final date of approval for the study where after data collection may commence.
2. Approval for data collection is for 1 calendar year from date of receipt of above mentioned acknowledgement.
3. The submission of an annual progress report by the PRP on the data collection activities of the study (form RECH-004 to be made available shortly on Research Ethics Committee (Human) portal) by 15 December this year for studies approved/extended in the period October of the previous year up to and including September of this year, or 15 December next year for studies approved/extended after September this year.
4. In the event of a requirement to extend the period of data collection (i.e. for a period in excess of 1 calendar year from date of approval), completion of an extension request is required (form RECH-005 to be made available shortly on Research Ethics Committee (Human) portal)
5. In the event of any changes made to the study (excluding extension of the study), completion of an amendments form is required (form RECH-006 to be made available shortly on Research Ethics Committee (Human) portal).
6. Immediate submission (and possible discontinuation of the study in the case of serious events) of the relevant report to RECH (form RECH-007 to be made available shortly on Research Ethics Committee (Human) portal) in the event of any unanticipated problems, serious incidents or adverse events observed during the course of the study.
7. Immediate submission of a Study Termination Report to RECH (form RECH-008 to be made available shortly on Research Ethics Committee (Human) portal) upon unexpected closure/termination of study.
8. Immediate submission of a Study Exception Report of RECH (form RECH-009 to be made available shortly on Research Ethics Committee (Human) portal) in the event of any study deviations, violations and/or exceptions.
9. Acknowledgement that the study could be subjected to passive and/or active monitoring without prior notice at the discretion of Research Ethics Committee (Human).

Please quote the ethics clearance reference number in all correspondence and enquiries related to the study. For speedy processing of email queries (to be directed to Lindie@mandela.ac.za), it is recommended that the ethics clearance reference number together with an indication of the query appear in the subject line of the email.

We wish you well with the study.

Yours sincerely



**Prof S Mago**

Cc: Department of Research Capacity Development
Faculty Research Co-ordinator: Lindie van Rensburg

**ACKNOWLEDGEMENT OF CONDITIONS FOR ETHICS APPROVAL**

I, **Prof C Arnolds** (PRP) of the study entitled **CLOUD COMPUTING FOR COMPETITIVE ADVANTAGE: A CASE OF RURAL SMEs IN THE EASTERN CAPE PROVINCE OF SOUTH AFRICA (MBA) (H20-BES-BUS-062),** do hereby agree to the following approval conditions:

1. The submission of an annual progress report by myself on the data collection activities of the study by 15 December this year for studies approved in the period October of the previous year up to and including September of this year, or 15 December next year for studies approved after September this year. It is noted that there will be no call for the submission thereof. The onus for submission of the annual report by the stipulated date rests on myself.

2. Submission of the relevant request to Faculty RECH in the event of any amendments to the study for approval by Faculty RECH prior to any partial or full implementation thereof.

3. Submission of the relevant request to Faculty RECH in the event of any extension to the study for approval by Faculty RECH prior to the implementation thereof.

4. Immediate submission of the relevant report to Faculty RECH in the event of any unanticipated problems, serious incidents or adverse events.

5. Immediate discontinuation of the study in the event of any serious unanticipated problems, serious incidents or serious adverse events.

6. Immediate submission of the relevant report to Faculty RECH in the event of the unexpected closure/discontinuation of the study (for example, de-registration of the PI).

7. Immediate submission of the relevant report to Faculty RECH in the event of study deviations, violations and/or exceptions.

8. Acknowledgement that the study could be subjected to passive and/or active monitoring without prior notice at the discretion of Faculty RECH.

Signed: _____ Date: 26 June 2020

## 7.2. Participation Consent

**Cloud computing for competitive advantage: A case of rural SMEs in the Eastern Cape Province of South Africa**

**Consent to participate in the research**

Dear participant

You are hereby invited to participate in the research study aimed at analysing on how rural SMEs can leverage on cloud computing capabilities for competitive advantage. Please note that **your participation in this research is voluntary and confidential.**

Your participation in this research is completely voluntary, and you may choose to not participate or withdraw from participating at any time. There is not penalty or consequences of any kind should you decide to withdraw your participation from the research.

Your role in the research is to fill in an online survey relating to the adoption of cloud services in rural and peri-urban SMEs. **Your responses will be kept confidential**, and we do not collect personal identifying information such as names, identity number email addresses and/or IP addresses. The results of the study will be used for scholarly purposes only and may be shared with the Nelson Mandela University Business School representatives, and any other relevant authorities.

If you have any questions or concerns regarding the survey, please feel free to contact me any via the email address that is provided below. Your assistance in this regard will be highly appreciated.

The survey should take you about 10 minutes to complete. If you agree to complete this survey, please tick the check box below:

☐

Yours sincerely
Mbongo Mpongwana
Email: mbongo.mpongwana@gmail.com

## 7.3. Questionnaire with Declaration

# Questionnaire

**Cloud computing for competitive advantage: A case of rural SMEs in the Eastern Cape Province of South Africa**

## Section A: Declaration

Dear Participant

My name is Mbongo Mpongwana and I am a Master of Business Administration student at Nelson Mandela University Business School. I would like to welcome and thank you for taking time to participate in this study. The survey will take approximately 10 minutes to complete. By completing this survey, you implicitly give consent to take part in the research study. Should you have any questions regarding the research, please feel free to contact the researcher at mbongo.mpongwana@gmail.com.

There are no foreseeable risks associated with this study. To ensure that your business's strategic decisions that may lead to competitive advantage are not compromised, the responses to this survey are strictly kept confidential and are intended for use to better understand the overall factors influencing the adoption and implementation of cloud computing by rural SMEs in the Eastern Cape province of South Africa.

Please ensure that you answer all questions frankly and objectively, using your own judgement and experiences. I would also like to remind you that your participation in this research is completely voluntary, and you may choose to not participate or withdraw from participation at any time. There is no penalty or consequences of any kind should you decide to withdraw your participation from the study.

Thank you,
Mbongo Mpongwana (Researcher)
Email: mbongo.mpongwana@gmail.com

## Section B: Respondent Demographics

Gender : ❑ Female ❑ Male

Age Group : ❑ 18-24 ❑ 25-34 ❑ 35-44 ❑ 45-54 ❑ 55-64 ❑ 65-74 ❑ >75

Race/Ethnicity : ❑ Asian ❑ Black ❑ Coloured ❑ White ❑ Other

Highest Education : ❑ <Matric ❑ Matric ❑ Certificate ❑ Diploma ❑ Degree

❑ Honours ❑ Masters ❑Doctoral ❑ Other

Work Experience : ❑ 0-5 ❑ 6-10 ❑ 11-15 ❑ 16-20 ❑ >20

## Section C: Company Demographics

Firm City / Town : _____

Firm Sector : _____

No. of Employees : ❑ 0 (Owner Only) ❑ 1-5 ❑ 6-19 ❑ 20-49 ❑ 50-99 ❑ 100-199 ❑ >200

Firm Age (years) : ❑ <1 ❑ 1-3 ❑ 4-6 ❑ 7-10 ❑ 11-15 ❑ >15

CIPC Registered? : ❑ Yes ❑ No

## Section D: Questions Related to your Firm Operations

Please indicate the level to which you disagree or agree to the following statements about your firm, ranking your responses from “Strongly Disagree” to "Strongly Agree". Please answer all questions frankly and objectively, using your own judgement and experiences.

Please note that question codes will not be part of the online survey, and their purpose is purely to group related questions together. The codes are defined below:

- **MRK**: Questions related to **Access to Market**
- **FIN**: Questions related to **Access to Finance**
- **IT**: Questions related to use of **Information Technology**
- **INF**: Questions related to availability of supporting **Infrastructure**
- **CC**: Questions related to understanding and use of **Cloud Computing**

| No | Statement | Strongly Disagree | Disagree | Neutral | Agree | Strongly Agree |
|---|---|---|---|---|---|---|
| 1 | **MRK1**: There is enough demand for our products and/or services from our local market (local town or region of firm's primary operation) to facilitate growth for our firm | 1 | 2 | 3 | 4 | 5 |
| 2 | **MRK2:** Big national and multinational companies often compete for the same local market, which impedes growth for our local small businesses | 1 | 2 | 3 | 4 | 5 |
| 3 | **MRK3:** Our current and potential customers (target market) has a strong Internet presence | 1 | 2 | 3 | 4 | 5 |
| 4 | **MRK4:** We often use Internet-based tools and services to reach out to our potential customers within and beyond our local market | 1 | 2 | 3 | 4 | 5 |
| 5 | **MRK5:** We have a significantly high percentage of national and international customer base | 1 | 2 | 3 | 4 | 5 |
| 6 | **FIN1:** Our firm has a formal documented and clear business plan | 1 | 2 | 3 | 4 | 5 |
| 7 | **FIN2:** As it currently stands, our firm can produce formal financial statements if/when required | 1 | 2 | 3 | 4 | 5 |
| 8 | **FIN3:** Lack of adequate private finance in the recent past has had negative effect on my firm's operations and expansion plans | 1 | 2 | 3 | 4 | 5 |
| 9 | **FIN4:** Local government provides adequate support, including financial support, for small businesses in my local community | 1 | 2 | 3 | 4 | 5 |
| 10 | **FIN5:** My firm often use electronic banking channels such as Internet banking and electronic funds transfers for payments and other related activities | 1 | 2 | 3 | 4 | 5 |
| 11 | **FIN6:** I deem my knowledge and skills as sufficient to obtain business finance if/when necessary, and no further support & training is required in this regard | 1 | 2 | 3 | 4 | 5 |
| 12 | **FIN7**: I believe that use of IT can / does generally increase chances of accessing finance from banks | 1 | 2 | 3 | 4 | 5 |
| 13 | **IT1:** Most of our business records / documents are kept, managed and shared electronically | 1 | 2 | 3 | 4 | 5 |
| 14 | **IT2**: Use of technology can improve our business operations and efficiency | 1 | 2 | 3 | 4 | 5 |
| 15 | **IT3**: Competitors in our industry often make use of technology for competitive advantage | 1 | 2 | 3 | 4 | 5 |
| 16 | **IT4**: We have a clear IT strategy that we have developed and adopted in our business | 1 | 2 | 3 | 4 | 5 |
| 17 | **IT5**: My organisation is positioned to easily adapt to IT changes in the foreseeable future | 1 | 2 | 3 | 4 | 5 |
| 18 | **IT6**: Employees in my organisation easily learn new technology when necessary | 1 | 2 | 3 | 4 | 5 |
| 19 | **IT7**: Lack of technological know-how (lack of people with technical knowledge within my firm) | 1 | 2 | 3 | 4 | 5 |

| | | | | | | |
|---|---|---|---|---|---|---|
| | impedes my organisation from adopting IT related systems and processes | | | | | |
| **20** | **INF1:** We have proper infrastructure in our firm's primary location to facilitate operations and timely delivery from our suppliers where necessary | **1** | **2** | **3** | **4** | **5** |
| **21** | **INF2**: We have reliable electricity supply in the area where my firm has primary operations | **1** | **2** | **3** | **4** | **5** |
| **22** | **INF3**: We have reliable Internet connectivity in the area where my firm has primary operations | **1** | **2** | **3** | **4** | **5** |
| **23** | **CC1**: I have a good understanding of what cloud computing is about and its associated benefits | **1** | **2** | **3** | **4** | **5** |
| **24** | **CC2**: I have a good understanding of applications that are delivered as a service over the Internet such as Google Apps, Amazon Web Services, Office 365, ERP, etc. | **1** | **2** | **3** | **4** | **5** |
| **25** | **CC3**: My organisation makes use of basic applications that are delivered over the Internet such as email (for business purposes) and company website | **1** | **2** | **3** | **4** | **5** |
| **26** | **CC4**: My organisation makes use of more complex applications that are delivered over the Internet as a service to perform our daily operations | **1** | **2** | **3** | **4** | **5** |
| **27** | **CC5**: My organisation intends to adopt (or continue to use) Internet based systems to streamline our processes in the near future | **1** | **2** | **3** | **4** | **5** |
| **28** | **CC6:** Internet costs is a factor when considering adoption and use Internet-based services in our daily operations | **1** | **2** | **3** | **4** | **5** |
| **29** | **CC7**: Reliable electricity supply is one of the main factors that impede our firm from adopting Internet-based services | **1** | **2** | **3** | **4** | **5** |
| **30** | **CC8**: Poor Internet connectivity is one of the main factors that impede our firm from adopting Internet-based systems. | **1** | **2** | **3** | **4** | **5** |

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**Thank you for your participation in the study**

## 7.4. TurnitIn Report