# CLOUD COMPUTING ADOPTION READINESS BY SMALL ENTERPRISES IN CAPE TOWN, SOUTH AFRICA

by

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# DECLARATION

I, Philemon Ilyihamije, declare that the contents of this thesis represent my own unaided work, and that the thesis has not previously been submitted for academic examination towards any qualification. Furthermore, it represents my own opinions and not necessarily those of the Cape Peninsula University of Technology.

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Signature                                              3 November, 2019

# ABSTRACT

In contemplation of business sustainability and competitive participation in the market, there is a compelling need for small, medium and micro-sized enterprises (SMMEs) to embrace technology innovations. However, the adoption rate and use of Information and Communications Technology (ICT) specifically by Small Enterprises (SEs) is still very low. The slow adoption rate is mainly attributed to the non-availability of sufficient resources in SEs.

Cloud Computing (CC) technology promises to provide the needed computing capacities to SEs at affordable cost. SEs do not have a clear understanding of what CC entails and are therefore not able to determine their readiness level for CC adoption.

This research aimed to explore the extent of the CC adoption readiness of SEs in the city of Cape Town as well as SEs' level of understanding of CC technology. Two primary research questions with two sub-questions each were posed. The primary research questions were formulated as follows:

1) To what extent are SEs prepared for cloud computing technology adoption?
2) How do SEs determine their readiness for the adoption of cloud computing?

The research was qualitatively designed, with a subjectivist and interpretivist approach. Semi-structured interviews by means of an interview guide were conducted with SEs in Cape Town and surroundings. The SEs were purposively selected using the non-random sampling technique. The research was conducted according to the code of ethics as prescribed by the University. Respondents had to consent to participating in the research, and the researcher continuously provided assurance of confidentiality to the respondents.

The research findings offer direction on the understanding, awareness, and readiness of SEs in general in Cape Town. Some of the main findings of the research revealed that SEs do not have a clear understanding of CC technology, consequently, it could not clearly be determined whether SEs are ready for the adoption. This has led to drawing conclusions that point to the low level of CC adoption readiness of SEs.

**KEYWORDS:** Cloud computing, small and medium enterprise, cloud computing adoption readiness, technology adoption, technology readiness

# ACKNOWLEDGEMENTS

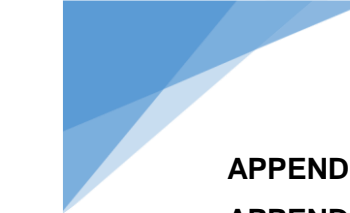I would like to sincerely thank:

- My supervisor, Dr Andre de la Harpe, for his tremendous support and guidance, who sacrificed so much to bring this thesis to completion. I have no words to express my gratitude. Simply put, without him I would not have completed this work.
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# ABBREVIATIONS

| Abbreviation | Explanation |
|---|---|
| CC | Cloud Computing |
| IaaS | Infrastructure as a Service |
| ICT | Information and Communications Technology |
| ISO | International Standards Organisation |
| IT | Information Technology |
| ITU | International Telecommunications Union |
| NIST | National Institute of Standards and Technology |
| PaaS | Platform as a Service |
| SaaS | Software as a Service |
| SLA | Service Level Agreement |
| SE | Small Enterprise |
| SME | Small and Medium Enterprise |
| SMME | Small, Medium and Micro-sized Enterprise |
| SEDA | Small Enterprise Development Agency |
| UNCTAD | United Nations Conference on Trade and Development |
| WWW | World Wide Web |
| CAPEX | Capital Expenditure |
| OPEX | Operations Expenditure |
| TOE | Technology Organisation and Environment |
| TAM | Technology Acceptance Model |
| DOI | Diffusion of Innovation |
| DAaaS | Data Analytics as a Service |
| DSaaS | Data Storage as a Service |
| BPaaS | Business Process as a Service |
| CaaS | Communication as a Service |

# CHAPTER ONE: INTRODUCTION

## 1.1 Introduction

Technology opens markets for small, medium and micro-sized enterprises (SMMEs). However, technology, specifically Information Technology (IT) infrastructure is expensive, and many SMMEs cannot afford to invest in technology (Abubakar, Bass & Alison, 2014). Furthermore, SMMEs find it difficult to adapt to new technologies and innovations (Afolayan, 2014). Cloud Computing (CC) is a disruptive technology that impacts all industries.

It is important to note that 'SMME' and 'small and medium enterprise (SME)' are terms used interchangeably to point to the same concept. The choice to use one over the other depends on the country/region where the term is used. 'SME' is mainly used in the Western countries to refer to small businesses. In Africa, some countries use 'micro, small and medium enterprise (MSME)'. In South Africa, 'SMME' is the term in use as defined in the Global Entrepreneurship Monitor (GEM) Report of 2010, the Department of Trade and Industry (DTI), and Small Enterprise Development Agency (SEDA). However, although 'SMME' is the common term used in South Africa referring to the small businesses sector, there is a clear distinction between micro, small and medium enterprises. SEs and IT have been propelled as non-arguable contributing factors in the quest for countries' economic development and sustainability on a worldwide scale (Sabi, Uzoka, Langmia & Njeh, 2016; Abubakar et al., 2014). IT has become a fundamental part of all organisations' operational lives, and due to the labour cost associated with technology innovations and escalations, an increase in self-service delivery models of technology has become a norm (Lin & Hsieh, 2006). As depicted by Gumbi and Mnkandla (2015), in order to operate in today's economy, technology is a license, and the choice of the technology is always directed by the nature of the business undertaken by the enterprise.

CC emerged as a paradigm that is to revolutionise the IT landscape (Hosseinian-Far, Ramachandran & Slack, 2018; Schneider & Sunyaev, 2016), opening opportunities for developing countries to actively participate in the global market (Goundar & Fiji, 2018). Developing countries, which are generally characterised by the lack of physical infrastructure at their disposal, continue to explore participative competition in the global economy (Laverty, 2011). SEs, which are widely accepted to contribute greatly in countries (Cass, 2012), are faced with the challenge of insufficient resources to invest in IT infrastructure and human resource development (Cass, 2012). CC promises to provide this computing power

(Wang & He, 2014). The cost of these pledged computing services should be affordable to SEs, as it can become a significant enabling factor for sustainability and growth of their businesses.

There is no doubt that ICT opens markets for SEs. However technology, and specifically IT infrastructure is expensive (Wang & He, 2014), and many SEs cannot afford to invest in these technologies (Zheng, Hatakka, Sahay & Andersson, 2018; Abubakar et al., 2014). Furthermore, SEs find it difficult to adapt to new technologies (Afolayan, 2014) such as cloud-based and supported strategies. According to Mbuyisa and Leonard (2015) as well as Alkhater, Walters and Wills (2018) the assumption is that, in South Africa, SMMEs may profit from the adoption of Information and Communications Technology (ICT). As a result, chances of job creation will increase, which can visibly contribute to the reduction of poverty faced by sub-Saharan African countries, including South Africa. Although literature provides evidence of the significant contribution of micro-enterprises in the country's economic development and sources of employment, they are mainly found in the informal sector, and the majority of these enterprises are not registered (Berry, Van Blottnitz, Cassim, Kesper, Rajaratnam & Van Seventer, 2002). For this reason, micro-enterprises are excluded from this study.

Furthermore, medium enterprises are excluded, and the focus of the study is on SEs only, which forms a large part of the formal enterprises in the definition of SMMEs. As put forth by Wilkin, Warren, Yeoh and Salzman (2018), the needs and capabilities of medium-sized enterprises do not necessarily translate to the smaller-sized enterprises; this is the reason why SEs should be looked at separately. SEs are defined in different ways depending on the country, but all the definitions are based on the number of employees the enterprise has, and the enterprise's turn over. The European Union, United Kingdom and Canada define SEs as those enterprises with a headcount up to 50 employees, whereas in the United States of America and China the number of employees depends on the industry concerned. In the South African context, when considering the headcount as a criterion, SEs as defined by the Small Business Agency Bureau as having up to 50 employees.

This study aimed to explore the extent of CC adoption readiness of SEs as defined in the SMME definition by the Small Enterprise Development Agency (SEDA). CC is a computing technology that captures the attention of both practitioners and academics researching in the domain of Information and Communications Technology (ICT) (Chang & Hsu, 2016; Adam & Musah, 2015; Asatiani, 2015;

Adamuthe, Salunkhe, Patil & Thampi, 2015; Lin & Chen, 2012). Different views and definitions have been given to the CC paradigm, creating a level of ambiguity and confusion among prospective adopters (Senyo, Addae & Boateng, 2018; Wang, Wang, Bi, Li & Xu, 2016; Adam & Musah, 2015; Oliveira, Thomas & Espadanal, 2014; Gillwald & Moyo, 2014; Gorelik, 2013; Zhou, 2013; Bitta, 2012; Feuerlicht & Margaris, 2012; Nazir, 2012; Rahul, Haque & Muntjir, 2012; Robu, 2012; Marston, Li, Bandyopadhyay, Zhang & Ghalsasi, 2011; Sultan, 2011; Khajeh-Hosseini, Sommerville & Sriram, 2010). Nevertheless, all share the common ground of CC being the technology that provides computing services as a utility over a shared network (Adam & Musah, 2015; Nazir, 2012).

In the view of the available scholarly work as well as practitioners' publications, SEs have been proven to play a significant role in countries' economies growth (Oguntala, Abd-Alhameed & Odeyemi, 2017; Gillwald & Moyo, 2014; Yeboah-Boateng & Essandoh, 2014; Cass, 2012). In doing so, SEs need to compete effectively in the global market, and in today's market landscape embracing ICT use is an indisputable requirement (Tarutė & Gatautis, 2014; Abdollahzadehgan, Hussin, Gohary & Amini, 2013; Ismail, Jeffrey & Van Belle, 2011). In order to competitively boost their efficiency in the market, SEs need to adopt and use ICT strategically (Adane, 2018; Tan, Chong, Lin & Eze, 2009).

Unfortunately, SEs have very limited tolerance in bearing the expenses associated with ICT (Prasad, Green, Heales & Finau, 2014; Carcary, Doherty, Conway & McLaughlin, 2014:13; Azarnik, Shayan, Alizadeh & Karamizadeh, 2012; Malecki, 1977). The resources at their disposal do not allow them to invest in the traditionally powered in-house ICT infrastructure (Sabi et al., 2016; Carcary, Doherty & Conway, 2013; Abubakar et al., 2014). Consequently, SEs forfeit the opportunity to exploit ICT potential to its fullness, due to its low diffusion in enterprises (Consoli, 2012). The failure to exploit the potential of technology results in unsustainability and significantly limits the chances of survival (Kamal & Qureshi, 2009).

CC technology promises to provide SEs having limited resources (Rogerson, 2008), with the required computing power. With CC, the financial cost associated with ICT infrastructure acquisition and operation (Jede & Teuteberg, 2016; Olumide, 2014) is significantly reduced and effectively managed by enterprises, based on their needs and affordability.

CC creates the opportunity for SEs to access complex computing power in order to gain sustainable growth and competitively participate in the global market (Low, Chen & Wu, 2011; Carcary et al., 2013; El-Gazzar, Hustad & Olsen, 2016). While CC has been exhibited as a technology with high potential benefits for SEs (Cristmann, Falkner, Horch & Kett, 2016; Wang et al., 2016; Adane, 2018), its adoption has been significantly slow (Abrahamsson, Helmer, Oyetoyan, Brocanelli, Cardano, Gadler, Morandini et al., 2016; Muhammed, Zaharaddeen, Rumana & Turaki, 2015; Raza, Adenola, Nafarieh & Robertson, 2015; Taylor, 2015; Low, Chen & wu , 2011), especially in developing countries (Adam & Musah, 2015). Mohlameane and Ruxwana (2013) propound that the findings of the study done on the awareness of CC in South Africa evidently shows a very low level of adoption. The lack of awareness of CC in South Africa is underscored while Wilkin et al. (2018) stress that the decision of SEs to adopt CC is positively influenced by enterprises' awareness of the technology to be adopted.

In order to successfully adopt CC and be able to leapfrog its benefits, SEs should conduct an adoption readiness assessment, and only embark on the adoption process once it is confirmed that they are sufficiently prepared for the move. Loebbecke, Thomas and Ullrich (2012) point to the requirement of clear assessment methods with regard to the appropriateness of CC adoption for IT services. It becomes highly important to assess the attributes affecting the successful adoption and optimal use of the technology (Lin & Hsieh, 2006), which determines the level of preparedness for the adoption.

The lack of readiness assessment for CC adoption is most likely to lead to the failure of the implementation process (Olumide, 2014). Xi and Mitrovic (2014) stress that a good understanding of all factors that might have an influence on the adoption and their relationships are highly important for the adoption to succeed. Though CC is seen as the enabler for SEs to access and use IT at an affordable cost (Yuvaraj, 2015), there is a belief that SEs fail to understand this technology, leading to a low and unsuccessful adoption. Capturing SEs' level of awareness and readiness for CC adoption should be the emphasis if SEs are to succeed in the adoption journey (Jonas, Ruediger, Stefan & Klaus, 2012). Nevertheless, as witnessed by the existing literature, there is a lack of studies focusing on the adoption readiness influencing factors in particular when placed in the context of SEs in developing economies such as South Africa.

Readiness is a term that has different and various meanings depending on the purpose and the contextual considerations applied (Vaidya, Sajeev & Gao, 2005).

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It may be broadly understood as a set of prerequisites for any given systematic initiative decision making (Heeks, 2010). From an SE perspective, technology adoption readiness refers to "a profound need for the availability of organisational resources needed to adopt and use the technology" (Fathian, Akhavan & Hoorali, 2008:1). Parasuraman (2000) states that technology readiness should be seen from the perspective enterprises or individuals have of a given technology. This state of mind has two types of drivers, enablers and inhibitors, and together they determine one's predisposition for the adoption and use of the technology in question.

The concept of technology adoption readiness of SEs places the emphasis on the ability of SEs to successfully adopt, use and benefit from the involved technology, in this case CC technology. The above definition fits the description of CC adoption readiness best and should be used whenever there is referred to adoption readiness in this study. The next section discusses the background of the research problem for this study.

### 1.2  Research problem background

CC received much attention by researchers over the past years (Alkhalil, Sahandi & John, 2017; Adam & Musah, 2015; Asatiani, 2015; Hashim & Hassan, 2015; Ghaffari, Delgosha & Abdolvand, 2014; Trinh, Pham & Tran, 2015; Lin & Chen, 2012; Marston et al., 2011). However, research related to adoption readiness is limited, in particular studies conducted in and on sub-Saharan African countries.

According to Lin and Chen (2012), both the commercial and academic spheres are attracted to CC as an emerging concept. The authors point out that the majority of publications focus on the potential financial gains of CC; however, they fall short of sufficient evidence on CC's realisation in practice. Adam and Musah (2015) argue that there is rapid growth of research in CC, and its potential transformational nature is high. Although researchers in the domain of Information Systems (IS) have concentrated their attention on investigating the proliferation of the CC paradigm (Hassan, Nasir & Khairudin, 2017), little emphasis has been placed on the adoption readiness from an organisational point of view in developing countries (Chang & Hsu, 2016; Johnston &  Loot, 2016; Sharma, Al-Badi, Govindaluri & Al-Kharusi, 2016; Abubakar et al., 2014; Omwansa, Waema & Omwenga, 2014; Low et al., 2011). This raises even more concerns when placed specifically in the context of sub-Saharan African countries.

Koehler, Anandasivam and Dan (2010) mention that a shift in focus is required from technology-centred issues to organisational and user-related issues; this is important for enterprises to obtain the right picture of CC adoption and take advantage of the promoted opportunities. Sub-Saharan African countries are offered accessibility to affordable computing power in a flexible way. This calls for further research to be conducted (Johnston & Loot, 2016; Hashim & Hassan, 2015). Abubakar et al. (2014) point to inconsistencies in findings regarding the potential and impact CC has on companies. CC adoption rates remain low despite all the discussions that have been taking place (Low et al., 2011). According to Hassan, Nasir and Khairudin (2017) as well as Abubakar et al. (2014), there is an unclear understanding of the implications CC might have on SEs' growth in sub-Saharan Africa.

In many countries, SEs contribute significantly to the growth of the economy (Wang et al., 2016; Marais & Pienaar, 2010; Billon, Ezcurra & Lera-lópez, 2009). South Africa is one of the few countries in sub-Saharan Africa that is leading in CC uptake and where notable advances in IT are happening (Muhammed, Zaharaddeen, Rumana & Turaki, 2016). However, although South Africa has exerted some development in research directed to CC adoption, little work has been dedicated to SEs. Despite searching though databases such as Google Scholar, Emerald, ProQuest and Scopus, no literature could be found on the CC adoption readiness of SEs, in particular in the City of Cape Town. This points a gap in the literature, and this research has attempted to fill some of the gaps found in the body of knowledge.

CC offers several strategic and operational benefits to SEs (Kauffman, Ma & Yu, 2016). The promoted benefits of this disruptive technical paradigm (Botta, Donato, Persico & Pescape, 2016) are varied and expected to significantly transform the outlook of SEs in developing countries (Adam & Musah, 2015). The need exists to identify the determinants and better understand the requirements of CC adoption factors for SEs in order to make informed decisions (Kauffman et al., 2016).

Kshetri (2011) relates to the unanswered important questions relating to CC adoption readiness in the South, namely the drivers for CC adoption, the impact of CC on business, and the role to be played by decision makers for the smooth adoption and use of CC. As highlighted by Carcary et al. (2014), SEs globally have three common characteristics: limited human resources, low level of technical skills and specialised training, and limited financial capital (Wang & He, 2014). CC technology is seen as tailored to address all the listed challenges in SEs, as the

promoted benefits of CC have the potential to alleviate the burden of many SEs (Johnston, Loot & Esterhuyse, 2016; Kshetri, 2016).

According to Abubakar et al. (2014), there are many issues relating to the adoption of CC in developing countries' enterprises. Duncan and Whittington (2015) argue that there is a lack of accepting responsibilities by CC service role players, and to resolve the issue, the authors strongly suggest the implementation of a well-negotiated Service Level Agreement (SLA) that provides a defined playing field level among cloud environment stakeholders.

Furthermore, Abubakar et al. (2014) and Durkee (2010) postulate that it is difficult to find meaningfully defined SLAs in the market. Adam and Musah (2015) state that the lack of reputable consultable resources in sub-Saharan Africa indicates a gap in the body of knowledge, and suggest that further research is done in the areas of legal and regulatory issues, ICT policy issues, institutions, and capability issues. This should be done with the aim of determining the impact of CC adoption on sub-Saharan African enterprises and enhancing the level of preparedness for CC adoption.

Scholars and practitioners agree that CC technology has numerous benefits for SEs (Fahrnberger, 2016), however, a question that continues to surface is whether there is a clear understanding of what CC entails and what the actual benefits and risks associated with CC adoption within organisations are (Johnston & Loot, 2016; Raza et al., 2015).

CC presents its offerings to SEs in developing countries as a great development in access and efficient use of IT (El-Gazzar, 2014). Previous research failed to mention the technical support that needs to be provided when enterprises prescribe to this promising technical advancement (Abdollahzadehgan et al., 2013). A point to be underlined is that there is no presence of the main and global CC providers in Africa, pointing to the difficulties to be experienced by prospective SE adopters in the area of technical support, which indirectly supports the argument that Africa has not been of much interest to big cloud players.

This presents another level of challenges for the technical support teams operating in SEs – as it is broadly known, internet connection reliability is major issue in sub-Saharan countries. The lack of adequate internet connectivity translates to the lack of readiness for CC services (Raza et al., 2015). Asatiani (2015) argues that the provider's infrastructure geo-location, regulations, and legislation of the provider's country as well as the guaranteed security and continuity of service should play an

important role in the adoption decisions. Posing at this point, the problem to be investigated in this research is defined in the section to follow.

### 1.3 Statement of the research problem

It is unclear whether SEs are capable of determining their level of readiness for the adoption of CC. CC is a potential enabler of economic development (Donou-Adonsou, Lim & Mathey, 2016), especially for SEs, known to be characterised by limited financial resources. The lack of these resources makes it difficult for SEs to invest in ICT infrastructure. Enterprises from all sectors are attracted to this emerging technology as it is believed that they will be able to benefit from its high optimistic promising offerings, even if the adoption is growing at a slow pace (Wilkin et al., 2018; Al Isma'ili, Li, Shen & He, 2016; Low et al., 2011). However, research related to adoption readiness is limited, in particular studies conducted in sub-Saharan African countries.

There is little published research on the drivers for adoption and while the drivers might be present in enterprises, the assessment of readiness for adoption should be an irrevocable requirement. As a consequence, the knowledge related to the benefits, adoption and implementation barriers of CC is limited (Johnston & Loot, 2016), bearing on its slow adoption rate in SEs (Wilkin et al., 2018; Kyriakou, Maragoudakis, Loukis & Themistocleous, 2017).

Without a clear understanding of what CC entails and the determinant factors for successful adoption by SEs, the question remains whether SEs in Africa, in particular sub-Saharan Africa, are ready for the adoption and use of CC. The importance of a clear assessment of the attributes (Alemeye & Getahum, 2015; Aziz & Yusuf, 2012; Lin, 2007), that facilitate proper adoption and use of the technology and associated services is essential from the consumer's side. More comprehensive research on the adoption readiness of CC needs to be conducted, especially in sub-Saharan African countries (Kauffman et al., 2016; Adam & Musah, 2015; Carcary et al., 2014).

### 1.4 Aim and objectives

The contextual background pertaining to the current research topic has shed a light on defining of the research problem. The aim of this study was to explore to what extent SEs in the City of Cape Town are ready for CC adoption. The research also aimed at exploring the determinant factors affecting SEs' adoption readiness of CC. The research further sought to explore the barriers faced by SEs when considering the adoption of CC.

The objectives of the research were identified as follows:

- Determine the level of CC adoption readiness of SEs
- Examine SEs' understanding of CC and its benefits to SEs
- Identify the factors influencing CC adoption readiness specific to SEs in Cape Town

The research questions and research sub-questions used to find the answers for the posed research problem are presented in the following section.

### 1.5 Research questions (RQs) and research sub-questions (RSQs)

Any research to be conducted is subject to the identified problem. One or more research questions are used to find the answer to the posed problem. This research aimed to explore the extent of CC adoption readiness in small businesses. Two research questions (RQs) and two research sub-questions (RSQs) for each main question, stated in Table 1.1, were posed to find a solution to the problem under investigation.

Table 1.1: RQ1 and RSQs

| RQ1: To what extent are SEs prepared for cloud computing technology adoption? | | |
|---|---|---|
| **RSQs** | **Objective** | **Methodology** |
| **RSQ 1.1:** What are determinant factors for cloud computing adoption readiness by SEs? | Identify the factors influencing cloud computing adoption readiness | Interview<br>Semi-structured questionnaire |
| **RSQ 1.2:** What benefits do SEs expect to gain from cloud computing technology adoption? | Examine SEs' understanding of cloud computing and its benefits<br>Determine the level of adoption readiness | Interview<br>Semi-structured questionnaire |

Table 1.2: RQ2 and RSQs

| RQ2: How do SEs determine their readiness for the adoption of cloud computing? | | |
|---|---|---|
| **RSQs** | **Objective** | **Methodology** |

| RSQ 2.1: How do SEs define adoption readiness for a given technology such as cloud computing? | Determine the level of adoption readiness<br><br>Identify the factors influencing cloud computing adoption readiness | Interview<br>Semi-structured questionnaire |
|---|---|---|
| RSQ 2.2: What kind of assessments do SEs perform to assess their readiness for technology adoption? | Examine SEs' understanding of cloud computing and its benefits<br><br>Determine the level of adoption readiness | Interview<br>Semi-structured questionnaire |

## 1.6  Contribution of research

The research sought to contribute to the body of knowledge by providing insight into SEs' level of readiness for CC adoption. The outcome of the research should assist SEs in deciding on CC adoption and determining the level of preparedness required for successful adoption and optimal use of CC. This study outcome will contribute to the body of knowledge on the readiness of SEs for CC adoption. The outcome of the study is to provide insight to business practitioners in making informed decisions regarding the adoption of CC.

## 1.7  Research methodology

In research, a method consists of a set of specific processes to be applied. These systematic procedures used to conduct the research to solve specific problems or understand given phenomenon make up the research methodology.

This research was designed as a qualitative, interpretative, explorative study using a multiple case study strategy. A purposive non-probability sampling method was applied in the selection process of enterprises to participate in this research. A sample size of 14 enterprises provided 14 participants in the research, where each of the participating enterprises was represented by one individual. Data were collected using semi-structured interviews, conducted on the 14 small enterprises operating in Cape Town and surroundings. The enterprises that participated in the research were purposively and non-randomly selected. The collected data were analysed using the content analysis technique.

The nature of the study required few specific theories to underpin the study. The prominent underpinning theories that have been applied in this research were: The Diffusion of innovation (DOI) theory of Rogers, the Technology, Organisation

and Environment (TOE) framework Technology acceptance model (TAM) and the Technology Readiness Index (TRI).

### 1.8 Ethical consideration

The current study complied with the CPUT research ethic policy. The compliance certificate had to be issued by the University ethic committee, before the researcher was allowed to start the research. The participants had to accept to participate in the research by signing the consent letter; and each participant was assured the confidentiality and the right to withdraw from the research if needed to do so. Data and all the information shared by the participants had to be kept confidential and protected all the time.

### 1.9 Thesis layout

The layout of the thesis is presented as follows:

**Chapter One:** An introduction of the study and background to the research problem is presented. The statement of the research problem as well as the aim and objectives of the research is discussed. Finally, a figure depicting the chapter layout is presented.

**Chapter Two:** A review of the literature pertaining to the study is provided. Concept definitions, advantages and disadvantages, evolution, and ecosystems as applied to CC are discussed. The chapter ends with a summary of the literature review.

**Chapter Three:** This chapter covers the design and methodology applied to the research. The chapter starts with a discussion of the underpinning theories for the research, followed by a brief layout of the philosophical stances informing the study. The methodology, data collection and analysis of data topics are covered. The chapter ends with a discussion of research ethics considerations as applied to the study.

**Chapter Four:** The research results and findings are presented in detail.

**Chapter Five:** In this chapter, the findings of the study are discusses and a mapping of these findings with the existing literature is done.

**Chapter Six:** A conclusion of the research is presented, accompanied by a set of recommendations and suggestions for further studies.

In the next chapter, a review of the existing literature on the adoption readiness of cloud computing is presented.

## 1.10  Chapter Summary

SEs do not have a clear understanding of what CC entails and what the determinant factors are for successful CC adoption. The aim of this study was to explore to what extent SEs in the City of Cape Town are ready for CC adoption. The research also aimed at exploring the determinant factors affecting SEs' adoption readiness of CC. The readiness assessment determines the level of preparedness and informs the adopters of what type of CC should be most viable for (and profitable to) the SEs.

As methodology, the study has adopted a qualitative inductive multiple case study approach, keeping in mind that a research methodology is a systematic search for answers specific problems or understanding a given phenomenon. Put simply, a methodology is a path followed for the research process, from the start of the research to the end. A qualitative, inductive research method was deemed suitable for the study.

Informed by the well-known theories in Information Systems (IS) research, including the Technical Organisation and Environment Theory (TOE) of Tornatzky and Fleischer (1990), and Diffusion of Innovation (DOI) developed by Rogers (1983), this research study sought to contribute to exploring CC adoption readiness of SEs as well as the main factors influencing small organisations to adopt CC.

# CHAPTER TWO: LITERATURE REVIEW

## 2.1 Introduction

It is unclear whether SEs are capable of determining their CC adoption readiness level. CC is a potential enabler of economic development. This research has been conducted with the aim (section 1.4) of exploring to what extent SEs in the City of Cape Town are ready for CC adoption. The research also aimed to explore the determinant factors affecting SEs' adoption readiness of CC. The research further sought to explore the barriers faced by SEs when considering the adoption of CC.

In the previous chapter the research problem, aim and objective of the research as well as the main research questions were presented. Chapter Two provides an overview of the definitions, explanations, and clarifications of terms associated with CC and its adoption. In addition, a brief overview of SEs in South Africa is provided. An explanatory review of CC adoption as well as its benefits and challenges in SEs is presented. CC characteristics, deployment and service models are discussed. Finally, gaps found in the existing literature are presented in a summarised format. The gaps refer to the limited or partial understanding and knowledge of a given concept and/or theory (Senyo et al., 2018). Keywords were identified from the research problem, research questions, aims, and objectives.

There are different ways to conduct a review of the literature, as indicated by King and He (2006), namely: i) narrative, ii) descriptive, iii) vote counting, and v) meta-analysis approaches. Kuziemsky and Lau (2008) suggest approaching the literature review in one of the following ways or a combination of more than one: i) narrative, ii) descriptive, iii) scoping, iv) aggregative, v) realistic, and vi) critical reviews. The descriptive review strategy was adopted for this review, seeking to determine to what extent a typical body of knowledge has the ability to reveal a clear pattern or trend pertaining to an existing phenomenon (Kuziemski & Lau, 2008). The choice of a descriptive review was motivated by the nature of the study, where the study attempted to explore to what extent SEs are ready for the adoption of CC and revealing the level of understanding SEs have of CC. The search of electronic databases has become predominantly apparent for literature reviews in IS research (Hwang & Thorn, 1999; Petter & McLean, 2009). The literature search was conducted using keywords derived from the title, problem statement, research questions and aim of the study, querying well-known scholarly online library databases including Google Scholar, Emerald, ProQuest, Scopus, and other available published internet resources. Figure 2.1 represents the layout of Chapter Two.

### 2.2  Concepts and definitions of terms

The dynamics of the labour cost and innovation escalations continue to drive the increase in using the self-service technology-based delivery model as preferred method of delivering computing services (Lin, 2007). This drive resulted in introducing the consumption of services without direct personal involvement or support. This mode of computing service delivery has been portrayed mainly as a customer enabling the interface to computing technology (Amron, Ibrahim & Chuprat, 2017). As put forth by Jadeja and Modi (2012), CC is a new technological trend that takes computing and data away from the user's computer, into data centres, while providing the user with high-end computing service capabilities.

Before embarking on adoption readiness and its assessment in SEs, it is important to briefly explore the definitions of CC technology and identify what the CC technology concept entails. The concepts and definitions discussed in this section are: i) cloud readiness, ii) CC deployment models, and iii) service models and characteristics. A brief discussion of the CC ecosystem is also presented.

### 2.2.1  Definition and understanding of cloud computing as emerging technology

CC is based on the concepts of distributed and grid computing, virtualisation and service-oriented architectures (Gong, Liu, Zhang, Chen & Gong, 2010). Virtualisation is a technology that creates and maintains the viability of CC and is viewed as the enabler of this disruptive technology (Wang et al., 2016).

Technological advancement has brought the advent of all facets of life to rely on technology (Gumbi & Mnkandla, 2015; Selwyn, 2003; Parasuraman, 2000). In the era of digital disruption, ICT has been attributed to enabling organisations to survive while striving for competitiveness (Afolayan, 2014; Oliveira & Martins, 2011). CC emerged as a technological development that claims to cause radical change in the way ICT is adopted, deployed, used, maintained and financed (Alkhalil et al., 2017; Al Mourad & Hussain, 2014; Yigitbasioglu, Mackenzie & Low, 2013). In the same light, Oguntala et al. (2017) opine that CC technology contributes to the growth of economies in developing states, particularly in Africa.

As a result of the change in service delivery models, business enterprise operations are to be transformed by this technological advancement (Chang, Walters & Wills, 2013). In the CC environment, users are more flexible when using computing resources and storage, augmented by the elasticity of computing. The

knowledge of the underlying infrastructure and the management thereof is not needed by cloud users (Li, Zhang, Chen & Xiang, 2018).

However, while much has been written and research has been conducted on this computing paradigm, there is still no clear and common understanding of what CC is (Senyo et al., 2018; Müller, Holm & Søndergaard, 2015; Yuvaraj, 2015; Lin & Chen, 2012; Loebbecke et al., 2012; Marston et al., 2011; Weinhardt, Anandasivam, Blau & Stößer, 2009). This leads to more confusion and misunderstanding CC, its benefits, and its developmental enabling capabilities (Adam & Musah, 2015). As underlined by Armbrust, Fox, Griffith, Joseph, Katz, Konwinski, Lee et al. (2010), there have been many blogs written on CC and the topic featured in numerous workshops, conferences and magazines. Nevertheless, the confusion of understanding what CC is all about, still remains.

As observed by Gong et al. (2010), more than 20 definitions of CC exist and there is a belief that the focus is primarily on certain aspects of this concept. However, all of those attempting to define CC agree that CC provides access to computing resources as a service via a shared network (commonly known as the Internet) (Wilkin et al., 2018). Some even refer to CC as the fifth utility, after the existing four public utilities (water, electricity, gas and telephone), as consumed on a pay-as-you-use basis (Priyadarshinee, Raut, Jha & Gardas, 2017; El-Gazzar, 2014).

Armbrust et al. (2010:1) support the view of CC as a fifth utility, stating that "CC is both the applications delivered as services over the Internet and the hardware and system software in the data centres that provide those services". Computing based on CC services is described as not being dependent on any location, and with this model of computing resources are shared on demand (Priyadarshinee et al., 2017; Loebbecke et al., 2012). Sultan (2011) points out that even though there is no commonly accepted definition of this concept and countless definitions have been provided, the description given to CC by the US National Institute of Standards and Technology (NIST) (Mell & Grance, 2011:1), namely "clusters of distributed computers providing on-demand resources and services over a networked medium", seems to be the closest description of what CC is promoted to be (Wilkin et al., 2018). NIST defines CC as a "computing model that enables ubiquitous convenient and on-demand network access that allows easy provision and de-provision" (Mell & Grance, 2011:7). Sabi et al. (2016) support this argument, opining that the definition of CC provided by NIST is unified and standardised. The authors note that in terms of telecommunications, CC is described as "any part of

the network that cannot be predicted, which transmits data from one end to another.

Buyya, Yeo, Venugopal, Broberg and Brandic (2009:3) define CC as "a type of parallel distributed systems that enables sharing". Kim, Kim, Lee and Lee (2009:2) view CC as "a data centre remotely accessed and made of virtual environments". The definition of CC in the IT Encyclopedia *Whatis.com* is, "all the IT hosted services accessed over the Internet and services are consumed as a utility" (Subashini & Kavitha, 2011:1).

Knowledge related to the benefits, adoption and implementation barriers of CC is very limited in the literature (Johnston & Loot, 2016). The same applies to the knowledge of the organisational factors' criteria for successful adoption, as stated by Chatzoglou and Chatzoudes (2016).

Nazir (2012) and Rahul et al. (2012) state that even though there is no concise definition of CC, there are central and basic principles that can be attributed to this paradigm. CC is "the provision of computing capabilities, taken off the premises and delivered as a pay as you use service model over the internet" (Maqueira-Marín, Bruque-Cámara, & Minguela-Rata, 2017:3). According to Yigitbasioglu (2015) and Rahul et al. (2012), the concept behind CC is that Web applications and services are accessed via the World Wide Web (www) protocol.

The complexity of CC in the backend justifies the challenge of this concept being accurately defined in its entirety (Yigitbasioglu et al., 2013). According to the definition of CC as proposed by the International Telecommunications Union (2012, 2014:8) and ISO (2013:xii), and endorsed by the United Nations Conference on Trade and Development (UNCTAD), CC enables access to the scalable and elastic pool of shareable resources (physical and virtual) on demand, to self-service provisioning, and to the administration model. The NIST definition of CC seems to incorporate all the elements of this technological innovation in general, and was chosen as the working definition for the purpose of this study.

CC is categorised on the basis of either its deployment model or its service offering model. Nevertheless, it is apparent that the understanding, characteristics, attributes and definitions associated with CC will continue to evolve for some time. Some definitions assigned to CC by different authors are presented in Table 2.1.

**Table 2.1: Table of summarised definitions of cloud computing**

| Author | Definition |
|---|---|
| Mell and Grance (2009:1) | "A model for enabling ubiquitous, convenient, on-demand network access to a shared pool of configurable computing resources that can be rapidly provisioned and released with minimal management effort or service provider interaction." |
| Jadeja and Modi (2012:2) | "CC is a new technological trend that takes computing and data away from the user's computer, into data centres, while providing the user with high-end computing services capabilities." |
| Armbrust et al. (2010:1) | "CC is both the applications delivered as services over the Internet and the hardware and system software in the data centres that provide those services." |
| Mell and Grance (2011:7) | "Computing model that enables ubiquitous convenient and on-demand network access that allows easy provision and de-provision." |
| Buyya et al. (2009:3) | "Type of parallel distributed systems that enables sharing." |
| Kim et al. (2009:2) | "CC is a data centre remotely accessed and made of virtual environments." |
| Subashini and Kavitha (2011:1) | "All the IT hosted services accessed over the Internet and services are consumed as a utility." |
| Maqueira-Marín et al. (2017:3) | "CC is the provision of computing capabilities, taken off the premises and delivered as a pay as you use service model over the Internet." |
| Rahul et al. (2012:2) | "CC is a concept where applications and files are hosted on a cloud consisting of thousands of computers and servers, all linked together and accessible via internet". |

The main characteristics, deployment and service models of CC as outlined in the NIST definition are viewed as a threefold model of providing computing services to the end users (Ali, Khan & Vasilakos, 2015). These three components are discussed in the next section.

### 2.2.2 Cloud computing main characteristics

Figure 2.1 portrays the five main characteristics of CC, discussed in the section to follow.
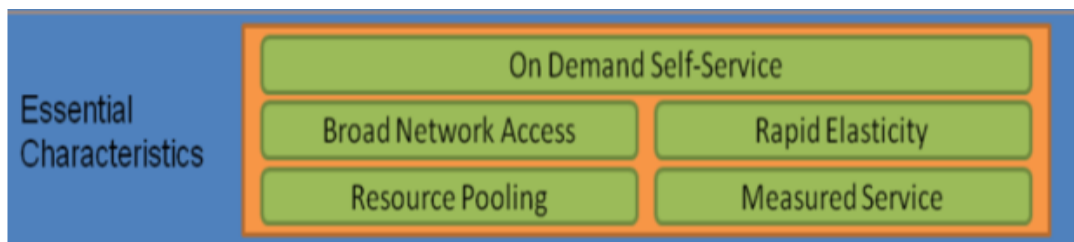


**Figure 2.1: Main characteristics of cloud computing**
**(Source: Mell & Grance, 2011:6)**

Various people describe CC in different ways, depending on the angle from which they are focusing their thinking and work. Be it the service delivery model or the deployment model, the offerings of CC are to be realised via internet access, where shared resources are dynamically accessed with a high abstraction of hardware. Gong et al. (2010) paint the picture of CC as cloudy, because the varied definitions each focus only on certain aspects, resulting in confusion of what CC really is. However, it is arguable that while the definition plays an important role in understanding CC, it is as important to get a clear picture of the main characteristics on how they relate to each other (Gong et al., 2010).

Multiple characteristics are associated with this paradigm. This multiplicity is due to CC's relationship with other domains in computing, the specific features brought in by CC, and the intentions of providers as well as the way in which the offerings are promoted (Schubert & Jeffery, 2012). Gong et al. (2010) allude to the big giants in the domain of cloud service offerings as being in a war-like situation among themselves. The main giants include Google, Microsoft, Amazon, IBM, Apple, Oracle and HP, to name a few.

The key points in identifying the characteristics of the CC ecosystem are summarised as follows: agility, low financial cost, device and location flexibility (independence), multi-tenancy, high reliability and scalability, security, and sustainability (Priyadarshinee et al., 2017). Five common traits distinguish CC from other known computing technologies today (El-Gazzar, 2014), and they form the main characteristics of this paradigm. This assertion is supported by Senyo et al. (2018) and Shahzad (2014) who present the main characteristics of CC as:

    i) **On-demand self-service:** The computing service provisioning and de-provisioning are done by consumers as needed. There is no need for human interaction of cloud service providers, as customers/consumers through the use of web services can manage the computing services as the need arises. There is no requirement of sophisticated technical skills in order to effectively provision and de-provision needed services.

    ii) **Broad network access:** All the computing capabilities and resources are available via a shared network, accessible via standard communication mechanisms (Shahzad, 2014). The ubiquitous nature of CC services (Fernandes, Soares, Gomes, Freire & Inácio, 2014) makes them accessible by all types of devices such as mobile phones, tablets, desktop computers and laptops, from anywhere.

    iii) **Resource pooling:** Computing services are delivered using a multi-tenant model where several resources have been pooled together to provide

services to a multiplicity of consumers. With the multi-tenancy model, the location independence allows consumers access to and use of computing resources without having control or knowledge of the physical location.

iv) **Rapid elasticity:** There is full flexibility to rapidly scale in and out the resource provisioning as needed. Customers have the ability to provision and de-provision computing resources any time and deem to fit their needs.

v) **Measured services:** it is easy to automatically control the use of resources – reports can be transparently generated for both provider and end user; no intervention of the provider is required. CC can be also characterised based on different aspects, as Gong et al. (2010) put it forward.

According to Gong et al. (2010), CC characteristics can also be classified based on different categories, namely:

i) **Conceptual – Service-oriented:** All the offerings of CC are delivered as a service, and abstraction and accessibility is key to the design of CC services. The oriented approach of CC is irrespective of the service model of CC adoption (Chang et al., 2013). Abstraction is achieved through virtualisation technology. As defined by Chang et al. (2013), the Reference Model for Cloud is seen as an architectural tower where the physical hardware resources are virtualised. The end user does not have to understand the backend technicality; however, it is arguably important to have a good understanding of the front line of the technology in order to fully benefit from its offerings.

ii) **Technical – Loose coupling and strong fault tolerance:** The decoupling of the system refers to the high availability offered by CC, as the failure of a system component results in the automatic moving of all services to another node without interrupting the service. This high availability provides a fault tolerant system, all of this through virtualisation.

iii) **Economic – Business model:** CC is mainly promoted as a technology to alleviate the financial burden of the subscribers.

iv) **User experience – Ease of using the system:** Being internet-based services, CC is user-friendly as the Internet interface is globally accepted. Furthermore, as long as the user has internet connectivity, the services are available from anywhere, any time, and there are no other technical requirements to access cloud services.

Supporting the classification of Gong et al. (2010), Schubert and Jeffery (2012) opine that the main characteristics of CC include utility computing, the elasticity of computing, service availability and reliability, and the ease of service access and

use. As reported by the University of California, Berkeley, the main characteristics of CC include elastic computing resources, no upfront investment for IT infrastructure, and the pay-as-you-use model (Avram, 2014). The consumption of cloud services does not require the user to have knowledge of the infrastructure, while Gong et al. (2010) denote that for an application to be suitable for CC there should be a need for flexibility, exponential growth or scalability, and the requirement of being independently and economically run. Table 2.2 provides a summary of the characteristics CC.

**Table 2.2: Characteristics of cloud computing**

| Main characteristics of cloud computing | Cloud computing characteristics based on contextual categorisations |
|---|---|
| On-demand self-services | Conceptual – Service-oriented |
| Broad network access | Technical – Loose coupling and strong fault tolerance |
| Resource pooling | Economic – Business model |
| Rapid elasticity | User experience – Ease of use of the system |
| Measured services | Conceptual – Service-oriented |
| – | Technical – Loose coupling and strong fault tolerance |
| – | Economic – Business model |

### 2.2.3  Cloud computing evolution

The main characteristics of CC are defined by the existing well-known computing technologies such as grid computing, computer virtualisation, virtual networking, service computing, and many others (Lin & Chen, 2012; Buyya et al., 2009). Wang, Laszewski, Younge and He (2010) claim that CC has evolved in a similar way as computing processing, where, in the 60s, multiple users were served by a time-sharing computing server. The sharing was dictated by the limited computing resources available to end users, not allowing them to access and use complex ICT infrastructures. CC is a concept that metaphorically represents the Internet (El-Gazzar, 2014), or simply stated, internet-based computing (Padhy, Patra & Satapathy, 2012).

Cloud technology is based on old distributed computing technologies such as grid computing and virtualisation, which, according to Wang et al. (2010), are the enabling technologies of CC. The differentiating factor between CC and the old technologies is found in the main characteristics of CC as presented in the previous section, namely: on-demand self-services, resource pooling, rapid elasticity, broad network access, and measured services. These characteristics make CC distinct from its genesis technologies (Senyo et al., 2018). The merits of

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grid computing as a service distribution by means of resources that are administratively and geographically distant and virtualisation being a masking of physical computing resource characteristics aiming to hide their complexities, have been combined and enhanced into the advent of CC.

This paradigm evolved gradually from the 1950s era of large-scale mainframe computing where dumb terminals were used to access central computers. These dumb terminals were only playing the role of interfacing the mainframe computer/ server. Figure 2.3 depicts the evolution of the various models that lead to the advent of the genesis of CC.

The 1970s brought forth the concept of virtualisation, taking one step up the shared access mainframe ladder of the 1950s. With the Virtual machine (VM), the execution of one or more independent operating systems simultaneously was made possible within the same physical infrastructure. The VM concept evolved into network connectivity virtualisation in the 1990s, which enabled more than one point-to-point data connection using the same physical infrastructure. Briefly, CC has evolved from grid computing (where large computing problems were resolved using parallel computing), to utility computing (computing resource offerings in the form of metered services), to CC as it is known today, where IT resources are dynamically delivered as a service to customers, and accessed from anywhere, any time, and as needed.

The parallel computing and virtualisation technologies and recently Web 2.0 are all the latest evolvements of CC. Figure 2.2 depicts the milestones of the evolution of CC technology. The inception of CC happened during the 1960s with utility and grid computing. During the 1999/2000 to 2006 period, the Internet became the best way to use computer applications as a service. CC as buzzword emerged around 2007; with its emergence, the terms *SaaS*, *IaaS* and *PaaS* became familiar and the topic of CC started becoming a subject of discussion by academics and in practice.
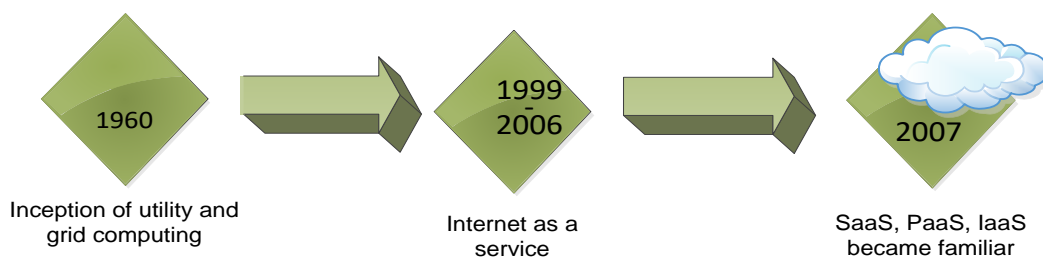


**Figure 2.2: Milestones in CC evolution**
**(Source: Compiled by researcher)**

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CC draws on existing and well-known other computing technologies. It encapsulates the integration and combination of all the technologies it emanates from, and the way these technologies are approached in a cloud environment (Weinhardt, Anandasivam, Blau, Borissov, Meinl, Michalk & Stößer, 2009).

### 2.2.4 Cloud computing service models

CC technology services (Figure 2.3) are offered as three distinct delivery models (Hinde & Van Belle, 2012).



**Figure 2.3: Initial main service models of cloud computing**
**(Source: Mell & Grance, 2011:6)**

The Reference Model for CC, developed by Chen, Wills, Gilbert and Bacigalupo (2010), is in agreement with the concept of Buyya, Yeo, Venugopal, Broberg and Brandic (2009), who divided CC into three fundamental models, built on the hardware that has been abstracted. These delivery models are: Software as a Service (SaaS), Platform as a Service (PaaS), and Infrastructure as a Service (IaaS) (Senyo et al., 2018). However, with the evolution of CC these three original service models have been expanded, as some researchers suggested the expansion of the initial cloud service models to better satisfy the requirements of clients (Kauffman et al., 2016).

According to Kauffman et al. (2016), the suggested new models that emerged include: Data Analytics as a Service (DAaaS) (Johnston & Loot, 2016), Business Process as a Service (BPaaS) (Columbus, 2012), Communication as a Service (CaaS), Data Storage as a Service (DSaaS) and Cloud Management as Service (CMaaS). The initial CC service models are presented in Figure 2.4. According to Lin and Chen (2012), these types serve different purposes and their customer targets are different; however, they share the same service delivery mechanism, which is the renting out of computing resources that must be accessed via the internet. With this model of accessing computing resources, SEs are enabled to access and use decent computing infrastructure. Arguably, whatever is applicable to the initial three service models applies to their extended models as well above. The main service models that initially formed CC technology are discussed in the section to follow.

### 2.2.4.1    Software as a Service (SaaS)

A unique, internationally accepted definition of SaaS does not exist. Many academics and practitioner researchers accentuate the technology definition (Xin & Levina, 2008), while others focus on the access and business aspect of the SaaS definition (ISACA, 2009). The NIST (Bohn, 2016) definition of CC is broadly accepted (Yang & Tate, 2012). The three different service models stand out, with Software as a Service (SaaS) being one of these. In this delivery model of computing resources consumed as a utility, systems software functionalities are delivered on demand as a service and in a pay-as-you-use fashion.

Hassan and Nasir (2017) assert that SaaS allows organisations to purchase computing resources from cloud providers as virtualised resources and as a result, a significant leverage of technology is achieved. Google apps, Salesforce.com, Oracle Siebel CRM, and Microsoft Office 365 are some of the examples of SaaS (Low et al., 2011). With this offering model as propounded by Wang et al. (2010), software or an application is hosted by a third-party provider as a service and the customer consumes the service over the Internet, with no installation and/or maintenance of the application and the computing infrastructure on the consumer's side. The elimination of the need for installation on the customer's local computers alleviates the customer's burden, resulting in the reduction of expenses associated with ICT use in the organisation (Amron et al., 2017; Wang et al., 2010). El-Gazzar (2014) opines that this model of computing service delivery provides the consumer with the capability of using the service provider's applications, running on cloud infrastructure. Software installation and related maintenance thereafter is left in the hands of the service provider who holds central control over all the computing processes (Armbrust et al., 2010).

Software updates and patching happens regularly, and this happens without the customer/consumer noticing. SaaS provides users with complete computing access by means of the Internet (Leavitt, 2009). The ultimate expectation of consumers regarding SaaS is the significant reduction, if not elimination, of the burden of software maintenance as well as the financial implications associated with the use of computing resources (Wang et al., 2010). Nevertheless, it is important to note that given the relative newness of this technical paradigm, there could be a change in some attributes of its definition over time due to the modifications, utilisation and contextual access of the underlying technologies. SaaS being an instance of the enterprise application, specifically designed for supporting different customers, it is important to understand its nature of support,

which is to dynamically adapt to changing situations. The Platform as a Service model is to be discussed next.

### 2.2.4.2    Platform as a Service (PaaS)

Platform as a Service (PaaS) is another type of cloud service model, and Google app Engine, Microsoft Azure, AWS, and Salesforce.com are some of the examples of PaaS. With PaaS, the computing infrastructure is provided and maintained by the cloud provider as well as the computing platforms, and the consumers develop/ install and maintain the applications that run on top. While PaaS consumers have the ownership and maintenance of the applications deployed in the cloud infrastructure, the network infrastructure that these applications run on are managed and maintained by the cloud service provider (Mell & Grance, 2011). This way, the cloud subscriber/consumer has enough time to focus on development and business productivity while most of the system's administration is taken up by the service provider.

The specialty of PaaS lies in the ability of the end customers to build and manage their own applications as they deem fit for their business needs, independently of the hardware and software infrastructure (Park, Lee, Park, Eun & Kim, 2016). The main difference between the SaaS and PaaS service models is that SaaS allows the customers to enjoy full access and use of the provider's applications and only pay a fee for what is consumed, while in PaaS, the customers have the flexibility to develop, deploy, run and maintain applications with full control and responsibility. With PaaS, while consumers can develop and deploy their own applications, the underlying computing infrastructure remains under the full control of the provider (Muhammed et al., 2016). The third cloud service model, Infrastructure as a Service (IaaS), is discussed in the next section.

### 2.2.4.3    Infrastructure as a Service (IaaS)

Infrastructure as a Service (IaaS) model of delivering CC architecture is an abstraction of the infrastructure, thereby enabling the management of virtualised resources, their self-provisioning, and their controllability. It fundamentally provides access to servers, storage and network computing infrastructure where consumers only pay for what is being used (Muhammed et al., 2016). As clearly identified in the NIST definition of CC, with IaaS, hardware and bandwidth infrastructure is delivered to the subscribed customers as services. This model gives the consumer the capability to install and maintain the computer platform and the applications running off the top of these platforms, leaving the cloud provider with the responsibility of underlying infrastructures such as storage, processing resources,

and the network infrastructure kit. There is no need for IaaS consumers to control the infrastructure, however, the operating systems, storage and deployed application systems are managed and maintained by the consumer (Mell & Grance, 2011). Examples of IaaS are Amazon Web Services (AWS' EC2 or Elastic CC) and S3 (Simple Storage Service), IBM Blue Cloud, Sun Network, and Microsoft Azure, among others.

Yang and Tate (2012) stress that with IaaS, the processing, storage and other multiple forms of low network level and/or hardware resources are virtualised to provide raw materials for CC. With regard to IaaS, there have been some suggestions by researchers to divide IaaS into Hardware as a Service (Haas) and Data as a Service (DaaS) (Yang & Tate, 2012). However, while a further subdivision of IaaS might have a valid justification it is more appealing that the term IaaS embodies the whole concept. The brief discussion of cloud service delivery models leads to the next section, which focuses on different forms of deploying CC services.

### 2.2.5 Deployment models of cloud computing

CC deployment models are referred to as specific ways in which cloud services can be implemented and provided to consumers. There are four different ways CC technology can be deployed, and prospective adopters must decide on the suitable deployment model based on their needs and the nature of the enterprise and business, among other managerial considerations. The four CC deployment models are: i) public, ii) private, iii) hybrid, and iv) community clouds (ISACA, 2009; Motahari-Nezhad, Stephenson & Singhal, 2009). As found in the UNCTAD report of 2013, the deployment models as depicted in Figure 2.4 are described in the section to follow.
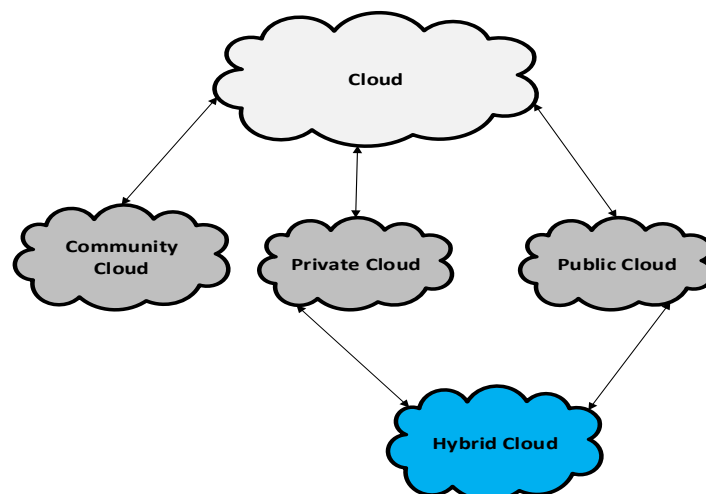


**Figure 2.4: Simplified overview of cloud deployment models**
**(Adapted from NIST definition, 2009:2)**

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### 2.2.5.1    Public cloud deployment

Public clouds are open network resources available for public use, either individuals or organisations (Azarnik et al., 2012). Computing resources are shared and open to all for access and use via the Internet, on a subscription basis. In a public cloud, computing resources are available to the public on a pay-per-use basis. There are numerous examples, including email systems, Webmail, Hotmail, Gmail, online storage, and social media, among others. The CISCI Global Cloud index refers to the public cloud as cloud assets fully residing on the service provider's side.

### 2.2.5.2    Private cloud deployment

Private clouds are, on the contrary, not open to the public and are deployed in a single organisation, internally hosted and managed by the hosting enterprise (Azarnik et al., 2012). These private cloud environments can, in turn, provide services to other organisations upon agreement. A private cloud is nothing other than an on-premise cloud – the key is the physical location of the physical infrastructure, and the control over it (Kim et al., 2009). With the private cloud, the organisation has full administrative control over the infrastructure on the premises of the organisation. The idea behind private cloud computing is to enable different units or departments in the organisation to centrally access IT infrastructure or computing resources from any location, any time via the Internet, while the control of the environment remains exclusively in the hands of the organisation.

The private deployment of CC is for the exclusive use of one organisation, and the full ownership of infrastructure and maintenance thereof reside in the hands of the enterprise, with full control. Having the cloud assets in the demarcation of the organisation qualifies it as private. In a nutshell, the exclusive use of the cloud is for one single customer (Park et al., 2016). eBay is one example of a private cloud.

The third deployment model is the combined features of private and public models to form a hybrid cloud. The hybrid cloud deployment will be briefly looked at in the next section.

### 2.2.5.3    Hybrid cloud deployment

Hybrid cloud is defined as a mixture of two or more deployment models into a single model (Twum-Darko & Sibanyoni, 2014). In this model, some IT resources are accessed and managed from within the organisation while others are external to the organisation (Kuo, 2011). The advantages and disadvantages of public, private and community clouds are combined to provide an ideal solution for

organisations still battling with issues related to data control and financial cost associated with computing resource access and use (Senyo et al., 2018).

### 2.2.5.4 Community cloud deployment

A community cloud is not dedicated to a single organisation, but makes network resources available to a range of clients or users/organisations in a well-defined community or societal organisation. It is used by groups of people/organisations with common interests/concerns and requirements. The management and ownership of the system are confined to the community being served (Kuo, 2011). This provisioning is done for a specific community, which will have the exclusive use of the deployed cloud solution. All the intended users of the solution must have the same needs and concerns, and share the same social or business values.

Figure 2.5 shows that CC is composed of five essential characteristics, three fundamental service models, and four deployment models as they interrelate to each other.
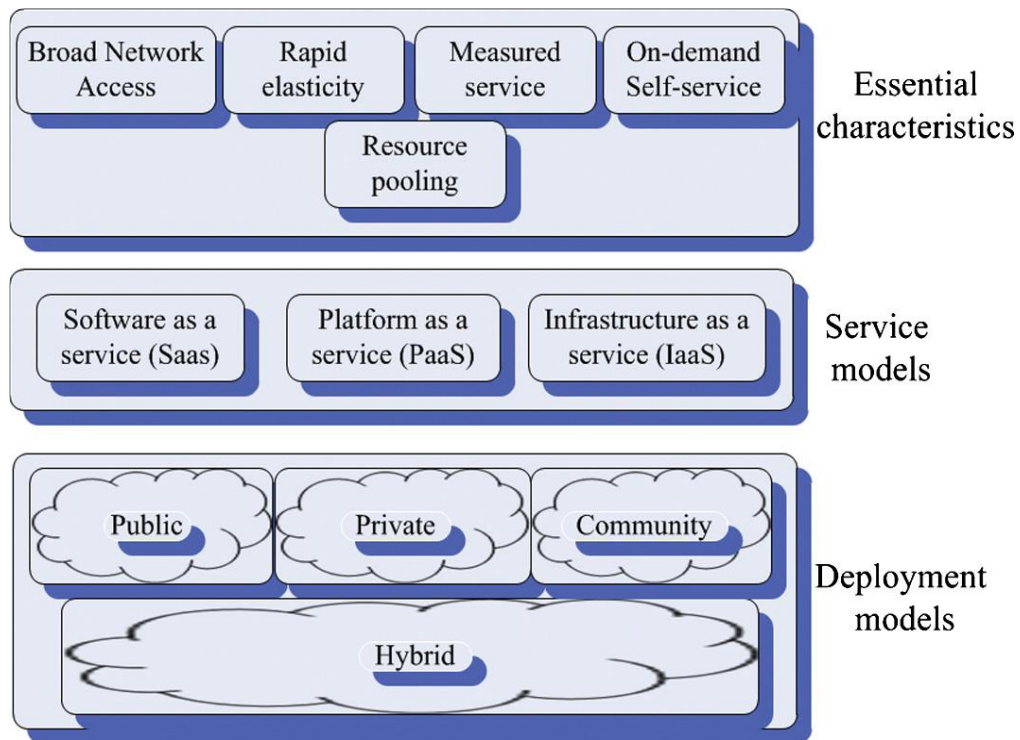


**Figure 2.5: Cloud computing characteristics and service models**
**(Source: Hogan, Liu, Sokol & Tong, 2011:14-15)**

Figure 2.6 portrays the different CC service models and the customer versus provider responsibilities in terms of system management and maintenance. The areas highlighted in blue represent the customer's responsibility, while the grey area is the provider's responsibility.

| Traditional IT | Infrastructure (as a Service) | Platform (as a Service) | Software (as a Service) |
|---|---|---|---|
| Applications | Applications | Applications | Applications |
| Data | Data | Data | Data |
| Runtime | Runtime | Runtime | Runtime |
| Middleware | Middleware | Middleware | Middleware |
| Operating System | Operating System | Operating System | Operating System |
| Virtualization | Virtualization | Virtualization | Virtualization |
| Servers | Servers | Servers | Servers |
| Storage | Storage | Storage | Storage |
| Networking | Networking | Networking | Networking |

**Figure 2.6: Layers and abstraction of cloud computing services, customer perspective (level of responsibilities)**

### 2.2.6 CC Ecosystem

CC emerged as a new computing paradigm, but it makes a call to the existing technologies such as grid computing and computer virtualisation, among others, in order to deliver the services being promoted (Senyo et al., 2018; Martens, Poeppelbuss & Teuteberg, 2011). The cloud ecosystem provides a description of the interdependence of needed environmental factors that enable CC adoption and its successful implementation (Surendro & Fardani, 2012). The CC ecosystem is understood as the interconnected key role players in implementing and using the technology, be it technological or market-related, where a value linkage can be observed.

These interdependent technologies and services allow the defining of CC service consumption without being constrained by any model, while the span can reach the entire IT capability spectrum. The collection of capabilities from different platforms and organisations together with services spanning across cloud models and environments form an ecosystem. In this ecosystem, one level of abstraction feeds a step further in service and computing abstraction. The astute understanding of cloud ecosystem by SEs allows them to successfully adopt and profitably optimise the use of CC technology.

CC is an ecosystem where every ICT function has its cloud equivalent, ranging from servers to applications, storage, and telecommunication, among others. The concept of an ecosystem implies the existence of co-operation and sound relationships between stakeholders in the system. There should be differences

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between the stakeholders, and eco-systematic environments are constantly evolving, which means stakeholders are in a constant relationship adaptation (Hedman & Xiao, 2016). The CC environment is of such a nature, and stakeholders need to be aware of the nature of the systems they operate. It is the combination of technologies and platforms, innovations, the rise of value and needs of customers, as well as services and activities from different actors that interact mutually to form the cloud ecosystem (Abbate, Cesaroni, Cicini & Villari, 2018). According to IBM (Kochut, Deng, Head, Munson, Sailer, Shaikh, Tang et al., and 2011:3), a good grasp of the cloud ecosystem is of extreme importance in the process of CC adoption, leading to the following:

  i)    Clarifying the appropriate cloud deployment mode.
  ii)   Assessing the organisation's readiness for the cloud.
  iii)  Evaluating the organisational capabilities to deploy and manage cloud-enabled solutions.
  iv)   Giving a clear line of governance strategy and the expected outcomes from the adoption.
  v)    Providing a plan and direction for adoption.
  vi)   Indicating the required information and application architecture for the success of the project.

Figure 2.7 is an example of how different components/elements can work together interactively to constitute a cloud environment.
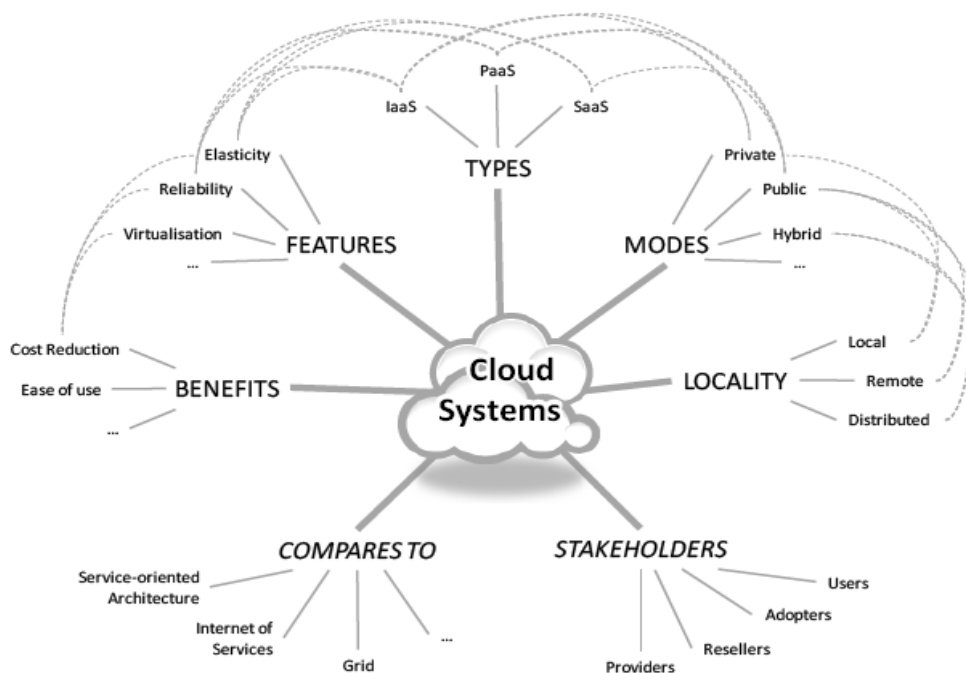


**Figure 2.7: The cloud computing ecosystem**
**(Source: Omwansa et al., 2014:23)**

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## 2.3 SE structure and role played in the economy

SEs are defined in different ways based on geographical locations (country) as well as the context and nature of organisations (section 1.1). Some are defined based on the number of employees, turnover per capita and asset value (Riemenschneider, Harrison & Mykytyn, 2003). Similar to CC, there is no single definition universally accepted for SEs; however, all definitions provided for this term by different role players overlap. It is arguable that the size of one enterprise varies depending on the industry they find themselves in (Abor & Quartey, 2010). Vukeya (2017) suggests that due to the confusion created by different definitions of SEs, this should be reviewed in South Africa to allow any enterprise to meet one of the criteria (i.e. number of employees, annual turnover, asset value) to qualify being an SE. For the purpose of this research, the definition provided by the South African National Small Business Act of 2003 (South Africa, 2003) has been adopted as the working definition. The South African National Small Business Act of 2003 defines SMME on the basis of the number of full-time employees in combination with the turnover and value of the capital asset per sector.

It is strongly accepted that SEs bring a significant contribution to national economies all across the globe (Lopez-Fernandez, Serrano-Bedia & Gomez-Lopez, 2015). SEs play a significantly potent role in advancing the socio-economic lives of the communities, on a local and national scale (Wolcott, Kamal & Qureshi, 2008; Taylor & Murphy, 2004). Wilkin et al. (2018) and Jere, Jere and Aspeling (2015) confirm the important role SEs perform in the economy in Europe, the United Kingdom and China, where above average percentages of job creation and economic development is attributed to a large proportion of small and medium enterprises. The same has been confirmed by many publications and government planning documents in South Africa – SEs have an important role to play in the country's economic growth (Oyelana & Adu, 2015).

### 2.3.1 SEs in context of the South African environment

South Africa entered the era of democratic rule in 1994, and since then the development of SMMEs has received a high priority. The advocacy of support for SEs aims to boost the creation of jobs and reduce the high unemployment level in the country, hence growing the economy. The National Small Business Act of 1996 (South Africa, 1996) insists that the process for SMMEs to access information and funding should be improved and access to physical infrastructure made much easier.

The driving engine behind the push and promotion of the national government to support SMMEs is that SMMEs are considered significant contributors to economic growth and job creation. In the light of this, the South African Government Gazette, published by the Department of Communications and Postal Services, on 29 March 2017 stated that SEs form the backbone of the country's economy. This can be justified by the number of initiatives launched by the government to promote and support SMME growth and sustainability.

Many countries such as South Africa, working together with international agencies such as the World Bank, started promoting SEs as a significant key factor for economic development and seeking the answer to alleviate the poverty problem at large. The South African government views SEs as the driver for economic growth and development (Government Gazette of 29 March 2017). According to the National Small Business Amendment Act of 2003 and 2004, in terms of the number of full-time employees, a small enterprise is classified as having more than 5 employees, at a maximum of approximately 50 employees.

In South Africa, SEs are dominated by informal businesses, but most of the time the formal and informal sectors of entrepreneurship overlap. The South African Nation Planning Commission of 2012 predicted in the National Development Plan (NDP) that by 2030, about 90% of jobs created in the country will be generated by SEs (Jere et al., 2015). This points to the role that SEs play and/or are expected to play in the economy of the country.

## 2.4 Perceived benefits and barriers of cloud computing adoption and use by small enterprises

There is a strong belief from a growing pool of literature that technology and entrepreneurship have a tight link with economic development (Wilkin et al., 2018; Ross & Leeser, 2014; Hussain, Sultan & Ilyas, 2011). Academic and practitioner publications concur that the competencies provided by ICT play an immeasurably important role in the success of enterprises (Ross & Blumenstein, 2013). The authors further mention the potential impact of CC technology on opening up the global market for business. Small enterprises are suggested to have the potential to highly profit from this new paradigm (Abubakar et al., 2016; Jung & Rahman, 2011), and this is derived from the potential of reducing some of the traditional disadvantages faced by small enterprises (Etro, 2009).

In the quest to transform businesses, due to the potential of increased productivity in SEs, CC has been promoted to be the right technology (Hassan & Nasir, 2017).

While the benefits driving the adoption of CC can be viewed using three different dimensions – financial, deployment and functional (Chang & Hsu, 2016) – the financial aspect seems to carry a heavier weight in terms of SEs deciding on technology adoption (Qureshi & Kamal, 2011). CC is deemed to provide an enhancement in the ability of SEs to grow their business, allowing them to exploit more business opportunities and access a broader market in terms of competitiveness (Oviatt & McDougall, 2005). Access to ICT is more likely to result in improved performance by SEs (Mbuyisa & Leonard, 2015), and CC technology provides access to SEs in an affordable manner. Enterprises are not required to capitally invest in ICT infrastructure and deal with the issues of licensing and cost associated with the maintenance – simply put, the cost of systems ownership (Ross & Leeser, 2014). This makes CC even more attractive to SEs. Misra and Mondal (2011) suggest that CC is suitable for enterprises that are prone to varying ICT needs because of the instability of workload, which may increase or decrease from time to time.

While ICT is required for any business to run today, CC allows SEs to shift their focus from ICT on a day-to-day basis to concentrate their effort on the core business processes of the organisation (Ross & Blumenstein, 2013). Nevertheless, the perceived benefits, together with the concerns of the business combined with the capability of ICT to drive the business operations, are seen as the main determinant factors for CC adoption (Maqueira-Marín & Bruque-Cámara, 2016; Hsu, Ray & Li-Hsieh, 2014).

Enterprises are required to adapt to innovative ways of doing business in order to compete in the ever-changing market environment. Without ICT, enterprises cannot participate competitively in the market. Hence, CC can effectively stimulate the enterprise's growth and sustainability without being constrained by financial limitations (Mbuyisa & Leonard, 2015; Qiang, Clarke & Harewood, 2006; Qureshi, 2005; Raymond, Bergeron & Blili, 2005).

### 2.4.1 Advantages of cloud computing

As put forward by Avram (2014), many SEs do not adopt/deploy cutting-edge technology services due to the high upfront cost associated with computing services. Wilkin et al. (2018) opine that the relative advantage is the level at which the technology adopters perceive the benefits of the innovations, and how these benefits are superior to other technologies. CC promises to drastically reduce this upfront computing cost while allowing organisations to access all the functionalities of existing/available ICT services.

According to Hassan, Nasir and Khairudin (2017), the relative advantages of CC adoption make reference to the benefits expected to be offered by CC technology. Although the benefits to be drawn from CC adoption by different enterprises are not the same, for SEs they exhibit more pronouncement in some respects, based on the distinguishing nature of their organisational structure and businesses (Haselmann, Vossen & Dillon, 2015). There is no objection when it comes to SEs needing cost-cutting mechanisms on ICT provisioning and operations, and a pay-as-you use model becomes the solution for SEs. This later model allows SEs access to software and other ICT infrastructure at an affordable cost. In the analysis done by Murugesan (2011) on how CC can be the enabler for small businesses, the findings indicate that CC can allow enterprises access and use of ICT resources they might otherwise not have been privy to in traditional computing environments.

Some of the key advantages of CC as highlighted by Priyadarshinee et al. (2017) are summarised as follows:

i) Drastic low cost of entry for SEs fighting for access to intensive business analytics. SEs cannot afford the use of required intensive computing power, and CC promises to make provision for accessing such dynamic resources.

ii) Providing quick access to computing hardware/infrastructure resources without upfront capital requirement, which is a relief for SEs in terms of investment (using the OPEX instead of CAPEX model). Only the services consumed are paid for by enterprises.

iii) ICT barriers to innovation are significantly reduced.

iv) Device dependence to access ICT services is minimised.

v) Access to data and computing services has become independent of computing infrastructure location.

vi) CC allows enterprises easy and quick services due to the capabilities of services being pooled by the provider and only provisioned as the need arises.

vii) Flexible access to high-end computing services not usually accessible due to high costs, without the requirement of investing in infrastructure and expert technical skills.

### 2.4.2 Cloud computing adoption barriers to SEs

Although CC holds numerous appealing benefits for SEs, there are equally significant barriers hindering CC adoption. CC raises some serious issues of technical, economic, ethical, legal and managerial nature (El-Gazzar, 2014). The literature available on CC adoption alludes to technical barriers, while

organisational issues relating to CC adoption have not received sufficient attention (Yang & Tate, 2012). Furthermore, no in-depth studies have been conducted on the adoption process (El-Gazzar, 2014).

Enterprises cannot only focus on the marketed benefits of this new technology, but also need to carefully consider the benefits against risks that accompany the adoption. Most enterprises have concerns regarding the co-localisation of their valuable data, placing it someone else's hands (Wang & Liu, 2015) without having direct control. These are issues of security and confidentiality that need to be addressed for CC to reach its promised incredible potential.

The World Economic Forum (WEF, 2012) reports on numerous surveys confirming that data security and data privacy are ranked as the top concerns expressed by potential cloud service adopters. Bhattacherjee and Hikmet (2008) allude to the loss of control over the enterprise's data once moved to the cloud, which is another prominent adoption inhibiting factor. The lack of standards or insufficient understanding of standards leads to confusion when enterprises reach the stage of making an appropriate selection. This constitutes another barrier of cloud adoption (Lyn, Liang, Gourinovitch & Morrison, 2018; Repschlaeger, Zarnekow, Wind & Klaus, 2012). The confusion can be linked directly to the non-existence of adoption requirements and readiness assessment criteria as postulated by Repschlaeger et al. (2012).

Computing power is being transformed rapidly into a commodity, and its pervasiveness within enterprises as well as its increasing complexity have rendered the cost of ownership by organisations more unaffordable (Avram, 2014). This carries a significant weight for SEs, which by inheritance do not have sufficient financial means to invest in technology. Avram (2014) underlines a number of barriers that seem to be the inhibiting factors of CC adoption for SEs. These barriers include security and privacy, poor connectivity and open access, data reliability and interoperability, systems integration, and political and regulations concerns, among others.

Microsoft Corporation advances the reasons for business reluctance to adopt the cloud as existing infrastructure investment in enterprises as well as the complexity and heterogeneity of system landscapes. The reliability of providers, business politics, and varying security, legal and regulatory compliance requirements faced by enterprises are also among the inhibiting factors. In support of the above, Mbuyisa and Leonard (2015) propound that in general, the adoption of ICT by SEs

is hindered by the associated cost and insufficient funding, lack of skills and awareness, security, and application integration concerns. To underline, due to the marketed values to gain from CC adoption, some SEs might have the intent to adopt, however, this intent does not necessarily translate into actual adoption (Armbrust et al., 2010). Some of the main inhibiting drivers of CC adoption in SEs are as follows:

i) Security and privacy refer to how information and data residing in the cloud will be protected, and what level of regulatory violation an enterprise can be pushed into by using CC.

ii) Connectivity, open access and reliability point to the high-speed access required for 24/7 availability, and systems and services support should be guaranteed to CC adopters.

iii) Interoperability (private and public clouds as well as on-premise environments need to allow smooth integration for easily portable data/ information between them). Enterprises still doubt the interplay between different platforms, environments and traditional applications as they access and use data in the cloud.

iv) Economic value factors are associated with understeering the value of using the cloud compared to traditional ICT infrastructure use.

v) Changes to the IT organisation, organisational culture and ways of doing things are always resisted by organisations.

vi) Issue related to politics due to geographical boundaries – the question of where the data physically reside, are processed, and are accessed from is still playing in the minds of many enterprises. This grey area raises concerns about complying with privacy and regulatory policies, because of the multiple cross-border policies CC is subjected to.

In summary, the issues are still unresolved and will not be disappear overnight.

From an infrastructure requirement viewpoint, the lack or poor internet access constitutes a big hindrance to CC adoption and use in developing countries. The CC adoption issue is aggravated by the lack of defined regulatory measures by governments and agencies (Raza et al., 2015). In terms of compliance, rising concerns of security threats, privacy, confidentiality and some aspects of monopolisation of the industry cannot be addressed. It can be argued that not being aware of laws in the country that protects data privacy (Raza et al., 2015) or at least guidance on how to go about once a data breach has infiltrated the cloud, builds a solid wall that prevents CC adoption by vulnerable enterprises.

Prospective CC adopters are still concerned about the physical location of data, the processing location, and the actual data access point, as well as moving organisational digital assets to the cloud environment. According to Kyriakou et al. (2017), existing relevant literature reveals that the main benefits of CC are based on the opportunities it provides in terms of reduced financial costs associated with computing infrastructure and fewer investment risks. Nevertheless, the challenge faced by enterprises adopting CC is the limitation in systems customisation. Also, enterprises can be blinded by the financial affordability of computing power, but then find themselves in a long-term 'sticker shock' situation. The additional charges associated with exceeding storage limit is most of the time overlooked when adopters sign up (Deyoja, 2008), and the poor designed SLAs do not provide any clarifications of this nature.

The other issue organisations are confronted with is problems related to systems and data integration – few integration options are offered beforehand (Lassila & Pöyry, 2006) – associated with the lack of standardisation, which is aggravated by enterprises not having sufficient skills/knowledge to mitigate risks. Perceived security concerns (Chandramouli & Mell, 2010) and upgrade incompatibilities constitute some of the adoption hindrances of CC adoption to SEs. Next, the adoption readiness factors are discussed.

## 2.5  Cloud computing adoption readiness

This section explores the extent of SEs' desire to adopt cloud technology and how to meet the basic requirements for successful adoption and use. Alemeye and Getahum (2015) argue that the assessment of readiness for any new technology to be adopted is always challenging, hence proper strategic planning is required. Little research has been done on CC readiness in South Africa and no literature could be found on CC readiness by SEs in Cape Town.

 Xi and Mitrovic (2014) conducted a study on cloud readiness assessment in South Africa, but the focus was on the provincial government and not SEs. Although the environmental factors in government agencies are different from SEs, there are in many aspects some commonalities and shared challenges. Considering that the adoption requirements cannot be emulated from one environment to another, Xi and Mitrovic found that the level of CC adoption readiness is low. Twum-Darko and Sibanyoni (2014), in a study conducted on the readiness of SEs for technology innovation in South Africa, posed the question how CC can benefit SEs in meeting their business objectives. A technology adoption readiness framework has been proposed with the emphasis on four components: i) attitude, ii) ICT infrastructure,

iii) hardware, and iv) software. The authors argue that the degree of readiness should be determined through enactment instead of appropriation. However, they only analysed data collected from a small number (6) of SEs in the Gauteng and Mpumalanga provinces.

The Cambridge Advanced English Dictionary (2016) defines readiness as the state's preparedness for something. Readiness is based on the thoroughness of planning, adequacy, training of personnel, supply, and reserve of support services or systems. Carcary et al. (2014) opine that technology adoption readiness refers to the behavioural aspects of the organisation towards a given technology and its impacting expectation. Carcary et al. further state that cloud readiness is concerned with identifying the services deemed to be suitable for CC based on the readiness assessment criteria in the context of organisations in general. According to Repschlaeger et al. (2012), the identification of factors having a direct influence on the organisational behavioural intent to adopt CC is a prerequisite for adoption. The same call was made by Son, Lee, Lee and Chang (2011) in their framework for CC adoption and conceptualisation of factors that affect the adoption and development of measurements. Abubakar et al. (2014) propel that SEs, specifically the decision makers, should sharpen their awareness of this technology. Enhanced awareness can be achieved through strengthening the understanding of what CC is and what benefits firms can gain by adopting CC in their enterprises.

The failure to plan for the move to the cloud/or adopt a new technology can result in adoption failure of the said technology or at least ineffective implementation of the technology (Godoe & Johansen, 2012). The key determinant factors for readiness of CC adoption are of both technical and non-technical nature (Oguntala et al., 2017). Parasuraman (2000) notes that unless a proper assessment for adoption readiness and the appropriateness of the adoption has been conducted, the expectation of technology adoption and use by a customer cannot be behaviourally positive.

Adoption readiness assessment is critical to determine the capability level of the organisation to adopt CC. This holds very true when viewed in the context of sub-Saharan countries such as South Africa, where ICT infrastructure affordability challenges still weigh heavily on SMMEs. A proper readiness assessment enables an accurate prediction of the perceptions and behavioural aspects of the enterprise regarding CC technology adoption and use (Parasuraman, 2000).

CC readiness is no different from e-readiness, as both concepts relate to the access and use of ICT resources. Mutula and van Brakel (2007) as well as Maugis, Choucri, Madrick, Siegel, Gillett, Haghseta, Zhu et al. (2005) attempted to define e-readiness and propounded that regardless of the organisational context, e-readiness should be understood as a measurement attribute used to determine whether a given entity meets the necessary requirements for successful adoption and use of a given technological innovation.

By conducting an e-readiness assessment, clear and critical questions related to the organisational capabilities to move data to the new environment can be posed. It can be clarified whether or not there is any other plan if grey areas have been identified. The CC adoption readiness level for an enterprise informs whether the move to the cloud and use of cloud infrastructure by the candidate enterprise is worth doing. With assessment, the risks associated with the migration can be properly mitigated.

Even though CC adoption has been painted by recent IS researchers as the main driving factor for cost saving, economic competitiveness and business sustainability for SMMEs (El-Gazzar et al., 2016; Akar, 2014), little work has been done to examine the extent of adoption readiness of SMMEs. The readiness for CC adoption necessitates an assessment to be conducted, as the latter helps to discover the extent of the enterprise's preparedness for adoption. The type of cloud solution that can be adopted and the likelihood of the associated financial cost can easily be identified.

Son and Lee (2011) suggest four dimensional constructs of Technology Readiness, which determine the acceptance of the chosen technology by the adopters. Those dimensions are: i) optimism, ii) innovativeness, iii) discomfort, and iv) insecurity. Significant work can be found in the literature focusing on the perceived motives for cloud adoption, quantitative predictions of the adoption, and how the adoption should take place (Amron et al., 2017; Yigitbasioglu, 2015; Akar, 2014). Unfortunately, there is not much discussion on the adoption requirements from the enterprise's point of view and the evaluation of the successful adoption criteria (Jonas et al., 2012).

The gap becomes much wider when this is applied to the SMMEs in developing countries of sub-Saharan Africa. The research has failed to pay attention to examining the readiness aspect of CC adoption by SMMEs. Jonas et al. (2012) point out the high relevance of the technological requirements, strategy and

enterprise's objectives in the CC adoption process. But, although there is rich literature on the business aspects of CC, the adoption requirements and the extent of adoption readiness in SMMEs have not been given much attention by researchers.

It is critical for the enterprise to evaluate the behavioural intention aspect for successful CC adoption, although the intention does not necessarily translate into adoption (Wilkin et al., 2018). The evaluation requires the conceptualisation of adoption factors and development of measurements (Son et al., 2011). The latter should be translated into the adoption readiness assessment requirement.

CC readiness cannot be determined without a precise understanding of the cloud service offerings under consideration (Loebbecke et al., 2012). Although the study focused on the CC readiness for organisations in general, its findings are relevant for SEs. The service offerings must be assessed against readiness criteria. These criteria can span from security aspects (archiving, privacy and integrity), to the degree of integration, cost-benefit analysis, risk transparency and other related areas such as data storage, data access, control of data, scalability, and flexibility. It is important to assess readiness in the context of each type of cloud delivery and deployment model, as each scenario comes with specific requirements and challenges. In general, SEs do not have the capability to properly evaluate CC adoption options (Haselmann et al., 2015). Haselmann et al. further state that due to the constraining resources faced by many SEs, there is no understanding of a detailed benefit analysis of CC as opposed to on-premises benefits.

### 2.5.1  Cloud computing readiness index

Godoe and Johansen (2012) expound that technology readiness focuses on the propensity of people to accept and use technology in order to achieve their goals. This propensity is the combination of human beliefs in the dimensions of the optimistic view, innovativeness view, as well as discomfort and insecurity views. Parasuraman (2000) argues that technology readiness has to do with people's ability to embrace and use technology for the effective accomplishment of their goals and objectives.

In the light of SEs' adoption readiness of CC, Kim et al. (2009) suggest a number of considerations to contemplate on during the assessment in order to determine the extent of the enterprise's adoption readiness. These are to be looked at from different groupings based on the areas of focus: i) internet connectivity, ii) connectivity quality/reliability, iii) awareness of the need of ICT for business,

iv) performance requirements; v) risks associated with data centre, vi) data security and privacy, vii) mobility need/requirements, and viii) data governance and compliance. The readiness for CC adoption needs a number of requirements to be met and this holds true irrespective of the service model or type of cloud solution (Repschlaeger et al., 2012). In Figure 2.8, various dimensional requirements for CC adoption readiness are displayed as suggested by Repschlaeger et al. (2012:7).
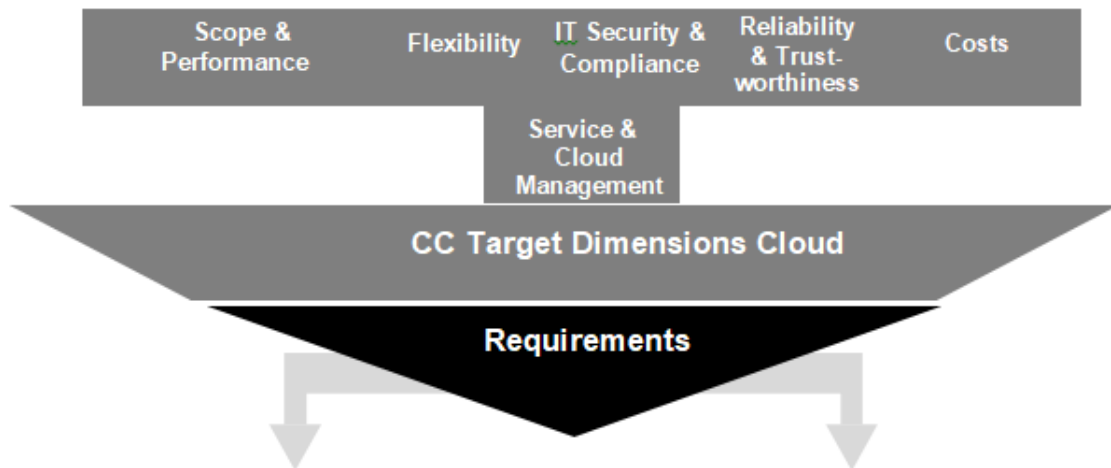


**Figure 2.8: Cloud Requirement Framework**
**(Source: Repschlaeger et al., 2012:7)**

To assess adoption readiness, a number of focused dimensional requirements need to be targeted. The enterprises should have acceptable broad coverage of understanding in those areas. In measuring the propensity of embracing and using a new technology such as CC, there have been suggestions of important constructs that should be the key points for the assessment of the enterprise's preparedness, namely: i) optimism, ii) innovativeness, iii) discomfort, and iv) insecurity. Some of these dimensions are inhibitors and others enablers (Amron et al., 2017:5). It is important to understand that the perceived usefulness of a newly adopted technology is the resultant function of the optimism and the satisfactory innovativeness as observed from the outcomes of a well-conducted readiness assessment.

Repschlaeger et al. (2012:10) suggest six areas of focus when determining the level of adoption readiness:

i)   Scope and performance should be the first targeted dimension, which refers to CC in general and how it functions. If the enterprise has not

sufficient general awareness of what CC is and its functionality, it could negatively impact on the envisaged adoption process and use.

ii) Flexibility is another dimension to consider when assessing readiness. Flexibility focuses on the enterprise's ability to quickly respond and adapt to changes, but equally indicates how easily resources can be allocated, de-allocated and reallocated without affecting business operations. Data availability and mobility need must be considered when doing a pre-adoption assessment for an enterprise.

iii) Security and compliance is a dimensional aspect concerning data protection and privacy, all legal implications pertaining to the move, and access and use of cloud resources. The enterprise's level of understanding will determine the level of adoption readiness.

iv) To successfully adopt and optimally use CC, the enterprise's adoption planning must include a level of reliability and trustworthiness in terms of the new technology and the service provider(s). The reliability and trust assessment must be done in advance, and it should be high enough to confidently move to the cloud.

v) Cost implications and operational modalities must be clearly understood, otherwise expectations might not be met and will only be realised after the move has been done. This is important as the payment and pricing models are the determinants of the choice of CC to adopt as well as the provider selection.

vi) The service management model details the service level agreement (SLA) between the customer enterprise and the service provider. The enterprise should have a relative understanding of what a SLA is and what should be included in the SLA for proper and concise negotiation. To add to Repschlaeger et al. (2012), Shojaiemehr, Rahmani and Qader (2018) state that the specification of a clear SLA negotiation strategy is necessary.

### 2.6 Factors influencing cloud computing adoption by SEs

Influencing factors for adopting CC by SEs are dualistically classified as i) enabling and ii) inhibiting factors (Figure 2.9). Enabling factors have the potential motivation to push enterprises toward adopting and using the technology. On the other hand, inhibiting factors may drive the enterprises away from considering the adoption of CC technology (Chang & Hsu, 2016). On both sides, influencing factors can be technical, organisational or environmental in nature as described in TOE framework of Tornatzky and Fleischer (1990).
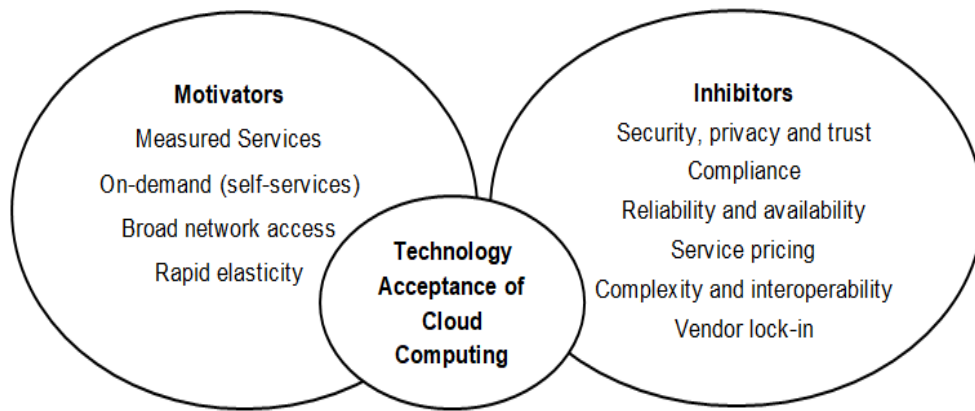
**Figure 2.9: Dual dimension of influencing factors of cloud computing adoption (Adapted from Amron et al., 2017:6)**

Technological innovations have a critical role to play in enterprises striving for growth and improving their business processes and operations (Lin & Hsieh, 2006). Haselmann et al. (2015) describe CC as a silver bullet for IT-related challenges encountered by SMMEs. A number of factors exert dependence to any IT adoption, including CC adoption (Fink, 1998). As argued by Adam and Musah (2015), the limited availability of resources places SEs in a challenging position with regard to adopting new technologies. However, CC adoption provides SEs with opportunities in terms of flexibility, scalability and access to technology without placing too much strain on their slim financial budgets (Adam & Musah, 2015; Sultan, 2011; Buyya et al., 2009).

A thorough understanding of factors that encourage enterprises to opt for technology adoption as well as factors that make them turn their back on adoption are necessary for successful CC adoption and use (Maqueira-Marín & Bruque-Cámara, 2016). However, scanning the literature has led the researcher to realise that there is limited knowledge available on technology adoption readiness and the factors associated with adoption readiness by SEs in developing countries. South Africa claims to be on the forefront of technology adoption among the sub-Saharan countries (Oguntala et al., 2017). Garg, Versteeg and Buyya (2013) emphasise the challenge of the high upfront capital cost investment faced by SEs when procuring ICT infrastructure and developing skills related to IT systems administration and maintenance. Researchers continue to stress that investment in infrastructure development has always been a challenge for SEs. However, the assumption is that some of the challenges might be alleviated by the adoption of emerging technologies such as CC (Dahiru, Bass & Alison, 2014).

Heeks (2010) suggests that the irreplaceable contribution of ICT on business growth and sustainability of SEs cannot be contested. This is supported by the United Nations Development Programme report of 2001, where it is stated that technology is seen as an ultimate enabler for SE performance as well as other aspects of economic activities in developing countries. Factors influencing the slowness of CC adoption are related to bandwidth availability, control of data, security, privacy, unpredictable performance, uptime, the challenge of local presence of providers, as well as unawareness and misunderstanding of regulatory compliance-related issues (Raza et al., 2015).

CC concerns are emphasised by professionals with decision making power who still seem to fear that their jobs will be threatened by introducing CC adoption. However, a closer look at these concerns seems to be the result of a lack of awareness and understanding of what CC really is. True understanding will instead be a motivation factor for new job opportunities. In developing countries, internet access has not been of good quality, and reliable internet access is a prerequisite for successful CC adoption and use (Juster, 2008). The hope is that internet access will continue to improve, as initiatives seem to be echoed in national and regional policy-making bodies. However, regulatory compliance remains an underexplored domain and it has a significant impact on the adoption and optimal use of CC (Raza et al., 2015).

Factors likely to hold enterprises back from CC adoption include performance bottlenecks, high probability of a single point of failure, data lock-ins, confidentiality, security and trust in CC and providers, unclear switching costs, systems integration issues, lack of awareness and understanding, laws and regulations not clearly defined, and a poor understanding of the adoption motivating factors.

### 2.7 Gaps existing in the body of knowledge on cloud computing adoption

Despite multiple studies conducted on CC adoption, there is a lack of studies conducted on factors influencing the adoption at enterprise level (Hassan, Herry & Nasir, 2017). Considerable research conducted on CC shows that there has been little focus on CC adoption by SEs in underdeveloped sub-Saharan countries, specifically on issues related to adoption readiness (Senyo, Effah & Addae, 2016; Yeboah-Boateng & Essandoh, 2014). A thorough understanding of CC adoption and its implications on the business of SEs is still unclear in sub-Saharan Africa (Dahiru et al., 2014).

By scanning the existing literature for high ranking journals that published papers on CC adoption readiness by SMMEs, in particularly sub-Saharan Africa with the focus on Cape Town, South Africa, the returned results were close to null. This suggests the need for research to be conducted on the topic, which provides the opportunity of further research on CC adoption by SEs.

In the final section before the summary, the underlying research theories supporting this study are discussed.

### 2.8  Underlying research theories

This section provides a background of the relevant research theories underpinning this study. While many theories have been used in IS research over the past decades, few of these have predominantly shown relevance to the organisational aspects of technology adoption, acceptance and use in enterprises. Prominent theories in IS research underpinning this study are: i) the Diffusion of Innovation theory (DOI) developed by Rogers (1983), ii) the Technology, Organisation and Environment theory (framework) (TOE) of Tornatzky and Fleischer (1990), the Technology Acceptance Model (TAM) developed by Davis (1989), and the Technology Readiness Index (TRI).

According to Murray (2009) as well as Wainwright and Waring (2007), DOI is one of the most widely accepted theories in explaining IT discipline adoption theories, focusing on the diffusion of technological innovations. As per Rogers (2003), an innovation is to be understood as a set of ideas and practices perceived to be new to an individual and the process of diffusing these new ideas and practices through well-defined channels over time results in embracing and putting these in practice by the society in question. The diffusion of innovation (DOI) theory as described by Rogers is likely to be appropriate for the investigation of technological adoption readiness (Sahin, 2006), including CC, as new ideas are to be diffused and embraced for successful adoption. According to Wilkin et al. (2018), two main influential factors stand out in DOI theories, namely innovation and organisational characteristics.

From another perspective, the TOE framework of Tornatzky and Fleischer (1990) has been viewed by a number of IS researchers as the best model for studying technology adoption. Its popularity was based on the main theoretical focus. The study conducted by Kuan and Chau (2001) on the perceived benefits of Electronic Data Interchange (EDI) adoption demonstrated the support of TOE as a good utility for investigating technology adoption. TOE provides a description of

influential components playing on the minds of enterprises during the decision process of new technology adoption (Lippert & Govindarajulu, 2006). Furthermore, Xu, Zhu and Gibbs (2004) note that the emergence of the TOE model as a research theory widely used in IT adoption studies makes it advantageous over other adoption theoretical models. While TOE is concerned with technological, organisational and environmental factors, SEs are strongly subjected to the influence of these factors in their operations. Consequently, new innovative ideas need to be diffused in organisations as a result of this influence.

The TOE framework of Tornatzky and Fleischer (1990) classifies the technology adoption factors into three contexts: technological, environmental and organisational. The technological factors refer to the infrastructural and technology-related ability of the organisation, albeit internally or externally related. The organisational factors defined in the TOE framework refer to aspects of organisational resources, characteristics and culture. The environmental context refers to influences outside the enterprise, where there is no direct control of the organisation (Tornatzky & Fleischer, 1990). These three elements of TOE influence the process of accepting and adopting any given technology in the organisation (Lippert & Govindarajulu, 2006).

Another appealing theory in IS research studies is the Technology Acceptance Model (TAM), developed by Davis (1989). Godoe and Johansen (2012), note that TAM and the Technology Readiness Index (TRI) of Parasuraman (2000) are outstanding theories in IS research. Chuttur (2009) posits that in order to properly study technology acceptance by users, an understanding of TAM is required. It can be argued that there cannot be an adoption of any technology without it being well-accepted by prospective adopters. Gangwar, Date and Ramaswamy (2015) opine that in order to understand the adoption and use of IT, the Technology Acceptance Model has a wide application. TAM has been widely used in most of the research studies aiming to examine and explain IS as well as technology acceptance and use by individuals. Perceived usefulness, ease of use and people's attitude towards the use of the system (Davis, 1986) are the factors considered to be the main drivers of TAM, which are rigid in terms of any decision on the adoption and use of new innovations. These factors are subject to the influence of external variables, which may be of a socio-environmental or politico-cultural nature, among others (Surendran, 2012). In this instance, it can be argued that conceptually different theories cannot be separated, i.e. TAM cannot be separated from TOE.

TRI as underpinning theory of new technology adoption is viewed in terms of the number of personality dimensions, perceived to have a potential direct effect on individuals' acceptance of the technologies to be adopted (Senyo et al., 2018). Godoe and Johansen (2012) posit that these dimensions can be summarised as optimism, innovativeness, discomfort, and insecurity.

According to the TOE framework, specific factors have a direct impact on technological innovation. These are technological factors, organisational factors and environmental factors (Kyriakou et al., 2017). TOE is supplemented by the DOI theory, which is closely associated with the technological factors of TOE in order to diffuse new technological thinking. In the process of diffusing new technology innovations, user acceptance becomes a key factor, thereby linking to TAM. Acceptance in turn leads to and shapes readiness, referring to the TRI model.

Drawing on existing scholarly evidence as found in the literature, TOE, DOI and TAM, with reference to the TRI framework, seem to best fit the theoretical base for the exploration of CC adoption readiness by SEs, and are considered the theories underpinning this current research.

In summary, the various definitions pertaining to CC have been presented in this chapter. The different service deployment models as well as the main characteristics of CC were discussed. The concept of CC has been explained in relation to small enterprises, as adoption readiness of SEs is the focus of this study. SEs were briefly discussed in order to lay the foundation of the study. The factors influencing CC adoption by SEs, the readiness index, and the gaps found in the body of knowledge were elaborated on.

### 2.9   Chapter Summary

In this chapter, the concepts of cloud computing and its adoption readiness have been presented. Different types and scenarios of implementing cloud computing, as well as the factors that influence determine the readiness of enterprises to adopt have been explored. Problem and misconception of adoption candidates; problems faced and advantages of adopting CC were discussed. Importantly, the assessment and understanding of the level of readiness by enterprises have been explored and comparatively analysed the different work studies that have been con ducted on the topic before. The clarification of terms and the broad understanding of the existing research outcomes took the lead to the following chapter in which discusses the research methodology and the design of the current research study.

The research methodology and design pertaining to this study are presented in Chapter Three.

# CHAPTER THREE:  RESEARCH METHODOLOGY AND DESIGN

### 3.1  Introduction

Any research is based on underlying philosophical and theoretical assumptions, hence the researcher's understanding of the assumptions underpinning any given research is very important to successfully conduct a scientific study (Aldawod & Day, 2017). In the order to design a research study, there must be principles informing the researcher during the design process. This set of informative principles and the way they are assembled are referred to as the research methodology (Redman-MacLaren & Mills, 2015). These philosophical assumptions form the fundamental basis of the research process (Myers, 1997). In this chapter, the common philosophical assumptions, research theories, and the strategy underpinning the research are presented.

### 3.2  Research aim

In a nutshell, the aim of the study was to explore to what extent SEs in the City of Cape Town are prepared for CC technology adoption and the factors affecting this adoption readiness. The research further sought to explore the barriers faced by SEs when considering the adoption of CC. To achieve the objectives of the study (section 1.4), a number of SMMEs operating in Cape Town and surroundings were selected, face-to-face interviews were conducted with participants from the selected enterprises, and the collected data were analysed to derive findings.

### 3.3  Theories underpinning this research

This research sought to use existing well-known theories to underpin the current study. These theories are the Technology, Organisation and Environment (TOE) theory, Diffusion of Innovation (DOI) theory, Technology Acceptance Model (TAM), and the Technology Readiness Index (TRI) framework. The theories were discussed in Chapter Two (section 2.8).

### 3.4  Research philosophy

Ontology and epistemology are the two main philosophical paradigms that provide guidance when undertaking research. Ontologically and epistemologically, any researcher seeks to make reference to the world's view of the phenomenon under investigation. With these two constructs, the research approach/strategy and the actual methodology best fitting the nature of the problem to be addressed by the research study are determined (Scotland, 2012).

The understanding of research theories (sections 2.8 and 3.3) by the researcher is essential to successfully conduct a scientific study, as this understanding enables the positioning of the research in the real world, thereby explaining the reality of the world (Aldawod & Day, 2017). The description of interconnected beliefs and assumptions relating to how knowledge gets developed is what research philosophy is all about (Saunders, Lewis & Thornhill, 2016). With ontology and epistemology, the researcher makes reference to the world's view of the phenomenon under investigation. In this study, the phenomenon investigated was the extent of SEs' adoption readiness of CC.

According to Gephart (1999), there are three classifications of philosophical stances in research, namely positivism, interpretivism and critical postmodernism. As Cooper and Schindler (2008) explain, the positivist philosophical stance is used by researchers to objectively present their views of the world, without any subjectivity involved. Taking this position, researchers do not allow their beliefs to influence the study outcome in any way.

Contrary to positivism, the interpretivist philosophical stance builds the justification for the problem being the subject of the research, based on the researcher's beliefs (Easterby-Smith, Thorpe & Jackson, 2012). By analysing and evaluating the data from the sample taken from the population in question, the researcher arrives at an understanding of the views, which can be extended to the larger population beyond the sample size (Kasi, 2009). The researcher's analysis focuses on the real facts on the ground as they pertain to the posed research problem.

This study was designed to be approached qualitatively with an interpretive multiple case study strategy (sections 3.5 and 3.6). Linking this with interpretivism, Saunders and Tosey (2013) indicate that the interpretivist philosophical stance is concerned with research conducted on people, not objects, with the aim of obtaining an in-depth understanding of the social world people find themselves in, and the probable meaning they assign to it.

Ontology, epistemology and postmodernism as research philosophies are discussed next.

### 3.4.1 Ontology

According to Glesne (2011), ontology refers to a comprehension of the being and of reality. The ontological assumption informs what knowledge to build and how it should be built, and this knowledge can only be acquired based on what is

available to be known, "the nature of what it is" (Grix, 2002:177). Ontologically, the researcher tries to obtain knowledge of the real-world phenomenon that has not been perceived as given. The analysis of the world as it is in nature allows the researcher to arrive at establishing some propositions that serve as answers to the research questions. Research can be of subjectivist (interpretivist) or objectivist (positivist) stance, based on the researcher's positional assumptions. With a positivist stance, the assumption is that the researcher and the real world are completely separate, as opposed to interpretivism where the researcher and the real world cannot be separated (Weber, 2004). According to Edirisingha (2012), positivism stands on one absolute objective reality, while Interpretivists have a belief that there is always multiplicity and relativeness in the world's reality.

In this research, an interpretivist approach has been followed. The choice of interpretivism is motivated by the assumption that the CC adoption in enterprises is subject to various factors that might be relatively different from one enterprise to another.

### 3.4.2 Epistemology

Epistemology as a philosophical domain is interested in investigating the nature of real-world views. Its main characteristic is the association with what things are meant to be. This theory of knowledge and how things are known (Matthews & Ross, 2010) is concerned with the knowledge, the nature of knowledge, and where it can be sourced from. The nature and source of knowledge are important components, as the phenomenon under investigation determines what knowledge is to be obtained and how this knowledge is to be gathered (Grix, 2002; Glesne, 2011). Creswell (2013) argues that there is no knowledge that can be created without being based on existing situations and experiences. Of importance is that with the positivist epistemological stance, the real objectivity of the world is beyond human understanding, while the interpretive stance indicates that based on the lived experience, knowledge of the world can be built (Weber, 2004).

In order to gain knowledge on a phenomenon, research questions need to be designed with ontology and epistemology in mind (Leitch, Hill & Harrison, 2010). To explore the extent to which SEs in Cape Town are ready CC adoption, the interpretivist stance has been adopted to make sense of the realities of the world as it is, rather than striving for the discovery of new truths (Cardella, Diefes-Dux & Marbouti, 2016).

### 3.4.3 Postmodernism

The Postmodernism viewed from a philosophical perspective deals with the periodic positioning after modernity (Aldawod & Day, 2017). Postmodernism philosophy as used in social research advocates the non-existence of one single reality that can be used to explain and represent the world (Hassard, 1999).

### 3.5 Research approach

The research approach is concerned with the specific process followed in investigating a given topic (Olumide, 2014). According to Kothari (2004), there are two approaches in academic research: qualitative research and quantitative research. These can be further classified in deductive or inductive reasoning, according to the nature of the study. Woiceshyn and Daellenbach (2018) state that the deductive approach of study works from the big picture down to the particulars, deriving from the general picture specific hypotheses to be tested in order to enhance the general theory. Contrary to deduction, the inductive approach starts with the specifics (or particulars) and progresses towards formulating the general theory. As noted by Bengtsson (1999), qualitative case studies are conducted without being supported by numerical data, and any influence on the subject of the study should be eliminated.

This study has adopted the qualitative research approach. The selection of this method is motivated by the emphasis that the qualitative method as research approach is subjective and inductive as opposed to quantitative methods, which are used to conduct objective studies using a deductive approach (Bryman & Bell, 2007). Qualitative techniques are used when the research phenomenon is likely to encapsulate some level of complexity. Njie and Asimiran (2014) as well as Baxter and Jack (2008) opine that qualitative studies focus on objects in their contextual settings and strive to make sense of their meanings and how they are interpreted. Qualitative research provides a deeper level of meaning and understanding of the interpretation of the product complexity, where the existing information is not sufficient to enlighten the public on the matter (Njie & Asimiran, 2014). The data generated qualitatively are richer, with insightfully revealing reasons and what is likely to be the pattern found in the phenomenon being studied.

Considering the type of data that was required to be collected and the way it had to be analysed, the inductive qualitative approach was deemed to be the most appropriate for this research. The exploratory inductive approach was adopted as appropriate for the study because this methodology is generally used in a situation where there is no or little knowledge available in existing literature of the problem

under investigation (King, Schneer & White, 2014). Information in the available literature on the readiness of SEs in Cape Town to adopt CC technology is non-existent. In the following section, the strategic approach that will inform this research is discussed.

### 3.6  Research design

The research design can be of exploratory, descriptive or explanatory nature, or a combination of these. Saunders, Lewis and Thornhill (2009) posit that the nature of the research informs which of the three approaches should be followed during the investigation. Saunders et al. (2009) further state that where there is little availability of knowledge on a phenomenon, an exploratory study is most suitable for this type of research. It will be appropriate to opt for exploratory research in the absence of a suitable, good understanding and structured knowledge of the problem under study (Saunders et al., 2009). The goal of the research in such a case will be to accurately present a well-profiled event or situation of the posed phenomenon. The uncovering of the cause and effect and causal relationships are appropriate for explanatory design.

In research, a logical way to connect data to the research questions (Mpofu & Watkins-Mathys, 2011) in order to address the posed research problem is essential. This research was designed to interpretively explore the extent of SEs' readiness for CC. Saunders and Tosey (2013) indicate that the qualitative mono-method, consisting of collecting data using in-depth interviews, is one of the methods that can be selected for research design. This method best fits the aim of this study.

### 3.7  Research strategy

Saunders et al. (2012:173) define research strategy as "a plan of action to achieve a goal". The term 'research strategy' refers to the methods scientifically applied during the research to assist the researcher in obtaining the answers to the research questions. As emphasised in their book entitled "Design research in information systems", Hevner and Chatterjee (2010) state that the appropriate research technique directs the execution of relevant activities, leading to generating a new understanding of the phenomenon being explored. There are many different strategies to select from when conducting research. However, the choice of strategy is always dictated by the nature of the study. The main research strategies include: experiment, survey, case study, action research, Grounded theory, ethnography, and archival research. Based on the nature and context of

this research, a case study strategy was adopted to explore the extent of SEs' readiness for CC adoption in Cape Town.

Structured, semi-structured and unstructured interviews are the main interview types used by researchers to collect data (Gill, Stewart, Treasure & Chadwick, 2008). Structured interviews use predetermined questions without room for further scoping or follow-up questions. Unstructured interviews are performed with very little, if any, predefined ideas or questions – only the introductory question to the interview is required. Semi-structured interviews are conducted using predefined key questions, which help to set boundaries for the areas to be explored. Using the key questions (or the interview guide), the researcher directs the interviewee where in-depth information is required and allows the participants to express their opinions openly.

Semi-structured interviews were considered suitable for the in-depth exploration of the preparedness of SEs for CC adoption. Using qualitative, semi-structured in-depth interviews enabled the collection of rich data, which were analysed using the content analysis technique with the aid of thematic analysis. In the next section, a case study strategy is briefly elaborated on.

### 3.7.1  Case study as a research strategy

When there is no sufficiently accessible knowledge or theories available on a specific phenomenon, a case study strategy is adopted to unravel the hidden knowledge (Mpofu & Watkins-Mathys, 2011). As method of research, a case study seems to be popular in academia and business studies (Gustafsson, 2017).

#### 3.7.1.1     Case study strategy explained

According to Saunders et al. (2009:177), a case study is "a research strategy that uses a multiplicity of resources of evidence, in empirically investigating the given phenomenon. It provides the means of gaining a good understanding of the research problem". A case is referred to as one instance (Easton, 2010). According to Karlsson (2016), depending on the object subjected to the case to be studied, a case can be of different sizes – a group in society (social grouping), a town or city in a country, a country or continent, a business organisation, a single person, or a family. Single case studies are distinguished from multiple case studies depending on the context and nature of the phenomenon under investigation. The single case study strategy is used for is a critical or unique case to be studied.

When a study has more than one case (in other words, more than one sample) the multiple case study strategy is used to gain knowledgeable on the phenomenon. With a multiple case study, each sample is treated as an independent case study (Yin, 2009), as the rationale behind the multiple case study is to determine whether there is commonality in the findings of all the cases, and/or whether these findings can be generalised Saunders et al. (2009). The conclusions reached by analysing data that were collected using multiple cases are more robust compared to the results obtained from a single case study (Bengtsson, 1999).

A multiple case study strategy was chosen for this particular study because Goel and Sunena (2018) identified the use of technology as a critical requirement for any business today. CC is a technology that can affordably enable businesses to sustain themselves (Juster, 2008), as they competitively participate in the global market. In the context of SMMEs, the readiness for CC with a focus on SEs in the containment of the city of Cape Town is researched.

### 3.7.1.2 Multiple case study versus single case study

Although case study research works are easy to find in the existing literature, it involves studying a chosen unit and then aiming for the generalisation over several units of the same nature. In qualitative studies, the researcher, by applying his/her wisdom, decides whether the study requires the adoption of one case (single case) or multiple cases (Gustafsson, 2017). The context of a study also calls for some consideration (Yin, 2003). When multiple cases are involved in a study, it is appropriate to use a multiple case study strategy as opposed to the use of only one case in the study. This study, "CC adoption readiness by SEs in Cape Town", dictated to opt for multiple cases in order to draw meaningful information from the study.

### 3.7.2 Unit of analysis

Any successful research starts with identifying the elements constituting the unit of analysis (Salkind, 2011). This means a clear determination of what the subject of analysis will be long before the data collection commences, is very important. The unit of analysis is always the fundamental consideration when envisaging research (Long, 2011). The unit of analysis is not necessarily the same as the unit of observation (Long, 2011). This research was directed towards exploring the extent of CC readiness adoption by SEs in Cape Town. These SEs (14 in total), non-randomly and purposively selected, constituted the units of analysis for this study.

### 3.7.3 Unit of observation

As indicated in section 3.7.2, 14 SEs formed the units of analysis for this study, the 14 SEs were purposively and non-randomly sampled. From each enterprise selected, one representative was interviewed. Therefore, the 14 individuals that were interviewed (one per each selected enterprise) formed the units of observation. The selection of the enterprises to be invited to participate in the research was based on the size of the organisation, as the enterprises had to meet the criteria of a small enterprise as per the small enterprises business ministry definition; the enterprise had to be a probable candidate for the use of technology to run business, and the location of the enterprise influenced the sampling process. For each invited enterprise that accepted to participate in the research, a semi-structured interview was conducted with either the owner of the enterprise, the enterprise's management, or an IT professional working on a full-time basis for the enterprise. In-depth face-to-face interviews were conducted with five (5) IT managers, two (2) technical personnel, and seven (7) business owners, in total 14 participants.

### 3.7.4 Data collection

Research data can be collected using different methods. Case study research makes use of interviews, direct observations, and questionnaires (Njie & Asimiran, 2014) to collect data.

In this study, semi-structured interviews were conducted. Semi-structured questionnaires assisted in administering the interviews, and an interview guide (Appendix B) was developed to direct the interviews.

### 3.7.4.1 Sampling

Sampling is an important part of any successful research activity. A sample is a subset of a specified larger population, and the process of selecting a sample from the population is referred to as sampling. Sampling can be classified as probable or non-probable. The simple difference between probability (also known as random) and non-probability (also known as non-random) sampling is whether the sample selection is done randomly or not. With the probability sampling technique, also known as random sampling, each element of the entire population has an equal chance to participate in the research. On the other hand, non-probability sampling does not rely on random selection. The researcher purposively selects members of the sample from the population.

For this research, a non-probability purposive sampling has been used. The sample was selectively chosen by the researcher from a list of SEs operating in Cape Town. The current research being qualitative in design, the subjectivity in judgment informed the selection of the sampling method as non-probability. The use of non-probability sampling deemed to be well fit for the nature of the study, which was an exploratory in a nutshell; and this had to be purposive, which was dictated by the judgemental aspect of the researcher in purposively choosing the sample population, based on its fitness for the study underway. The sample population of the study was selected from the list of small and medium enterprises database in Cape Town as found on the Chamber of Commerce of Cape Town.

### 3.7.4.2    Permission

Obtaining permission from the participants to conduct the research is a necessary requirement. The researcher sent invitations to the enterprises via email (Appendix A2), but most of the time physical visits to the enterprises was required. Telephonic follow-ups were done before the interviews took place. The participants were required to freely accept or agree to participation in the research by signing a consent letter before the interview (Appendix A3). Only after signing the consent letters could the interviews commence. All the participants have signed a letter of informed consent.

### 3.7.4.3    Interview process

As depicted by Yin (1994), the research design is concerned with the main question to be investigated, what type of data is required to answer the question, and the availability of the data. The way the data should be collected and analysed forms part of the design of any scientific research. Different data sources can be found; however, the nature of the study determines the appropriateness of the data collection method (McNiff, 2002). In this study, the data collection was done using a semi-structured questionnaire, guided by an interview guide by means of interviews. In all interviews, notes were taken, and in some cases recorded by the researcher. The notes and records taken from interviews were transcribed for further analysis. The interview presented itself an appropriate choice for the data collection method in this study, given that this is a qualitative research, and respondents were required to openly express their opinions and feelings about CC adoption.

### 3.8  Data analysis

Pandey and Pandey (2015:70) define data analysis as "the discovery of facts by conducting a study on organised material, from a different point of views". To

analyse data, various activities, either qualitative, quantitative or the combination of the two must be embraced. In qualitative studies, data analysis forms a focal point and analysing data qualitatively aims to gain a greater understanding and detailed description of the phenomenon (Flick, 2015). Stake (2005) highlights that the qualitative approach of analysing research data provides a level of flexibility, as results from different cases are compared.

The research method directly dictates the data analysis method to be used, and in this study, qualitative data analysis had been adopted to explore the phenomenon anticipated by the research question. Content data analysis aided by thematic analysis techniques were used. Interviews were transcribed, and keywords were determined (coded) and categorised accordingly. From the categorisation, thematic analysis was applied, linking the themes to the research questions. Saunders et al. (2009) point to the importance of having the data collection and analysis methods interacted, as the emergence of the new patterns and relationships between these provide the meaning of the contained data.

### 3.9  Ethical considerations

The purpose of ethical considerations in research is mainly to guide the conduct pertaining to the envisioned research as related to the interactions between the researcher and the people taking part in the study (Resnik, 2015). Ethics deals with the behavioural standards of individuals, their way or norms of living, and how these are related (Akaranga & Makau, 2016). The aim is to build a trust relationship between these two entities (Mack, Woodsong, Macqueen, Guest & Namey, 2005). In qualitative research, interviews and questionnaires are the most used methods to collect data. It is common for researchers to have a direct relationship/interaction with the population being studied (Coughlan, Cronin & Ryan, 2007). The responsibility of assuring that the confidentiality and data protection of participants has been catered for remains in the hands of the researcher.

Ethics in research is a moral obligation of the researcher that enables the achievement of competency during the study and gains the confidence of the respondents. Myers (2009) argues that research ethics consists of applying certain research principles such as planning and conducting the research as well as presenting the results of the research. During the research process all activities performed are required to be thorough, objective, relevant, and true (McNabb, 2002). According to Akaranga and Makau (2016), research ethics is the weapon used by researchers to protect research participants and information. Without

ethics, the purpose of research, which includes knowledge dissemination and honest expression of truth as viewed by the world, cannot be enhanced.

This research was conducted with organisations where human beings have been directly involved. Consequently the researcher, due to the nature of the study, ensured that all the respondents' personal information as well as organisational data and information were protected and handled safely. The researcher guaranteed that truthfulness, thoroughness, objectivity, and relevance as well as any legal-related factors such as data protection would be observed. In order to protect human research subjects, the Belmont report lists three basic research principles: respect for individuals, beneficence, and justice (DeLanda, 2009). Note that the responsibility of protecting the rights and safety of people participating in the research is always left to the researcher undertaking the study (Akaranga & Makau, 2016).

The principle of respect for individuals means that that any individual participating in research should be treated anonymously, and their protection from harm should be assured. No exploitation of identified vulnerabilities should happen, and respecting all participants' dignity must be the aim of the research. This implies respect for the research participants as well as their voluntary participation in the research. Anonymity goes hand in hand with confidentiality and privacy. Safeguarding the identification and background of the participants is one of the moral obligations of the research undertaking.

Beneficence means that research should be conducted for the good of the people, and as stated in the 2009 Belmont report, it should be seen as an obligation of the researcher. There should be a commitment requirement to minimise the risks associated with the research, and a clear articulation of the ways this can be achieved is required. The researcher has the responsibility of explaining to participants the purpose of the research before the research commences (Akaranga & Makau, 2016).

The third principle is justice, which relates to the benefits that participants could gain by partaking in the research, and that participants should be protected from any harm. There should be informed consent before the research commences, and risks and benefits should be fairly distributed. The informed consent is interpreted as the mechanism enabling research participants to have a clear understanding of what needs to be done and what is required of them. In this

study, a letter of consent was presented to the all the interview participants, who had to accept participation in the interviews by signing this letter (Appendix A3).

In this research, the interview questions were tested against compliance with the University's Ethics Committee, where a Certificate of Compliance was issued (Appendix A1). All the respondents and the enterprises that accepted participation in the interviews were assured that all collected data would be presented anonymously, without disclosing any names of the individuals or organisations that participated in the research.

### 3.10 Summary

In this study, the researcher adopted a qualitative inductive approach, with the ontological philosophical stance being subjectivism and the epistemological philosophical stance being interpretivism. An exploratory multiple case study strategy was used.

To achieve the aims of the study, 14 SEs operating in Cape Town were purposively selected to be interviewed. Semi-structured face-to-face interviews were conducted with individuals in the selected enterprises that have responded to the invitation to participate in the research. The outcomes of the interviews were instrumentally used to narrow down the content of the questions by grouping related topics into themes. The 14 SEs formed the units of analysis, while the 14 interviewees (SE business owners, SE managers, and IT professionals working in the SEs) constituted the units of observation.

Permission to partake in the research was obtained from all the participants, who signed a letter of consent before the interviews commenced. Research ethics as defined by Cape Peninsula University of Technology were taken into consideration and adhered to throughout the research process.

# CHAPTER FOUR: RESEARCH RESULTS AND FINDINGS

## 4.1 Introduction

The focus of this chapter is on the analysis of the data obtained from the interviewees, and the presentation of these findings. The research took place in Cape Town, one of the cities in Western Cape Province of the Republic of South Africa. Fourteen (14) SEs were interviewed (section 4.2), with the aim of conducting an exploratory study to determine the extent to which SEs in the city of Cape Town are ready for CC adoption. The research further aimed to explore the determinant factors affecting the adoption readiness of CC by SEs. The research further sought to explore the barriers faced by SEs when considering the adoption of CC.

A brief narrative of the case is given, followed by a brief description of the interviewee population. This is linked to the analysis of the data and the presentation of the research findings. The analysis is based on the posed research problem, which is broken down into two research questions (RQs), with two research sub-questions (RSQs) under each research question. These questions provided the direction for the analysis so that answers could be formulated from the findings. The findings were derived from analysing the interview feedback transcriptions, which are the original source documents. The analysis was done with the guidance of the theories that underpinned the research, where the findings had to be put in the context of technology to be adopted in the organisations' environment. It was important to analyse the study results mapping them to the theory of diffusing new innovation, which required the acceptance and readiness for the adoption by enterprises. Linking the study results and the underpinning research theories lead to strong and reach findings.

## 4.2 Case of the study (SEs)

The research was conducted with fourteen (14) SEs in Cape Town and surroundings, which formed the units of analysis of the study. Interviews were administered to SE owners, managers and/or IT employees, who comprised the units of observation. The participating enterprises operate in different areas of the City of Cape Town and suburbs, namely the Southern and Northern suburbs as well as the West Coast, Woodstock and Observatory areas.

Next, the brief profiles of the enterprises that took part in the research are presented. The names of the enterprises are omitted for the sake of privacy and replaced by letters in alphabetical order. The number of years each enterprise has

been in business, whether it is owner managed or not, the number of employees in each enterprises and the type of business are presented as follows:

i) Enterprise A is in the Software Development business, for a period of five (5) years, it is owner managed, and has 30 full-time employees

ii) Enterprise B is a Manufacturing company, ten (10) years in business, it is owner managed, and has 60 full-time employees

iii) Enterprise C functions in the Adult Education and Training sector, five (5) years in business, is owner managed, and has 20 employees

iv) Enterprise D is in Property Management industry, in business for four (4) years, with 15 full-time employees and is not owner managed

v) Enterprise E is in the IT consulting business, for a period of two (2) years, is owner managed, and has 25 employees

vi) Enterprise F functions in the Adult Education and Training sector, ten (10) years in business, with 45 employees and is not owner managed

vii) Enterprise G in involved in Tourism business operations, for ten (10) years, with 50 full-time employees and is not owner managed

viii) Enterprise H is in the Printing Services business, for five (5) years, is owner managed and has four (4) employees

ix) Enterprise I is in the Cleaning Services business, for three (3) years, is owner managed, and has 20 full-time employees

x) Enterprise J functions in the Adult Education and Training sector, six (6) years in business, is owner managed, and has ten (10) full-time employees

xi) Enterprise K in in the Electronics Services business, for two (2) years, is owner managed, and has six (6) employees

xii) Enterprise L is in the Printing Services business, for ten (10) years, and had ten (10) employees

xiii) Enterprise M is in the Software Development business, for ten (10) years, is owner managed, and has 60 full-time employees

xiv) Enterprise N is in the Software Development business, for five (5) years, is owner managed, and has 25 employees

Figure 4.2 shows the geographical locations of the enterprises that partook in the research. The areas circled in red on the map are the localities where the interviewed enterprises operate, and this is also where the interviews took place.
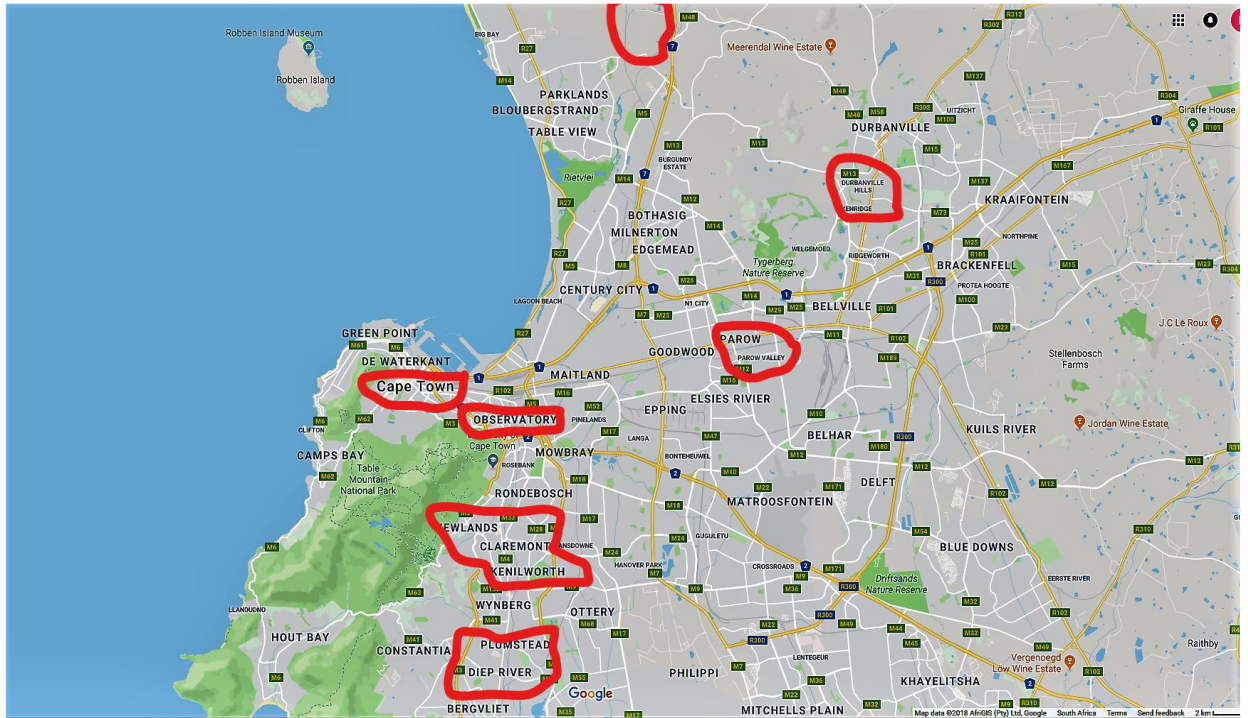


**Figure 4.1: Map of Cape Town**

### 4.3 Interview respondents

Fourteen (14) SEs (participants) were interviewed, with eight (8) of them already using CC and the remainder six (6) not using this technology. Among the participants in the study, seven (7) are business owners, five (5) are managers, and two (2) are IT professional staff. The profiles of the research participants are presented in Table 4.1. The table shows the participant (P), position in the enterprise, industry in which the business functions, geographical location, and whether CC has been adopted. For reasons of confidentiality, the names of the participants and the enterprises are not revealed. Codes have been used to make reference to the participants.

| Participant | Position/Role in Enterprise | Industry | Area (geographical location) | Cloud in use? |
|---|---|---|---|---|
| P1 | Managing Director | Software Development | Woodstock (Cape Town) | Yes |
| P2 | Owner | Manufacturing/Building | West Cost | Yes |
| P3 | Managing Director | Education/Training | Observatory/City | Yes |
| P4 | Managing Director | CEO/Manager | Cape Town/City | Yes |
| P5 | Manager | IT Consultant/Service Provider | Claremont/Southern Suburbs | Yes |
| P6 | IT Professional | Education/Training | Claremont/Southern Suburbs | Yes |
| P7 | IT Professional | Tourism | Kenilworth/Southern Suburbs | No |
| P8 | Business Owner/MD | Printing Services | Southern suburbs | No |
| P9 | Business Owner | Services | Cape Town | No |
| P10 | Manager/Business Owner | Education and Training | Southern Suburbs/Plumstead | No |
| P11 | Business Owner/MD | Electrical and Alarm Systems Installation and Maintenance | Northern Suburbs | No |
| P12 | Business Owner/MD | Printing and Office Services Supplier | Southern Suburbs/ Diep River | No |
| P13 | Business Owner/MD | Software Development/ Service Provider | Southern Suburbs/ Kenilworth | Yes |
| P14 | Business Owner/MD | Software Development and IT Consultant | Northern Suburbs | Yes |

## 4.4  Data analysis process

To arrive at the analysis, semi-structured interviews were conducted with participants from the non-random, conveniently selected SEs that accepted the invitation to participate in the research.

The interview questions (IQs) (Appendix B) were derived from the RQs and RSQs, shown in Table 4.2.

| RQ1: To what extent are SEs prepared for cloud computing technology adoption? | | |
|---|---|---|
| **RSQs** | **Objective** | **Methodology** |
| **RSQ 1.1:** What are determinant factors for cloud computing adoption readiness by SEs? | Identify the factors influencing cloud computing adoption readiness | Interview<br><br>Semi-structured questionnaire |
| **RSQ 1.2:** What benefits do SEs expect to gain from cloud computing technology adoption? | Examine SEs' understanding of cloud computing and its benefits<br><br>Determine the level of adoption readiness | Interview<br><br>Semi-structured questionnaire |
| RQ2: How do SEs determine their readiness for the adoption of cloud computing? | | |
| **RSQs** | **Objective** | **Methodology** |
| **RSQ 2.1**: How do SEs define adoption readiness for a given technology such as cloud computing? | Determine the level of adoption readiness<br><br>Identify the factors influencing cloud computing adoption readiness | Interview<br><br>Semi-structured questionnaire |
| **RSQ 2.2**: What kind of assessments do SEs perform to assess their readiness for technology adoption? | Examine SEs' understanding of cloud computing and its benefits<br><br>Determine the level of adoption readiness | Interview<br><br>Semi-structured questionnaire |

### 4.4.1 Interview process, transcriptions and coding from raw data

The researcher commenced each interview with an introduction, stating the reason for the interview and what it is all about. The participant was then asked if he/she accepted voluntarily to be part of the research, where after the letter of consent (Appendix A3) was presented for signing. The acceptance and signing of the consent letter allowed the researcher to continue with the actual interview research questions.

General questions were asked first to gain a thorough understanding of the participant profiles as indicated in Table 4.1 and the selected enterprises in general.

These questions focused on:
  i)   Identifying the number of full-time employees in the enterprise.

  ii) The nature of the business and the industry in which the enterprise conducts business.

  iii) The function or position held by the respondent in the enterprise.

  iv) The geographical location of the enterprise's operations.

The general questions allowed for a smooth transition to the interview questions focusing on the CC adoption readiness of SEs. It also assisted the researcher in understanding the context in which the participants were likely to answer the questions and helped tailor the sub-questions to obtain more meaningful and informative responses.
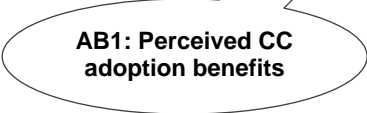
After the closure of each interview, the interview was transcribed. The transcription was then given to the participant to validate the correctness thereof and confirm that his/her intent has been captured correctly. At this point, the researcher reviewed the transcription to comprehend the contextual meaning of the participant's responses.

Next, the coding process followed based on the raw interview data and contextual understanding of the researcher. The notation of patterns in the raw data collected from the interviews enabled the identification and coding of key concepts. This coding process led to the categorisation of concepts, and finally to deriving meaningful themes.

Table 4.3 shows a transcription snapshot of the responses obtained from participant P13 and assigning codes to key concepts.

| IQ 1.1.1: | **Did you hear about cloud computing technology before? Where and how? What does it mean for your enterprise's business operations?** |
|---|---|

**P13:** Yes, I am [an] IT pro. It is about outsourcing underlying IT servers; instead of buying physical hardware and put it in the data centre, you buy the service from the company that has and maintains the hardware (this is the level one basic). Instead of buying the physical servers, you buy virtual machines, which will run from different physical infrastructure, which will support high availability and redundancy. The next level is the abstraction, like a compute engine where you write your software against [an] abstractive platform that manage the scaling and look at the server less solutions. My definition goes with the lowest level of infrastructure, but another part that is more relevant is the Software as a Service. Depending on the kind of the business the company is in, they will start looking at CC in terms of what they spend the money on and the business needs, the system reliability and allowing to solving the problem they have at a low cost.

AF1: Drivers for CC adoption

AF6: Data security and recovery

U1: Understanding of concepts

| IQ 1.1.2: | **What potential for business sustainability do you see in cloud computing adoption in your organisation?** |
|---|---|

**P13:** For some organisations, CC is not the driver – it depends on what you are looking at. The use of CC solutions that affect positively the service/ business operations is what the company will look at. Reducing cost of using systems and access high end software platforms. Business benefits is what drives [a] company when adopting technology, not the technology per say. Because CC offers advantages of more scalability, and availability and reliability, it allows the business to sustain itself; and also, from a financial perspective, you get away from CAPEX vs. OPEX. Many companies prefer to run their physical servers in their data centres, because their data will be seating on foreign systems.

AF2: Drivers for CC adoption

RC1: Regulatory Compliance

There is complexity of sending data off to the provider's system, and you do not know where it is housed, which subjects to different legislations where the servers are located. Legislation pertaining to data storage and access is the concern for many enterprises, without forgetting the cost involved and restrictions in accessing the data. Governments are passing laws regarding confidentiality and how personal data are kept accessed and maintained.

Example. If you have a South African company hosting data in the cloud located physically in Europe data centres, the question is, does the European law applies to that data? If someone wants to access the data for criminal investigation, do you follow the European legal process, because that's where the data physically is located, or you follow the South African process, because the data belong to a South African firm/citizen? Some companies have specific requirements around that, and we have not much (no huge number of) physical infrastructure present in South Africa/Africa. Irrespective of the location, the data is at the end located somewhere on physical hardware, and it must comply with the country's law where it is housed. With regards to the complexity around the data, sometimes some companies look at the legal complexities around data storage, and access and the cost that can be incurred, and compare it with the physical infrastructure where you have full control and one single law is applied and choose to stay away from CC.

| IQ 1.2.1: | **In your opinion, what are the main gains the enterprise should get from the use of cloud computing?** |
|---|---|
| **P13:** | Increased reliability/availability, scalability, lower operational/maintenance cost, you do not have a system administrator to maintain the physical infrastructure, because the provider does all the maintenance; for a small company, you cannot employ a server admin, or 2 to only look after the infrastructure, the salary cost is significant for those SEs. Cloud is not cheaper than physical systems, it's cheaper to buy your own machine and build your own infrastructure. Fast to deploy is another benefit of CC. |

**AB1: Perceived CC adoption benefits**

| IQ 1.2.3: | **Do you see any positive financial impact on the organisational performance through the adoption of cloud computing? How do you see it be realised?** |
|---|---|
| **P13:** | Not really, the physical infrastructure can be much cheaper than being in the cloud in the long term, specifically on the bottom line cost. You do not pay upfront physical infrastructure, but the monthly instalments end up being too high. It is cheaper to buy your own machines and build your own system/infrastructure. |

**U2: Understanding of concepts**

**AB1: Perceived CC adoption benefits**

| IQ 1.1.3: | **Do you believe that readiness assessment is necessary for the successful adoption of a new technology? In what way?** |
|---|---|
| **P13:** | Different factors to be considered, scalability, increased reliability, application must be CC ready. Map the business value to the cloud offerings, business decides to adopt because there is business value. Scalability, and get the infrastructure quickly, increased reliability. Assess if applications to be used are CC ready, which is not often in business control. [The readiness assessment] allows to determine the cheaper option, better redundancy and better uptime, and if there is no legislation preventing you from doing that. Assess and determine the skills availability at the company's disposal. The definition of readiness is being ready for use, in terms of internal infrastructure, legislation to be complied with, and company's strategy. |

**RI1: Adoption readiness influencing indicators**

### 4.4.2  Key concepts, associated codes and relationships

Through the analysis of the transcribed data, the related codes were grouped together. Nine (9) key concepts were identified from these groupings. The codes and key concepts are directly related and hold specific information of the answers provided by the participants.

Table 4.4 shows the identified key concepts, associated codes, and their relationships.

| No. | Key concept | Code | Short description |
|-----|-------------|------|------------------|
| 1 | Understanding of concepts | U1 | Having a clear understanding of CC concept / definition of CC |
| | | U2 | Having a clear understanding of technology adoption readiness |
| 2 | Factors influencing the adoption | AF1 | Determinant factors influencing CC adoption |
| | | AF2 | Inhibiting factors for cloud adoption |
| | | AF3 | Finance as a driver for adoption |
| | | AF4 | Systems availability and scalability as a motivating factor for cloud adoption |
| 3 | Readiness influencing indicators / Requirements for adoption readiness | RI1 | Determinant factors influencing the readiness for adoption |
| | | RI2 | Internal technical skills availability |
| | | RI3 | Access to reliable internet |
| | | RI4 | In-house infrastructure capability |
| | | | CC awareness |
| 4 | Adoption challenges / Barriers for adoption readiness | RI5 | Challenges encountered by enterprises in adopting CC |
| 5 | Perceived adoption benefits | B1 | Benefits of adoption and use of CC |
| | | B2 | Benefit of technology adoption readiness |
| | | B3 | Business competitiveness / competitive advantage |
| | | B4 | Financial impact of CC on the business / affordability |
| 6 | State of interest and trust in CC | TI1 | To what extent enterprises are interested in adopting CC / and or have trust in CC service offerings |
| 7 | Data security and recovery | F6 | How enterprises understand and feel secure with their data housed in the cloud |
| 9 | Data / system access | D1 | Data control |
| | | D2 | Access to computing resources |
| | | D3 | Systems integration, availability and flexibility |

### 4.4.3  Categories based on key concepts and associated codes

In addition to grouping the related codes together and identifying nine (9) key concepts, these codes and concepts were mapped to the RQs, RSQs and IQs.

Table 4.5 presents an extract of the key concepts derived from the interviews, associated codes, the research question addressed for each key concept, and a brief description of each key concept.

**Table 4.5: Extract of key concepts and associated codes mapped to research questions**

| RQ, RSQ and IQ | | Key | Description | Explanation |
|---|---|---|---|---|
| **RQ1:** | To what extent are SEs prepared for cloud computing technology adoption? | | **P1** | |
| | | **U1** | Understanding of concepts | Heard about CC at the college. CC is about using computing as a utility, accessed via the Internet. |
| **RSQ1.1:** | What are determinant factors for cloud computing adoption readiness by SEs? | | **P2** | |
| **IQ 1.1.1:** | Did you hear about cloud computing technology before? Where and how? What does it mean for your enterprise's business operations? | **U1** | Understanding and awareness | I heard about CC through word of mouth, informal conversation. It does not mean much to me. |
| | | **TI1** | State of interest and trust in CC | It is a money making scheme. People wanting to get money, and once you are subscribed there is no easy way out. |

### 4.4.4  Finding categorisation and themes

After having analysed all the interview answers provided by the participants, a total of 197 findings were derived. The findings were further analysed by grouping repeating concepts together. This process reduced the number of findings from 197 to 50 (Table 4.13). Through analytical classification, the summarised findings were then classified into nine (9) meaningful categories. These nine categories were further analysed, resulting in five (5) themes (Table 4.6).

**Table 4.6: Categories and themes**

| Finding category | Theme |
|---|---|
| Understanding of concept and adoption awareness of CC | Understanding of concept |
| Concerns around CC adoption and use | Trust in CC adoption |
| Perceived CC adoption benefits | Perceived CC adoption benefits |
| Requirements for CC adoption readiness | Adoption Readiness indicators |
| Drivers for CC adoption | Drivers for CC adoption |

| | |
|---|---|
| Regulatory compliance and its impact on CC adoption readiness | Regulatory compliance |
| State of trust and interest in CC adoption | Trust in CC adoption |
| Data security and data recovery | Adoption readiness indicators |
| Requirements and technology adoption readiness indicators | Adoption readiness indicators |

Of note is that the combination of some terms, although having different meanings, can be deemed closely related contextually, and these have been grouped together to form a single category, for example, "understanding and awareness" and "adoption benefits and the drivers for adoption".

*In this light, the understanding of concepts and CC adoption awareness are closely related and complement each other when placed in the context of this study. It makes therefore logical sense to discuss the two under the umbrella of one theme. "Understanding of concepts" will be used as the theme when referring to understanding and awareness.*

*Equally, the benefits for CC adoption and the drivers for CC adoption are placed under one theme for simplicity and the discussion will refer to "Drivers of CC adoption" for both concepts. The same applies to trust and interest in CC, where "Trust in CC adoption" has been opted for as theme to represent the two concepts.*

Table 4.7 shows the finding category counts per theme. The five (5) themes identified are presented together with the number of occurrences of each category per theme. Note that the perceived CC adoption benefits should have been considered as a theme, but due to its link to the driver aspect of the adoption, it has been added to the "Drivers for CC adoption" theme. In addition, the regulatory compliance is mentioned as one (1) count as it was only seen in a few questions, but where it has been mentioned, it had a strong emphasis as far as the adoption readiness is concerned, reason for it being considered a finding theme.

**Table 4.7: Finding category counts per theme**

| Theme | Category count |
|---|:---:|
| Understanding of concepts | **10** |
| Trust in CC technology | **9** |
| Adoption readiness indicators | **12** |
| Regulatory compliance | **1** |
| Drivers for CC adoption | **4** |

### 4.4.5 Interview findings from participant responses

The participants expressed their opinions and feelings on their readiness for CC adoption in their enterprises, and mainly the extent of readiness for adopting this emerging technology in their respective enterprises.

Each interview started with the question of knowing whether the participant was aware of CC technology. The intention was to determine whether the participant has a basic understanding of the technology.

## 4.5 Findings for RQ1

**RQ1: To what extent are SEs prepared for cloud computing technology adoption?**

### 4.5.1 RSQ 1.1

**RSQ 1.1: What are the determinant factors for cloud computing adoption readiness by SEs?**

*IQ 1.1.1: Did you hear about cloud computing technology before? Where and how? What does it mean for your enterprise's business operations?*

This question was asked to determine the general awareness of CC technology in SEs. This awareness can be classified indirectly as one of the main factors influencing CC adoption readiness. By expressing themselves on the topic, participants indicated whether they knew about CC technology and what meaning they associated it with in a general sense.

Twelve participants (P1, P2, P3, P4, P5, P6, P7, P9, P10, P12, P13, P14) from a total of 14 confirmed that they are aware of CC technology, while only two (P8, P11) did not know anything about CC. The meaning and the way CC is introduced in general, is not clear to many of the participants. While a few of them became aware of it through formal education at a college, some participants (P2, 5, 6, 7, 10, 12) mentioned that they have learnt of CC through advertisement/marketing and via informal channels.

P6 stated that CC was introduced to him via word of mouth, and for him it means pay for computing resources as a service. P12 said that he heard about CC via informal conversations and gatherings, and that "it does not mean much to me as I consider it as a money-making scheme, people try their luck to get access to my money, and once in, no easy way out" (Appendix C12). P4 and P5 added to P6

and 12 who stated that they heard of CC through self-research. P8 mentioned that CC was introduced to him via self-training/self-learning and research, and they could not find any meaningful explanation of CC for their organisations. P2 responded that he heard of CC in publications and marketing journals, and that CC means being "free from hardware and software maintenance" (Appendix C2).

**Finding 1:** The concept of CC is learnt via unconventional means, leading to the lack of a clear understanding of what CC entails

**Finding 2:** Many SEs have little awareness of CC technology, as they do not seem to have a clear understanding of CC

### IQ 1.1.2: What potential for business sustainability do you see in cloud computing adoption in your organisation?

The SEs are in constant strive to sustain their businesses and compete effectively in the market. Although business operations are obliged to depend on technology, their readiness for adopting any given technological innovation can only be determined through the potential observed by the enterprise of that technology. The benefits they see in the technology should be to competitively allow the enterprises to sustain their business operations. Many participants believe that CC is a potential enabler for sustaining their business operations.

Contrary to this view expressed by eleven (11) participants, P8, P9 and P12 could not see any potential for sustaining their businesses through CC. P1 stated that CC allows them access to computing resources and standardisation, access to the same opportunities as big players in the market, allows a quick process to market, and brings flexibility for change (Appendix C1). P2 added to this, stating that CC allows business growth and competitiveness, efficient delivery of services, the use of up to date features, and access to applications (Appendix C2).

P5 mentioned that CC provides a low cost of ownership of IT to enterprises, and organisations have enough time to focus on the business processes (Appendix C5). P13 and P14 indicated that system sustainability comes from more system functionalities and availability, which is promised by CC. They clarified that improved business operations are what enterprises are looking for in technology. The low cost of access and use of CC as well as access to the high-end software platforms is what makes the businesses sustainable.

**Finding 3:**   There is a perception that CC comes with low computing cost, with potential for business sustainability

P7 agreed with the previous participants that CC allows cost saving for SEs, but could not elaborate further. P8, P9 and P12 did not see any business sustainability potential for their enterprises by adopting CC. P9 stated that there is no sustainability in CC adoption, as it depends on the nature of the business (Appendix C9). P8 did not offer any opinion. One of the participants (P12) said: "I do not see any potential" (Appendix C12).

**Finding 4:**   The adoption of CC is not clearly understood and does not bring sustainability in business

### IQ 1.1.3:  Do you believe that adoption readiness assessment is necessary for the successful adoption of a new technology? In what way?

This question aimed to gather the general feelings of respondents on technology adoption readiness. Thirteen (13) of the 14 participants believed that readiness assessment is necessary for successful technology implementation. P5 is the only participant who did not see the necessity of conducting the readiness assessment before adopting a new technology in the enterprise. According to P5, all depends on the type of implementation: "Not necessary. It depends on the solution being implemented and what it is being implemented for" (Appendix C5). P1 said: "Yes, it [readiness assessment] is very important; [it] allows to map the business processes to the IT process; measure compliance processes" (Appendix C1). P1 further stated that readiness assessment provides and understanding of the environment, it enables the understanding of technical requirements and compatibilities, it and allows for proper planning and the development of required skills. P13 and P14 supported the view of P1. P13 said that readiness assessment allows determining (assessing) if the internal system is cloud-ready, it maps business value to the cloud offering, gives an idea of the systems and options to guide in provider selection. It also makes you think of the laws and regulations to be complied with and whether there are issues and it determines the skills availability and where to improve for successful adoption (Appendix C13). P14 added that readiness assessment is necessary as it enables the awareness of governance requirements and legislation compliance required, it identifies internal systems and whether these are ready to be integrated with the cloud, and it gathers infrastructure requirements information such as internet availability and reliability (Appendix C14).

**Finding 5:** There is a lack of understanding of the necessity of readiness assessment before new innovation adoption

*IQ 1.1.4: Is there any belief that cloud computing adoption can have an impact on your business competitiveness? Expand.*

Fifty percent (50%) of the participants (P1, P2, P3, P5, P6, P12, 14) answered that CC can have a positive impact on the competitiveness of the business. Some participants (P4, P7, P9, P10, P11, P12) did not see any positive impact, while P8 was not sure of what impact CC can have on their business. P1 and P6 stated that CC can allow the business to operate at a low cost due to systems scalability and speeding up of marketing.

P2 related CC as a technology that brings high availability of data/information and allows ease of communication; it provides better service delivery to customers; and systems are maintained by professionals, which makes the system available and up to date (Appendix C2). P13 explained the impact of CC on the business by saying: "[There is] no [need for] high technical skills requirement in the organisation [no need to hire highly skilled people]; It offers reliability, uptime and availability… giving you more flexibility" (Appendix C13). P14 added that it allows systems to stay up to date, thereby effectively addressing the customers' needs (Appendix C14).

**Finding 6:** There is a need for CC adoption by SEs for business competitive operations

P4, P7, P8, P9, P10, P11 and P12 opined that there is no tangible impact of CC on business competitiveness. P4 stated the following: "No – as a technology company any competition will have similar use of CC and it will therefore not differentiate us to have a competitive edge" (Appendix C4). P9 simply stated that their business does not require CC to be successful (Appendix C9), while P10 said: "No, my business cannot be impacted by CC, as I have the software I need on my computers" (Appendix C10).

**Finding 7:** There is a lack of clear understanding of CC which leads to the lack of seeing the benefits cloud can offer to small businesses

*IQ 1.1.5: How do you explain regulatory compliance with regard to cloud computing adoption and use?*

This question was asked to test the level of awareness of regulatory compliance pertaining to the adoption and use of CC. Having a good understanding of what regulates the adoption and use of CC is one of the indications of the adoption readiness. Nine participants (P3, P2, P4, P7, P8, P9, P10, P11, P12) did not know what regulatory compliance is about or were not aware of any regulations in place to be complied with in adopting and using CC. Five participants had some understanding of laws and regulatory compliance (P1, P5, P6, P13, P14). P2, P3 and P12 mentioned that they are not aware of any law or regulations in the country to be complied with in order to use technology. They added that they can only rely on the service providers. P2 stated that they are not aware of any law and regulations in the country, and that they rely on the providers and trust although they are worried about their data security (Appendix C2). P3 indicated that they are not aware of any clear policy and regulations, that there is no standardisation of services, and that they do not know or understand which regulation to comply with, as all is left in the hands of the provider (Appendix C3). Participants P4, P7, P8 and P11 stressed that they do not know or understand what regulatory compliance is and why they should have the compliance. P10 added that there is no need for regulatory compliance requirement.

**Finding 8:**  The understanding of the importance of regulatory compliance pertaining to the adoption and use of CC and the awareness thereof is absent in SEs

P13 and P14 expressed their concerns on personal data housed under a foreign law across borders. Laws pertaining to data access and storage in a given country must be complied with – when crossing the border, data must be subjected to the laws of the country in which the data are physically housed. P13 and P14 further stated that some companies do not want to put their data at risk as it will be bound to the foreign law (Appendix C13; Appendix C14).

**Finding 9:**  Enterprises seem not prepared for CC adoption, resulting in reluctance to adoption

### *IQ 1.1.6:   What are the system areas in your enterprise that cloud computing adoption could have a direct impact on?*

The extent of readiness for cloud adoption is determined by a number of indicators, and understanding the data/system requirements and priorities associated with them is a major key indicator of readiness for decision making. P4, P7, P8 and P9 stated that they are not sure or have no idea of what part of their

systems can be affected by CC. P9 said there is no need to move their data to the cloud, while P12 argued that nothing should move to the cloud, as CC seems to be a money making scheme (Appendix C12).

**Finding 10:** SEs lack the ability to clearly identify the areas in the systems that CC can have an effect on

Four participants (P1, P14, P5, P13) mentioned that they have all their systems in the cloud and that any utility of their system can be impacted by cloud. For P13, what seemed important is that they do not move anything to the cloud before their internal testing and SLA negotiations have been fully analysed. The remainder of the participants opined that although they have no problem with the cloud, they prefer moving the less sensitive data/system to the cloud.

**Finding 11:** The sensitivity of data, systems, and the cost is the main driving factor for the move to the cloud, implying that data management systems and operations can be affected by CC

**Finding 12:** There is little trust in CC, resulting in reluctance/rejection of CC adoption

### IQ 1.1.7: How can this organisation profit from the use of the pay-as-you-use model when using cloud computing technologies?

The awareness of the benefits of CC by the enterprises is the starting point for identifying the level of adoption readiness, as SEs cannot be prepared for a technology where benefits are not visible. While some participants agreed that there may be benefit in using the cloud, 50% of the participants revealed that they do not understand how pay-as-you-use computing can be applied in their businesses.

P6, P7, P8 and P9 stated that they do not see how this can be applied in their organisations. P9 went further by noting that although this is an excellent concept, he cannot understand how it can be applied to the use of computers. It is revealed that, even among those enterprises that have adopted CC, they only consider the immediate financial benefits, as they see it costing them more than buying their own infrastructure in the long run. The problem for them is the initial upfront payment affordability. P4 indicated the preference of using their in-house computing infrastructure, and P1 argued that it may be cheap in the beginning, but

in the long run, CC can become much more expensive than the infrastructure on site.

**Finding 13:** While some enterprises can see the benefits of pay-as-you-use CC, there is still a need for understanding/awareness of the concept

**Finding 14:** CC is perceived as a low-cost solution, but over the long term it is more expensive than on-premises infrastructure

### *IQ 1.1.8: How can you describe the requirement for internet availability for business operations in your enterprise? How good is your internet connectivity?*

All respondents viewed internet access as necessary for the business, except for P9 who stated that the Internet, although it is good to have, it is not a requirement for their business to run. All other participants confirmed having internet access in their enterprises, although for four enterprises (P8, P9, P10, P11) the reliability is not great.

**Finding 15:** SEs have internet access, but the connectivity is not sufficiently reliable for all

### *IQ 1.1.9a: What are the major consideration factors in your organisation that influence the choice of new technology adoption for the business?*

### *IQ 1.1.9b: If cloud services are in use, how was decided what data / systems should be pushed into the cloud and what should remain on the premises?*

To decide on technology adoption, SEs need to consider a few key considerations to inform their decisions. The decisions for new technology adoption and the success of the adoption depend highly on the level of understanding the enterprises have of the new technology. CC adoption as technology adoption is no different.

For those enterprises already using the cloud, the decision of moving to the cloud was dictated by the business needs or the cloud systems availability offerings. P1 stated that they looked at the "required investment cost; speed of having the system up and running; building required IT infrastructure affordability. The main factors influencing the adoption decision were the "cost of infrastructure and

ownership", the fitness of the technology for business needs, the ease and type of support model available, "ease of maintenance, robust and secure system; system deployment time" (Appendix C1). According to P14, the decision was based on the budget, as there was no need to invest in physical server purchases: "I do not have to invest in IT personnel" (Appendix C14).

Six of the 14 participants (P7, P8, P9, P10, P11, P12) indicated that they are not using CC. P2 and P9 alluded to security and cloud system availability as one of the major influencing factors for not using CC.

**Finding 16:** The decision to adopt CC is mainly influenced by the needs of the business, finances, and system availability

The findings relating to RSQ 1.1 are presented in Table 4.8. Sixteen (16) findings were derived from the responses and linked to the corresponding categories and themes. The findings are presented in a manner that directly creates a link between the categories and themes.

Table 4.8: Summary of findings: RSQ 1.1

| No. | Finding | Finding Category | Theme |
|-----|---------|------------------|-------|
| 1 | The concept of CC is learnt via unconventional means, leading to the lack of a clear understanding of what CC entails | Understanding of concept and adoption awareness | Understanding of concepts |
| 2 | Many SEs have little awareness of CC technology, as they do not seem to have a clear understanding of CC | Understanding of concept and adoption awareness | Understanding of concepts |
| 3 | There is a perception that CC comes with low computing cost, with potential for business sustainability | Perceived adoption benefits | Drivers for CC adoption |
| 4 | The adoption of CC is not clearly understood and does not bring sustainability in business | Understanding of concept and adoption awareness | Understanding of concepts |
| 5 | There is a lack of understanding of the necessity of readiness assessment before new innovation adoption | Requirements for CC adoption readiness | Adoption readiness indicators |
| 6 | There is a need for CC adoption by SEs for business competitive operations | Requirements for CC adoption readiness | Adoption readiness indicators |
| 7 | There is a lack of clear understanding of CC which leads to the lack of seeing the benefits cloud can offer to small businesses | Understanding of concepts and adoption awareness | Understanding of concepts |
| 8 | The understanding of the importance of regulatory compliance pertaining to the adoption and use of CC and the awareness thereof is absent in SEs | Regulatory compliance and its impact on CC adoption readiness | Regulatory Compliance |

| No. | Finding | Finding Category | Theme |
|-----|---------|------------------|-------|
| 9 | Enterprises seem not prepared for CC adoption, resulting in reluctance to adoption | Concerns around cloud adoption and use | Trust in CC technology |
| 10 | SEs lack the ability to clearly identify the areas in the systems that CC can have an effect on | Perceived adoption benefits | Drivers for CC adoption |
| 11 | The sensitivity of data, systems, and the cost is the main driving factor for the move to the cloud, implying that data management systems and operations can be affected by CC | Drivers for CC adoption | Drivers for CC adoption |
| 12 | There is little trust in CC, resulting in reluctance/rejection of CC adoption | State of trust and interest in CC adoption | Trust in CC technology |
| 13 | While some enterprises can see the benefits of pay-as-you-use CC, there is still a need for understanding/awareness of the concept | Understanding of concepts and adoption awareness | Understanding of concepts |
| 14 | CC is perceived as a low-cost solution, but over the long term it is more expensive than on-premises infrastructure | Requirements for CC adoption readiness | Adoption readiness indicators |
| 15 | SEs have internet access, but the connectivity is not sufficiently reliable for all | Requirements for CC adoption readiness | Adoption readiness indicators |
| 16 | The decision to adopt CC is mainly influenced by the needs of the business, finances, and system availability | Drivers for CC adoption | Drivers for CC adoption |

### 4.5.2  RSQ 1.2

**RSQ 1.2:  What benefits do SEs expect to gain from cloud computing technology adoption?**

*IQ 1.2.1:  In your opinion, what are the main gains the enterprise should get from the use of cloud computing?*

The readiness for CC adoption is shaped by the understanding of the benefits of this technology by the prospective adopters and their clear understanding of what is expected from the adoption of CC.

Sixty percent (60%) of the participants expressed the expectation to gain from CC adoption, mainly the access of up to date computing resources and the financial savings on upfront infrastructural investment. At the same time, their opinions and expressions directly tie in with their level of readiness for the adoption. P1 stated that CC allows small businesses to access the same playing field as big enterprises, allowing them access to the global competitive market as well as access to up to date computing resources without upfront investment. P2

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emphasised the simplicity brought by CC in supporting IT operations, which becomes a pillar for business operations. P3, P4 and P5 pointed to the ease of access and high availability of the systems, and the low cost associated with access and use of computing resources.

Forty percent (40%) of the participants (P2, P8, P9, P10, P12) did not see any tangible gain for adopting CC. They could not comment on what they do not know or understand. P10 and P12 stated that there are no tangible CC benefits for them, while P8 and P9 said they do not understand the concept of CC.

**Finding 17:** The benefits of CC for enterprises are mainly the reduction of costs associated with IT, systems availability, and performance

### IQ 1.2.2: What category of your organisational data/systems would you be comfortable with to move to a cloud computing environment?

To be able to accurately identify the systems and data that will be best for migration without impacting the business operations, CC adoption readiness assessment criteria are required.

Four of the 14 participants stated that they have no problem with all their systems being in the cloud. P5, P13 and P14 said they are comfortable with having everything in the cloud. P1 supported P13 and P14, saying: "We can and do have all our stuff in the cloud environment" (Appendix C1). Five participants (P3, P4, P6, P7, P10) were still reluctant to move their sensitive data/systems to the cloud. P3 stated that the administrative system is the best to be moved to the cloud as nothing can be stolen (Appendix C3). P7 clarified that only non-sensitive data could be moved to the cloud. Four of the respondents (P8, 11, P12, P6) had no trust or did not understand fully the concept of CC, hence could not decide on what should be moved to the cloud.

**Finding 18:** Many SEs that consider CC as a solution prefer to move non-sensitive data/systems to the cloud

### IQ 1.2.3: Do you see any positive financial impact on the organisational performance through the adoption of cloud computing? How do you see it be realised?

One of the potential drivers for the SEs to adopt CC is financially related. Being able to clearly elucidate the expected financial benefits CC can offer is an

indication that the enterprise is on the path towards CC adoption readiness. This question has two complementary parts, seeking to obtain the full picture of the financial impact from participants.

Four of the 14 participants (P2, P10, P12, P13) indicated that they do not see any financial benefit in CC, and two of these (P10, P12) have not adopted CC, while the other two (P2, P13) did. P13 argued that there is no real financial benefit to SEs in CC adoption. P13 further elaborated that "physical infrastructure can be much cheaper… You do not pay upfront for physical infrastructure, but the monthly payments ends up being too high" (Appendix C13). P2 shared the same view as P13, stating that in the long run they do not see any financial benefit, as the on-premises IT infrastructure can be much cheaper. P2 however admitted that CC use could free up some time to be used on business processes, thereby improving business competitiveness (Appendix C2). P10 simply could not see any impact CC can have on their business, while P12 openly declared that there is no trust in CC, stating that CC has no impact on their business as they have no trust in CC, and they do not understand the CC concept (Appendix C12).

Eight participants (P1, P3, P4, P5, P6, P7, P11, P14) believed that CC has potential financial benefits to the adopting enterprises, while four participants (P8, P9, P10, P12) confessed to not understand what CC is all about, and could not tell if there is any benefit.

**Finding 19:** There is a lack of understanding and awareness of CC regarding the financial benefits it can offer to SEs

### IQ 1.2.4:  In your opinion, what are the technical challenges the migration to cloud computing presents to your organisation?

Having an idea of what the challenges might be during any given operation before it commences is a good sign of preparedness, whatever the operation entails. In this case, being aware of the issues associated with the migration of systems to CC gives the adopter the opportunity to assess the key requirements before embarking on the adoption. P1 stated:

> "The legal compliance side is a big challenge for us, most of the time our customers do not understand the legal implications involved in using cloud computing  as they do not understand how CC operates; there is no local presence of cloud computing service providers; stay up time for SLA's is another problem as the agreement gets mapped to the (trans-continental)

laws and regulations – regulations are interpreted differently in different parts of the world" (Appendix C1).

P1's response is complemented by P3 and P5, who pointed to the lack of IT strategy and understanding of existing infrastructure as one of the main challenges. P8, P9, P10, P11, P12 and P14 did not see any challenge in the process of adopting CC, but this may be attributed mainly to the lack of understanding. Of these six participants, only P14 seemed to have a level of CC understanding.

**Finding 20:** There is a lack of IT infrastructure, strategy and skills in enterprises, which affects the analysis of existing systems for possible systems integration

**Finding 21:** CC is perceived as having hidden costs

**Finding 22:** The awareness and understanding of regulations and compliance pertaining to CC adoption in SEs are lacking and perceived to be complex and confusing

A summary of the findings for RSQ 1.2 is presented in Table 4.9. The findings are directly mapped to the categories and related themes. To note is that although understanding and awareness are two different concepts, they are contextually related and are combined to form one theme.

**Table 4.9: Summary of findings: RSQ 1.2**

| No. | Finding | Finding category | Theme |
|-----|---------|------------------|-------|
| 17 | The benefits of CC for enterprises are mainly the reduction of costs associated with IT, system availability and performance | Perceived adoption benefits | Drivers for CC adoption |
| 18 | Many SEs that consider CC as a solution prefer to move non-sensitive data/systems to the cloud | Concerns around cloud adoption and use | Trust and interest in CC adoption |
| 19 | There is a lack of understanding and awareness of CC regarding the financial benefits it can offer to SEs | Perceived adoption benefits | Drivers for CC adoption |
| 20 | There is a lack of IT infrastructure, strategy and skills in enterprises, which affects the analysis of existing systems for possible systems integration | Requirements for CC adoption readiness | Adoption readiness indicators |
| 21 | CC is perceived as having hidden costs | Understanding of concept and adoption awareness | Understanding of concepts |

| No. | Finding | Finding category | Theme |
|-----|---------|------------------|-------|
| 22 | The awareness and understanding of Regulations and compliance pertaining to CC adoption in SEs are lacking and perceived to be complex and confusing | Regulatory compliance and its impact on CC adoption readiness | Regulatory compliance |

### 4.6  Findings for RQ2

#### 4.6.1  RSQ 2.1

**RSQ 2.1:  How do SEs define adoption readiness for a given technology such as cloud computing?**

*IQ 2.1.1:  Does your enterprise need to have access to ICT of any sort to run the business? Please expand.*

This question was asked to gain insight into whether SEs perceive ICT as a required tool to succeed in their business ventures. Without being aware of the importance of ICT in business operations, CC has no meaning for SE business operations. In response to the question, there was agreement among participants that ICT is an irreplaceable requirement for the business to run smoothly. Only P9 stated that ICT is not a requirement for their business to run.

**Finding 23:**  There is an acceptance by SEs of a pressing need for ICT in order to competitively run business operations in SEs

*IQ 2.1.2:  Do you outsource, or have you ever outsourced any IT systems / services in your organisation? What is the reason for choosing outsourcing?*

It is imperative to make a distinction between IT outsourcing and CC technology in order to determine the extent of readiness for CC adoption. The confusion that can be observed in the enterprises regarding the two concepts indicates the lack of preparedness for adoption.

Many participants (P2, P5, P6, P8, P9, P10, P11, P12, P13) answered that they do not outsource their IT services, but they call in technicians for assistance from time to time. They have no permanent contracts with these companies, and according to them, they are not outsourcing. Only four participants (P1, P3, P7, P14) admitted using outsourcing due to the lack of skills (human resource-related issue).

P1 said: "Some of our IT resources are partly outsourced [for the complex in-house system configuration]. The reason is the lack of in-house specialised skills" (Appendix C1). P3 mentioned that outsourcing allows them to access advanced technical support. Contrary to P3, participants P2, P5, P6, P7, P8, P9, P10 and P13 confirmed not outsourcing their systems. P6, P8 and P10 stated that they call in an external company whenever needed. P13 argued that CC is a form of outsourcing and stated that there is no outsourcing other than using CC.

**Finding 24:** Although many enterprises do not admit to outsourcing their IT services, external companies are indeed used to maintain their systems

### IQ 2.1.3: What is the level of IT skills in your enterprise's work force?

To be ready for CC adoption in terms of effective use means that the enterprise adopting the technology must interact effectively with the technology without a problem, which requires a certain level of IT skills.

Six of the 14 participants (P1, P3, P4, P5, P13, P14) claimed to have a high level of IT skills. P1 stated that the business they run is providing IT services, and they cannot run the business without having IT skills. Eight participants mentioned that they have a basic level of IT skills (P6, P7, P8, P9, P10, P11, P12) or intermediate (P2) IT skills.

**Finding 25:** There is a lack of CC technical skills in SEs

### IQ 2.1.4: Do you use or are you aware of any form of cloud computing use in the organisation?

SEs need to at least have a general knowledge of what technology they have adopted or what they want to adopt. Awareness of the technology they have or want is an indication of a probability of readiness for that technology to some extent.

The answers to this question varied. Eight participants (P1, P2, P3, P4, P5, P6, P13, P14) responded that they have and are aware of the use of CC in their enterprises. P1 stated that they use SaaS for their office applications (Appendix C1). P2 added that they use CC to access email where they have Google email accounts, and that they also have an accounting system (QuickBooks) that is in the cloud. P7, P8, P9, P10, P11 and P12 said that CC is not in use in their

enterprises. However, not all who state that cloud is in use were able to clearly say what form of a cloud is being used.

**Finding 26: SEs are not aware of the cloud solutions being used in their own enterprises**

*IQ 2.1.5: How do you trust promised cloud computing services for the competitiveness of your business?*

With regard to technology adoption such as CC, trust is an important factor that determines the readiness for the adoption. Without trust in CC, it simply cannot be adopted or used optimally.

P1 stated that they trust CC due to the high availability of systems, data security and up to date systems. P2 argued that although they have trust in CC, there is no choice and as customers, they are forced to accept what they get. P14 advanced the view that it is not about trusting the provider, but as a business the trust is based on the protection of the image of the business more than anything else: "We trust providers because we must protect our relationship in order to give credit to the business" (Appendix C14).

Four participants (P7, P10, P11, P12) shared the view of P14, namely that they do not trust the providers, as the marketed services are not what they get after signing the contract. The lack of understanding as the reason for not trusting CC was mentioned by some participants (P10, P11, P12). P13 said it is not possible to trust CC offerings if the SLA negotiations are not properly done, and there is a high possibility of being locked in once they sign up for the service. The view of P13 is supported by P6 who stated that trust depends on SLAs, and there is no direct SLA negotiation that takes place.

**Finding 27:** The lack of trust in CC adoption is a reality in SEs

*IQ 2.1.6: If cloud computing is not being used in your organisation, is there any consideration of adopting it in the future? Why?*

This question applies to the enterprises that do not use CC. Of the 14 participants, six have not adopted CC (P7, P8, P9, P10, P11, P12). Of these six enterprises, five (P8, P9, P10, P11, P12) were not prepared to adopt CC at least in the near future, while one SE (P7) was already in the process of adopting it. The reason advanced by participants is that they do not understand CC (P11), they do not trust

CC (P8, P12), and they do not see any value in adopting CC (P9, P10). P10 stated the following: "[We have] no idea of adopting it further; we do not see the benefit for our business" (Appendix C10).

**Finding 28:** The trustworthiness of cloud providers and insufficient understanding of the cloud paradigm by SEs keep them away from adopting CC

### IQ 2.1.7: What potential benefits do you see in conducting the adoption readiness assessment?

The readiness for CC adoption can only be accurately determined by conducting the readiness assessment. It is important for SEs to understand the importance of the adoption readiness assessment before decide to adopt.

P1 argued that although it is important to conduct a readiness assessment, their company did not have a need to do it, as they have never had IT infrastructure on their premises. More than 50% of the participants agreed on the necessity of conducting a readiness assessment if one wants to successfully implement a technology. P3 stated: "The readiness assessment will allow determining what and why they need it" (Appendix C3).

P2 added that the readiness assessment builds trust and allows for smooth adoption/implementation, but it is almost impossible to assess readiness for small organisations (Appendix C2). P2 substantiated this view saying that the lack of skills in SEs is the reason why conducting the readiness assessment is practically difficult. P7 and P9 did not see the importance of conducting a readiness assessment. They stated the lack of understanding of what should be done and why it should not be done as reason.

**Finding 29:** There are contradicting views on the understanding of benefits and the importance of adoption readiness assessment by enterprises

**Finding 30:** Although it is beneficial to conduct a readiness assessment, the lack of skills in SEs renders it impossible

### IQ 2.1.8: Is your organisation open to technological change? How and why?

A culture of openness to technological change makes it much easier for SEs to adopt new/emerging innovations such as CC. The level of openness can be considered as a strong adoption readiness indicator. While many participants shared the view of willingness to embrace change for new innovations, some

expressed reserve when they mentioned the dependency on the decision making bodies.

P7 expressed his views with these words: "Not really. It is a management decision and sometimes they do not see the need for changing to the new technology as it is seen an unnecessary cost to the company" (Appendix C7). Participants P1, P2, P3, P4, P5, P6, P8, P10, P11, P12, P13 and P14 confirmed that their enterprises are open to technological change.

**Finding 31:** SEs show interest in adopting new technological innovations such as CC

**IQ 2.1.9: How can you explain readiness for adoption of a technology such as cloud computing, putting it into the context of your organisation and business?**

Adoption readiness can have different meanings for different contexts. This question aimed to persuade the respondents to provide the meaning of adoption readiness in the context of their enterprises. The manner in which respondents expressed themselves revealed the perception they have of adoption readiness.

P1 stated that adoption readiness is synonymous to infrastructural preparedness: "Being prepared for the adoption; having of the required tools and infrastructure ready; understand all the processes, IT and business and know how they can be integrated to use the technology to run business" (Appendix C1). This view was supported by P2, P13 and P14. P8 indicated the meaning of adoption readiness as understanding the need and the technology to be adopted, as it assists in adopting the right technology and choosing the right service provider (Appendix C8).

**Finding 32:** There is a perception that SEs in general have a vague understanding of what technology adoption readiness implies

*IQ 2.1.10: How advantageous do you think cloud computing is for small businesses such as yours?*

From the participants' answers is seems that enterprises are aware of the benefits CC can bring to their businesses. According to P1, CC technology allows SEs to access IT infrastructure that they could not afford previously. P2 expanded on this by saying that with CC, data and system security is more stable and controlled, as cloud providers have well-qualified professionals to look after the systems in the

cloud. Participants P5, P6, and P7 shared the view that CC comes with a reduced cost of IT resource access and use, and it improves business operations.

Contrary to the participants who viewed CC as a tool that brings a competitive advantage to SEs' business, a few participants could not find any advantage in using CC. P8, P9 and P11 shared the same feeling, namely that they do not understand what CC is and they do not see any advantage. P10 did not perceive any advantage in CC adoption, as their enterprise "does not need CC". In the same breath, P12 saw no advantage in cloud implementation: "It has no advantage to our business. They want to suck our money without much to gain" (Appendix C12).

**Finding 33:** There is a lack of understanding of what CC is and as a result, SEs could not state the advantages of CC for their enterprises

### IQ 2.1.11: What financial gain can your organisation enjoy from cloud computing adoption? Explain.

SEs share the common problem of financial struggle, which impacts heavily on business performance, growth and sustainability. The awareness of the benefits to gain from CC adoption by the enterprise is directly related to the enterprise's level of readiness for CC adoption.

According to participants P1, P2, P3, P4, P6, P7, P13 and P14, CC is perfect as there is no need for investing in IT infrastructure and maintenance, while operational costs are low. Capital expenditure (CAPEX) is minimal in a cloud environment, while operational expenditure (OPEX) increases, opined P13 and P14. However, P2 and P5 argued that although there is no upfront investment in IT infrastructure, enterprises can run the risk of spending much more on the cloud than on on-site infrastructure, especially in the long run. P5 said: "If CC is to be used for a short period, that can be profitable, but if the implementation is for a significantly long period, on-premise solutions can be cost effective" (Appendix C5).

According to P12, there is no financial benefit in using CC. P8, P9, P10 and P11 indicated that they do not have a sufficient understanding of the CC concept. Sixty-four percent (64%) of the participants (8 of 14) thought that CC adoption by SEs is financially beneficial, while 36% (6 of 14) could not see any financial benefit in CC adoption.

**Finding 34:** There are conflicting views on the belief that CC can be of financial benefit to SEs

**Finding 35:** SEs' lack of understanding and awareness prevent them from seeing CC as financially advantageous

***IQ 2.1.12:*** *If moved to the cloud environment, what are your considerations for the service continuity and recovery plans? In your opinion, who should be held responsible for data loss in case there is a breach relating to data stored in the cloud?*

Each system is designed with a clear security and service continuity plan and policies. This question sought to uncover whether enterprises are aware of their system security matters, which is one of the signs of adoption readiness. A clear understanding of the responsibilities and accountability of systems and data indicates the enterprise's level of preparedness for CC adoption.

Eight (P2, P3, P5, P6, P7, P8, P10, P11) of the 14 participants opined that security as well as continuity of service and systems in the cloud is the sole responsibility of cloud providers, and that enterprises adopting CC have no role to play. Three participants (P1, P13, P14) stated that in the cloud environment, the responsibility and accountability are shared between the provider and the customer (enterprise). Other respondents (P12, P5) indicated no need for a plan as they cannot plan for what they do not trust. According to P12, "the data in the hands of someone else cannot be trusted. We cannot let our information be managed by other people without control" (Appendix C12).

**Finding 36:** Enterprises are not ready to take responsibility of their data and systems housed in the cloud environment

The responses from the IQs related to the RSQ 2.1 were analysed, and 15 findings were identified. These findings are presented in Table 4.10, where each finding is linked to the category and related theme.

Table 4.10: Summary findings: RQ 2.1

| No. | Finding | Category | Theme |
|-----|---------|----------|-------|
| 23 | There is an acceptance by SEs of a pressing need for ICT in order to competitively run business operations in SEs | Requirements readiness indicators | Adoption readiness indicators |

| No. | Finding | Category | Theme |
|-----|---------|----------|-------|
| 24 | Although many enterprises do not admit to outsourcing their IT services, external companies are indeed used to maintain their systems | Requirements readiness indicators | Adoption readiness indicators |
| 25 | There is a lack of CC technical skills in SEs | Requirements for CC adoption readiness | Adoption readiness indicators |
| 26 | SEs are not aware of the cloud solutions being used in their own enterprises | Understanding of concepts and awareness | Understanding of concepts |
| 27 | The lack of trust in CC adoption is a reality in SEs | State of interest and trust in CC | Trust in CC adoption |
| 28 | The trustworthiness of cloud providers and insufficient understanding of the cloud paradigm by SEs keep them away from adopting CC | State of interest and trust in CC | Trust in CC adoption |
| 29 | There are contradicting views on the understanding of benefits and the importance of adoption readiness assessment by enterprises | Understanding of concept and adoption awareness | Understanding of concepts |
| 30 | Although it is beneficial to conduct a readiness assessment, the lack of skills in SEs renders it impossible | Requirements for CC adoption readiness | Adoption readiness indicators |
| 31 | SEs show interest in adopting new technological innovations such as CC | State of interest and trust in CC | Trust in CC adoption |
| 32 | There is a perception that SEs in general have a vague understanding of what technology adoption readiness implies | Understanding of concept and adoption awareness | Understanding of concepts |
| 33 | There is a lack of understanding of what CC is and as a result, SEs could not state the advantages of CC for their enterprises | Understanding of concept and adoption Awareness | Understanding of concepts |
| 34 | There are conflicting views on the belief that CC can be of financial benefit to SEs | Perceived adoption benefits | Drivers for CC adoption |
| 35 | SEs' lack of understanding and awareness prevent them from seeing CC as financially advantageous | Adoption challenges / barriers for adoption readiness | Understanding of concepts |
| 36 | Enterprises are not ready to take responsibility of their data and systems housed in the cloud environment | Data security and recovery | Understanding of concepts |

### 4.6.2 RSQ 2.2

**RSQ 2.2: What kind of assessments do SEs perform to assess their readiness for technology adoption?**

*IQ 2.2.1: Is there a dedicated IT unit in your organisation (enterprise)?*

In any environment, especially IT, dedication and accountability is measured based on the importance the IT units are given by the enterprises. This question was asked to gauge the level of accountability and to some extent the priority IT receives from the enterprises' management.

Only two participants (P4, P6) mentioned the existence of IT units in their respective organisations. The other 12 seem not to have any dedicated IT units. When asked why, the reason advanced was the lack of resources.

**Finding 37:** SEs do not have dedicated IT units in their organisations

### IQ 2.2.2: What is the main role played by IT staff in your organisation pertaining to technology adoption decision making?

The extent of SEs' management support and trust in technical staff has a direct impact on technology adoption decision making. This question aimed to obtain the opinions of the respondents on the involvement of staff in deciding and using technology. The soundness of effective adoption decision making is a direct indicator of the extent of the SEs' readiness to adopt and use the technology.

According to eight interview participants (P1, P2, P3, P8, P9, P11, P12, P14), the decision to adopt a given technology is the sole mandate of management, with no consultation of employees. In some SEs, the management has no confidence in the technical staff and wants to control every step of the adoption process of new innovations such as CC, which is indicative of the immaturity and lack of adoption readiness in these enterprises. Is portrays a lack of trust in the employees and management taking the full control. Six participants (P4, P5, P6, P7, P10, P13) advised that although the decision making power lies is the hands of management, a consultative dialogue with staff members occurs before the final decision is made.

**Finding 38:** IT staff are not involved in decision making with regard to technology adoption

### IQ 2.2.3: How do you determine whether a new technology such as cloud computing is ready for adoption?

The adoption of a given technology requires assessing the existing system to determine whether the enterprise is prepared for the adoption. According to nine participants (P3, P4, P6, P7, P9, P11, P12, P13, P14), technology adoption readiness is determined by the business needs and requirements. According to P13 and P14, the business requirements determine the need for new innovations, but new technologies must be tested in the existing environment before implementation.

P1 stated: "Constantly monitor the environment, and business needs will dictate" (Appendix C1). P3 indicated that the readiness to adopt a new technology is determined by "the needs of the business, calculation of the value to be brought to the business (benefits), and a financial overhead analysis" (Appendix C3). P7 said there are no mechanisms in place to determine readiness and that the decisions are opportunity driven (Appendix C7).

**Finding 39:** The adoption readiness assessment does not seem to be practiced in SEs before adopting new innovations

*IQ 2.2.4: What would you consider to be critically important when deciding to move your applications to the cloud? Is there any pre-defined process in place?*

The decision of SEs to move to the cloud requires thorough consideration in order to achieve satisfying results. In answering the posed question, six participants (P1, P5, P6, P7, P9, P13) expressed that before the decision is made, it is important to take into account a number of issues, but these are not specific. In similar reasoning, six participants (P2, P3, P10, P11, P12, P14) openly stated that they do not have any specific considerations, or they do not understand what they should look at. P10 said: "No idea at the moment" (Appendix C10). P11 stated: "There is no process, we do things as we see them fit our budget in relation to our needs" (Appendix C11), and P12 indicated: "No consideration as we do not see any value in moving to cloud" (Appendix C12).

P13 argued that some important factors to consider are related to internal systems and internet availability:

> "Reliable internet availability. Is there infrastructure redundancy built in the provider's infrastructure? We must have conducted a full test on the application to ensure integration and inter-operability; and the support and cost involved. The process we have is to conduct a test, and make sure scalability and redundancy is built in the infrastructure based on the SLA drawn by the providers" (Appendix C13).

Security-related matters and availability of skills have been mentioned by P1 and P13, while P6 added skills availability as a factor not to be ignored during the assessment process.

**Finding 40:** Enterprises are not sure of the specifics to take into account when deciding on CC adoption and they do not have any process in place

### IQ 2.2.5: Who is in charge of the maintenance of your organisational IT assets?

The responses from participants are equally divided. Fifty percent (50%) of the participants (P1, P2, P3, P5, P6, P13, P14) stated that they maintain their systems themselves, while the other half (P4, P7, P8, P9, P10, P11, P12) said their enterprises use external technicians to maintain their systems. However, even those claiming to maintain their systems themselves alluded to the lack of high technical skills.

**Finding 41:** The maintenance of IT assets in SEs is done by external companies due to the lack of in-house skills

### IQ 2.2.6: What cloud computing deployment model has been implemented in your organisation so far? How was it decided on?

### IQ 2.2.7: Was there any pre-assessment performed? What were the challenges encountered in the implementation process, if any?

Interview questions 6 and 7 were asked to assess the awareness of enterprises regarding their cloud solution in use if there is one, and to determine whether there was logic applied when they adopted the solution. Due to the close relatedness of these two questions, it makes sense to combine them for analysis purposes, as separating them can produce incomplete information, leading to a skewed interpretation.

 Eight participants (P1, P2, P3, P4, P5, P6, P13, P14) confirmed having cloud implemented in their enterprises. Of these, two (P3, P6) were not sure of the type of cloud they have. The remainder six mentioned SaaS as the cloud model implemented. P13 and P14 also added IaaS and SaaS. When asked how the decision to adopt was reached, only two participants (P13, P4) had an idea of how it was decided on. P14 stated: "The decision was based on the needs and the budget available at that time" (Appendix C14). The other participants were not sure of how the decision of adoption was reached and what served as the basis of the decision.

**Finding 42:** The majority of the enterprises that have adopted CC use SaaS, but they do not know how it was decided on, and they are not aware of any pre-assessment that was done

***IQ 2.2.8:  Is there a clear IT strategy in your organisation? If yes, how is it in
line with your business strategy?***

Three participants (P1, P13, P14) responded that they have an IT strategy in place
and that it is in line with the business strategy. P10 stated that they have no IT
strategy, mainly because they do not have IT departments in the organisation
(Appendix C10). As per P2: "There is no IT strategy in place, everything is done as
it is seems fit" (Appendix C2). The necessity of an IT strategy was not felt by P5:
"No, we do not think an IT strategy is necessary, a business strategy will suffice"
(Appendix C5).

One participant (P3) stated that the organisation is in the process of developing an
IT strategy: "There is a business strategy in place. An IT strategy is being
developed and the two strategies must go hand in hand (integration)" (Appendix
C3).

**Finding 43:** There is a lack of IT strategy in SEs, and the understanding of the
role of an IT strategy is not sensed in enterprises

***IQ 2.2.9:  Any new technology or process gets adopted because of the
perceived business value it can provide. Is there any way to assess
the value to be brought by the new innovations in the organisation
before embarking on the adoption? Please expand.***

It is not possible to know whether one has achieved the goals set if there is no
means to measure the results of the planned actions. The success of a project is
determined by what the post-implementation evaluation reveals.

Some participants (P1, P2, P3, P13) mentioned that they do monitor the
performance of their systems that are in the cloud, conduct cost analyses, and use
users' feedbacks as a means to measure the value added by CC; however, they
have no dedicated tool or process in place to evaluate the gains from CC. P13
posited: "We do not conduct any evaluation, but we know it works based on the
feedback from clients; and the new implemented system allows us to accomplish
our goal by meeting the customers' expectations" (Appendix C13). P3 stated the
following: "We monitor the system and analyse performance reports against the
signed SLA; we use feedback from customers and users' evaluations to position
ourselves" (Appendix C3). Other participants clearly indicated that they do not
have any process and do not perform any evaluation assessments. P6 indicated
that there is no established way of measuring the value gained from technology

adoption. In the same light, P7 stressed that there is no means to perform a value assessment gained from technology adoption.

**Finding 44:** Small enterprises do not have mechanisms to evaluate their investment in the cloud against expectation

*IQ 2.2.10: What are the criteria you have in place for the selection of a cloud provider in your organisation, if needed?*

The success of the adoption and use of CC depends on the proper analysis and provider selection, service offered, and how these services are offered. It is imperative that adopters understand what to look out for when deciding on cloud providers.

The striking point in the participants' answers is that when deciding on the provider, their considerations relate to the cost involved in acquiring the services. P2 mentioned: "Price, type of service, support mechanism, cost involved" (Appendix C2). P8, P10 and P12 indicated the cost and support model as the main factors to be considered when deciding on the service provider.

Apart from the cost and support model, participants mentioned the type of service provided (P1, P2, P13, P14). P6 considered SLA definition as the main factor for adoption decision making, and P3, while supporting P6, stipulated that the provider's local presence is an important consideration to take note of: "provider local presence, type of infrastructure requirement and support, service level agreement (SLA)" (Appendix P3).

**Finding 45:** SEs consider SLA negotiation/definition as well as the provider's local presence as the main criteria to be considered for provider selection

**Finding 46:** Support model and cost-related issues are the main factors influencing SEs in deciding on cloud providers, leaving out other aspects indicating the low level of adoption readiness

*IQ 2.2.11: How do you plan to protect the organisational assets moved to the cloud?*

The protection of data is crucial to any organisation. The move of data and systems to the cloud makes it more complex, and consequently, enterprises need to have a certain level of understanding on who should be held responsible for data and systems in the cloud and how it should be affected.

Twenty-one percent (21%) of the participants (P1, P13, P14) understood that the data and systems being housed in the cloud are equally protected by the enterprises and the cloud providers, meaning they have a shared responsibility. P14 stated the following: "When it comes to security, we rely on the service provider, but we have a shared responsibility in securing our data that are in the cloud. The provider will secure the infrastructure, but the actual data, we must make sure that it incepted and protected, as we are accountable to our customers and government, hence we have a shared responsibility" (Appendix P14).

Contrary to this, 36% of the participants (P2, P3, P4, P5, P6) opined that the security of data/systems in the cloud is the sole responsibility of the cloud provider and they have nothing to be accounted for. P2 stated that the enterprise relies on the service provider for data security. P3 added the following statement: "The protection of the data in the cloud is left to the provider, as the agreement should include it. Risk assessment is conducted before signing the agreement" (Appendix P3). The respondents who do not have an interest in or do not trust CC did not want to comment on this question.

**Finding 47:** There is a need for awareness to educate enterprises on the responsibilities and accountability of each party in the cloud environment

*IQ 2.2.12:* **What type of cloud service has been adopted in your enterprise, and what is the likelihood of cloud computing being adopted if it is not in use yet?**

The awareness of the service in users depicts their readiness for CC adoption.

All the participants who did not adopt CC (P7, P8, P9, P10, P11, P12) indicated that they have no plan to adopt CC. The main reason given is that they do not have a clear understanding of what CC is and have no trust or interest in CC adoption. Two participants (P10, P12) advanced the lack of trust as the motive for not considering cloud. The majority of participants that have adopted CC opted for SaaS except for two participants (P13, P14) where IaaS is in use.

**Finding 48:** There is still a significant number of SEs that are not considering cloud as an option for ICT access

***IQ 2.2.13: Do you have an IT staff training plan in your organisation, especially when a new technology is to be adopted? Expand if needed.***

IT systems and specifically CC are evolving fast, which means that with the ever-changing environment, there should be a defined way of keeping track of the new developments and interacting with the system effectively. A plan for development and training is deemed important for any organisation to enable staff to stay up to date as the system goes through various changes and updates.

Five participants (P1, P5, P6, P13, P14) stated that they have a staff training plan in place. P5 mentioned: "There is no proper plan, but as part of the job requirement, staff members are expected to keep themselves up to date with technology in order to offer services (self-training)" (Appendix C5). Some participants said that staff members are required to find ways for self-training via available online courses, while others said they have no training plan in place.

**Finding 49:** SEs do not have a plan for technical skill development and training for staff members

***IQ 2.2.14: How risk aware is your organisation with regard to the enterprise's digital assets?***

In today's economy, data are a highly valuable asset for any business. For an enterprise to decide to take their irreplaceable assets and place them under someone else's control is a risky decision. Hence, it is very important for SEs planning to move to CC to understand the risks involved. This question was asked to determine the level of risk-taking of SEs as far as their data and systems are concerned.

Eight participants (P1, P2, P3, P5, P6, P12, P13, P14) indicated that they are highly risk aware, while three perceive themselves as low risk aware. One participant (P4) said they are at a medium level, while two indicated they do not care.

**Finding 50:** SEs still hesitate to take the risk of moving their sensitive data/system to the cloud environment

The fifteen (15) findings drawn for RSQ 2.2 are presented in Table 4.11. The finding categories and themes are directly linked to the research findings, which in turn are related to the research questions.

Table 4.11: Summary findings: RQ 2.2

| No. | Finding | Finding Category | Theme |
|---|---|---|---|
| 37 | SEs do not have dedicated IT units in their organisations | Requirements and adoption readiness indicators | Adoption readiness indicators |
| 38 | IT staff are not involved in decision making with regard to technology adoption | Management support and decision making | Drivers for CC adoption |
| 39 | The adoption readiness assessment does not seem to be practiced in SEs before adopting new innovations | Requirements and adoption readiness indicators | Adoption readiness indicators |
| 40 | Enterprises are not sure of the specifics to take into account when deciding on CC adoption and they do not have any process in place | Requirements and adoption readiness indicators | Adoption readiness indicators |
| 41 | The maintenance of IT assets in SEs is done by external companies due to the lack of in-house skills | Requirements and adoption readiness indicators | Drivers for CC adoption |
| 42 | The majority of the enterprises that have adopted CC use SaaS, but they do not know how it was decided on, and they are not aware of any pre-assessment that was done | Requirements and adoption readiness indicators | Adoption readiness indicators |
| 43 | There is a lack of IT strategy in SEs, and the understanding of the role of an IT strategy is not sensed in enterprises | Requirements and adoption readiness indicators | Understanding of concepts |
| 44 | Small enterprises do not have mechanisms to evaluate their investment in the cloud against expectation | Perceived adoption benefits | Adoption readiness indicators |
| 45 | SEs consider SLA negotiation/definition as well as the provider's local presence as the main criteria to be considered for provider selection | Understanding of concepts and awareness | Adoption readiness indicators |
| 46 | Support model and cost-related issues are the main factors influencing SEs in deciding on cloud providers, leaving out other aspects indicating the low level of adoption readiness | Drivers for CC adoption | Drivers for CC adoption |

| No. | Finding | Finding Category | Theme |
|-----|---------|------------------|-------|
| 47 | There is a need for awareness to educate enterprises on the responsibilities and accountability of each party in the cloud environment | Understanding of concepts and awareness | Understanding of concepts |
| 48 | There is still a significant number of SEs that are not considering cloud as an option for ICT access | State of interest and trust in CC | Trust in CC technology |
| 49 | SEs do not have a plan for technical skill development and training for staff members | Requirements and adoption readiness indicators | Readiness indicators |
| 50 | SEs still hesitate to take the risk of moving their sensitive data/system to the cloud environment | Security and control | Drivers for CC adoption |

In Table 4.12, the five (5) identified themes are presented as they relate to the research findings and linked to the RQs and SRQs.

Table 4.12: Summary of themes and findings, arranged per RSQ and RQ

| Themes | Findings | RSQ | RQ | No. of findings |
|--------|----------|-----|-----|-----------------|
| Adoption readiness indicators | 5, 6, 14, 15, 20, 23, 24, 25, 30, 37, 39, 40, 42, 44, 45, 49 | 1.1, 1.2 2.1, 2.2 | 1 2 | 16 |
| Understanding of concepts | 1, 2, 4, 7, 13, 21, 26, 29, 32, 33, 35, 36, 43, 47 | 1.1, 1.2 2.1, 2.2 | 1 2 | 14 |
| Trust in CC adoption | 9, 12, 18, 27, 28, 31, 48 | 1.1, 1.2 2,1, 2.2 | 1 2 | 7 |
| Drivers for CC adoption | 3, 10, 11, 16, 17, 19, 34, 38, 41, 46, 50 | 1.1, 1.2, 2.1, 2.2 | 1 2 | 11 |
| Regulatory compliance | 8, 22 | 1.1, 1.2 | 1 | 2 |

## 4.7  Summary of findings grouped by RQ / RSQ

The research findings have been analysed with the aim of finding answers to the posed research questions in order to address the identified problem (section 1.3). Findings were grouped into five (5) themes as they relate to research questions (Table 4.12) as follows:

- **Adoption readiness indicators:** There are 16 findings that relate to the theme and contribute to answering RSQ 1.1, RSQ 1.2, RSQ 2.1 and RSQ 2.2

- **Understanding of concepts:** There are 14 findings for this theme, and the findings address RSQ 1.1, RSQ 1.2, RSQ 2.1 and RSQ 2.2
- **Drivers for CC adoption:** There are 11 findings that relate to the drivers for technology adoption and contribute to answering RSQ 1.1, RSQ 1.2, RSQ 2.1 and RSQ 2.2
- **Trust in CC adoption:** There are seven (7) findings contributing to answering RSQ 1.1, RSQ 1.2, RSQ 2.1 and RSQ 2.2
- **Regulatory compliance:** There are two (2) findings that provide the answers to RSQ 1.1 and RSQ 1.2

The findings of this study as they map to the research questions are presented in Table 4.13, and each finding is linked to the question it is likely to find the answers for.

**Table 4.13: Research findings summary (all questions)**

| No. | Findings | RSQ |
|---|---|---|
| 1 | The concept of CC is learnt via unconventional means, leading to the lack of a clear understanding of what CC entails | 1.1 |
| 2 | Many SEs have little awareness of CC technology, as they do not seem to have a clear understanding of CC | 1.1 |
| 3 | There is a perception that CC comes with low computing cost, with potential for business sustainability | 1.1 |
| 4 | The adoption of CC is not clearly understood and does not bring sustainability in business | 1.1 |
| 5 | There is a lack of understanding of the necessity of readiness assessment before new innovation adoption | 1.1 |
| 6 | There is a need for CC adoption by SEs for business competitive operations | 1.1 |
| 7 | There is a lack of clear understanding of CC which leads to the lack of seeing the benefits cloud can offer to small businesses | 1.1 |
| 8 | The understanding of the importance of regulatory compliance pertaining to the adoption and use of CC and the awareness thereof is absent in SEs | 1.1 |
| 9 | Enterprises seem not prepared for CC adoption, resulting in reluctance to adoption | 1.1 |
| 10 | SEs lack the ability to clearly identify the areas in the systems that CC can have an effect on | 1.1 |
| 11 | The sensitivity of data, systems, and the cost is the main driving factor for the move to the cloud, implying that data management systems and operations can be affected by CC | 1.1 |
| 12 | There is little trust in CC, resulting in reluctance/rejection of CC adoption | 1.1 |
| 13 | While some enterprises can see the benefits of pay-as-you-use CC, there is still a need for understanding/awareness of the concept | 1.1 |
| 14 | CC is perceived as a low-cost solution, but over the long term it is more expensive than on-premises infrastructure | 1.1 |
| 15 | SEs have internet access, but the connectivity is not sufficiently reliable for all | 1.1 |

| No. | Findings | RSQ |
|---|---|---|
| 16 | The decision to adopt CC is mainly influenced by the needs of the business, finances, and system availability | |
| 17 | The benefits of CC for enterprises are mainly the reduction of costs associated with IT, system availability and performance | 1.2 |
| 18 | Many SEs that consider CC as a solution prefer to move non-sensitive data/systems to the cloud | 1.2 |
| 19 | There is a lack of understanding and awareness of CC regarding the financial benefits it can offer to SEs | 1.2 |
| 20 | There is a lack of IT infrastructure, strategy and skills in enterprises, which affects the analysis of existing systems for possible systems integration | 1.2 |
| 21 | CC is perceived as having hidden costs | 1.2 |
| 22 | The awareness and understanding of Regulations and compliance pertaining to CC adoption in SEs are lacking and perceived to be complex and confusing | 1.2 |
| 23 | There is an acceptance by SEs of a pressing need for ICT in order to competitively run business operations in SEs | 2.1 |
| 24 | Although many enterprises do not admit to outsourcing their IT services, external companies are indeed used to maintain their systems | 2.1 |
| 25 | There is a lack of CC technical skills in SEs | 2.1 |
| 26 | SEs are not aware of the cloud solutions being used in their own enterprises | 2.1 |
| 27 | The lack of trust in CC adoption is a reality in SEs | 2.1 |
| 28 | The trustworthiness of cloud providers and insufficient understanding of the cloud paradigm by SEs keep them away from adopting CC | 2.1 |
| 29 | There are contradicting views on the understanding of benefits and the importance of adoption readiness assessment by enterprises | 2.1 |
| 30 | Although it is beneficial to conduct a readiness assessment, the lack of skills in SEs renders it impossible | 2.1 |
| 31 | SEs show interest in adopting new technological innovations such as CC | 2.1 |
| 32 | There is a perception that SEs in general have a vague understanding of what technology adoption readiness implies | 2.1 |
| 33 | There is a lack of understanding of what CC is and as a result, SEs could not state the advantages of CC for their enterprises | 2.1 |
| 34 | There are conflicting views on the belief that CC can be of financial benefit to SEs | 2.1 |
| 35 | SEs' lack of understanding and awareness prevent them from seeing CC as financially advantageous | 2.1 |
| 36 | Enterprises are not ready to take responsibility of their data and systems housed in the cloud environment | 2.1 |
| 37 | SEs do not have dedicated IT units in their organisations | 2.2 |
| 38 | IT staff are not involved in decision making with regard to technology adoption | 2.2 |
| 39 | The adoption readiness assessment does not seem to be practiced in SEs before adopting new innovations | 2.2 |
| 40 | Enterprises are not sure of the specifics to take into account when deciding on CC adoption and they do not have any process in place | 2.2 |
| 41 | The maintenance of IT assets in SEs is done by external companies due to the lack of in-house skills | 2.2 |
| 42 | The majority of the enterprises that have adopted CC use SaaS, but they do not know how it was decided on, and they are not aware of any pre-assessment that was done | 2.2 |

| No. | Findings | RSQ |
|-----|----------|-----|
| 43 | There is a lack of IT strategy in SEs, and the understanding of the role of an IT strategy is not sensed in enterprises | 2.2 |
| 44 | Small enterprises do not have mechanisms to evaluate their investment in the cloud against expectation | 2.2 |
| 45 | SEs consider SLA negotiation/definition as well as the provider's local presence as the main criteria to be considered for provider selection | 2.2 |
| 46 | Support model and cost-related issues are the main factors influencing SEs in deciding on cloud providers, leaving out other aspects indicating the low level of adoption readiness | 2.2 |
| 47 | There is a need for awareness to educate enterprises on the responsibilities and accountability of each party in the cloud environment | 2.2 |
| 48 | There is still a significant number of SEs that are not considering cloud as an option for ICT access | 2.2 |
| 49 | SEs do not have a plan for technical skill development and training for staff members | 2.2 |
| 50 | SEs still hesitate to take the risk of moving their sensitive data/system to the cloud environment | 2.2 |

## 4.8 Chapter summary

In Chapter Four, the results and findings of the study were discussed in detail. The chapter started with the introduction and overview of the case study, followed by the discussion of the interviews and participants' transcriptions. The analysis of the research findings followed, resulting in categories and themes as they relate to the RQs and RSQs.

Based on 50 summary findings, nine (9) categories were formed, and five (5) themes were generated from these nine categories, namely:

i) Understanding of concept and adoption awareness of CC

ii) Concerns around CC adoption and use

iii) Perceived CC adoption benefits

iv) Requirements for CC adoption readiness

v) Drivers for CC adoption

vi) Regulatory compliance and its impact on CC adoption readiness

vii) State of trust and interest in CC adoption

viii) Data security and data recovery

ix) Requirements and technology adoption readiness indicators

The following themes have been identified from the finding categories, namely:

i) Understanding of concepts

ii) Trust in CC technology

iii) Drivers for CC adoption

iv)     Adoption readiness indicators

v)      Regulatory compliance

In the next Chapter, the themes that were derived from the findings are discussed as they relate to the research questions and objectives.

# CHAPTER FIVE: DISCUSSION OF THE FINDINGS

## 5.1 Introduction

SEs make a large contribution towards the global economy (Gillwald & Moyo, 2014), but in many cases they lack the capital to grow (Mbuyisa & Leonard, 2015; Oyelana & Adu, 2015). In the 21st century, marked by the information age and ever-changing business environments (Harfoushi, Akhorshaideh, Aqqad, Al Janini & Obiedat, 2016), ICT has taken the lead in all spheres of the life of businesses (Alkhater et al., 2018). To be able to sustainably participate in global competition, there is a necessity for business entities of all sorts to embrace the efficient use of resources, seeking to excel operationally (Senyo et al., 2018). ICT has been proven to support business operations effectively. Unfortunately, the affordability is not for all, and SEs, especially in developing communities, suffer the most.

CC emerged as a computing solution for SEs that cannot afford large investments in technology that is required for their business growth and sustainability. CC computing promises to provide access to computing resources at an affordable cost, and the services are provided with flexibility and scalability. However, to be able to benefit optimally from cloud offerings, enterprises need to be prepared for CC adoption, otherwise the adoption is likely to not produce the anticipated results.

A number of previous studies on SEs have revealed that organisations already using CC are not able to determine their readiness for adoption (Ray, 2016). Cloud adoption is defined as the ability to shift from the traditional ways of using technology to the access of computing resources via the Internet in a flexible and cost-effective manner (Oguntala et al., 2017). SEs' readiness for cloud adoption in Cape Town has been explored in this study.

As indicated in previous chapters, CC is potentially beneficial to SEs (Hassan, Herry & Nasir, 2017). Oguntala et al. (2017) opine that CC is an enabler of on-demand access to computing resources. Accessing resources minimises and/or eliminates the need for management effort and service provider interaction. In this study, interviews were conducted with selected SEs in Cape Town, findings were drawn and summarised (Table 4.13), and themes were developed (Table 4.12).

The discussion of the developed themes is done in relation to the RQs and RSQs as they map to existing literature in the body of knowledge. The themes discussion aims at finding answers to the posed research questions in order to address the

identified research problem and objectives. In the next section, the five identified themes are discussed in detail. The five themes are:

i) Understanding of concepts
ii) Trust in CC adoption technology
iii) Drivers for CC adoption
iv) Adoption readiness indicators
v) Regulatory compliance

## 5.2 Discussion of theme 1: Understanding of concepts

To successfully adopt and effectively use a technology, the adopter must have a clear understanding of what the technology to be adopted entails. Although understanding and awareness are two different concepts, they are closely related. For the purpose of this study, understanding and awareness will be discussed under the umbrella of theme 1, "Understanding of concepts".

Awareness of the advantages and disadvantages of the new technology, the benefits to be expected from the adoption, and how these benefits can be realised are important factors for adoption readiness. However, awareness is useless without a clear understanding. In this study, the understanding and awareness of CC consists of eleven findings derived from the analysed participant responses. This is a significant number of findings, implicating that the understanding and awareness of CC and the preparedness for CC adoption by SEs are very important factors for a successful implementation and optimal use.

**RSQ 1.1:  What are the determinant factors for cloud computing adoption readiness by SEs?**

In the attempt to find the answers for RSQ 1.1, it is evident that SEs do not have a clear understanding of CC. Mohlameane and Ruxwana (2014) propound the same in their previous research work on the awareness of CC by South African SMMEs. The findings derived in this study are in full agreement with Mohlameane and Ruxwana in terms of SEs having a low level of CC knowledge. The few enterprises that do have some degree of CC knowledge present their views in a confused manner, which is an indication of the lack of understanding and/or awareness of this emerging technology. A clear understanding by enterprises is a major determinant factor of adoption readiness. This is in agreement with the existing findings found in literature.

Avram (2014) posits that although CC is not a solution perfectly fit for all organisations, it can only be adopted once a well-informed analysis has been

conducted. Mohlameane and Ruxwana (2014) support this view by saying that the adoption of new innovations by SMEs is difficult when there is no understanding of new innovations and how they work. Similarly, Senyo et al. (2018) confirm the existence of gaps in the knowledge of cloud technology, where even in academia the partial understanding of CC is still observed.

CC is not known by many enterprises, and those who claim to have knowledge of the concept lack a clear understanding of what the concept entails, as revealed by a participant's statement that, "CC does not mean much to me". While there are enterprises that have been introduced to CC via formal education, many participants heard of cloud CC via informal channels, marketing and self-research, which contributes to the confusion found in understanding the CC paradigm. The confusion or lack of understanding of CC has a significant impact on identifying the adoption determinant factors by enterprises, sliding the scale of adoption readiness for enterprises to the very bottom. The adoption of CC can bring opportunities of sustainable business operations to SEs, but in order to achieve this, the adoption must be based on identifying the factors that are possible to influence CC adoption and use. The level of understanding and identifying influencing adoption factors in enterprises seems to be low, and this is an indication of the low level of readiness for CC adoption. What businesses are looking for is the ability to participate competitively in the market. There is a feeling that few enterprises comprehend the positive impact CC can have on their business operations. However, the number of enterprises that do not see any positive impact CC can have on their business competitiveness, or categorically do not want to adopt CC, is still high. SEs realising the impact that CC can have on their organisations is a strong motivating/de-motivating factor for the adoption, depending on whether the impact is identified as positive or negative.

The lack of identifying these factors by many enterprises shows that SEs are still at a very low level of readiness for the successful adoption and optimal use of CC. This is likely a call for SEs to increase their CC awareness and receive more education on CC. It is important to note that 43% of the enterprises interviewed could not see any significant impact CC can have on their businesses, while 7% had no idea of what to say. Of these 43% of respondents, some have already implemented CC while others could not see any reason why CC should be adopted. Furthermore, even those who could see a possible positive impact of CC on their business, have different views on how their businesses can be affected. These diverse views can be attributed to the different levels of CC awareness those enterprises have. This finding supports Akhusama and Moturi (2016) who

found that among African organisations, the awareness of cloud solutions is lacking. For example, it was found that although some participants see CC as a great concept, there is no reason to apply it to their enterprises. This is despite 93% of participants declaring that the use of ICT is highly important to their businesses operations.

A closer look reveals that the reason for these disparities might be the confused state or lack of understanding of the CC concept. This aligns with the findings of Maresova, Sobeslav and Krejcar (2017) who note that the CC concept is not understood, and a direct evaluation pertaining to CC adoption and use in enterprises is difficult. To summarise, the determinant factors for CC adoption readiness are:

i)   Understanding and awareness of the CC concept
ii)  Understanding the requirements for adoption readiness
iii) The ability to identify the adoption readiness indicators
iv)  Understanding the existing environment
v)   Having a clear understanding of regulation and compliance
vi)  Having trust in the technology
vii) The ability to identify and understand the benefits to gain from CC adoption

## RSQ 1.2: What benefits do SEs expect to gain from cloud computing technology adoption?

As discussed in the previous section, in order to benefit from any technology adoption, enterprises need to have a fair awareness of the technology they want to adopt. Expectations of the new technology once adopted should be identified and well understood by the enterprises, as this will enable them to see the improvements brought by the adoption. In this case, SEs should be able to clearly identify business-enabling changes of CC adoption in their enterprises. This statement is in line with Scholtz, Govender and Gomez's (2016) argument who state that CC brought about computing initiatives that drive economic and societal changes in developing countries, which changes should be able to be identified and understood. The level of understanding the benefits to be gain from CC implementation as well as the factors influencing the adoption, directly dictates the enterprise's level of readiness for the adoption, and this understanding, without doubt, eases the preparation for adoption and optimal use. The lack of clearly identifying and understanding these factors leads to the probability of the adoption failing. Additionally, even if the implementation goes through, the enterprise might

not be able to evaluate the success or failures of the implementation as there is no baseline to be referenced.

As demonstrated by the interview responses, enterprises view the accessibility of computing systems and the reduction of financial cost as the main benefits of CC. However, there are many more benefits to be gained by enterprises from CC adoption. There is a lack of a deeper understanding of what CC technology entails. Being aware of the advantages becomes part of the influencing factors for adoption readiness in enterprises (Hassan, Herry & Nasir, 2017). Forty percent (40%) of the participants could not see any tangible benefits in adopting CC. The lack of understanding the benefits results in SEs still questioning the adoption of CC. Furthermore, the failure to comment on why there is a lack of understanding or trust is an indication of SEs' unpreparedness for adoption. Significant attention should be given to the education and awareness of CC if SEs are to succeed. To summarise, the benefits SEs could gain from adopting CC are:

i) Affordable access to technology
ii) System scalability
iii) Reduction of financial cost associated with ICT infrastructure acquisition
iv) Business process improvement supported by technology
v) Economic growth

**RQ2:  How do SEs determine their readiness for the adoption of cloud computing?**

**RSQ 2.1:  How do SEs define adoption readiness for a given technology such as cloud computing?**

This study sought to explore to what extent SEs in the City of Cape Town are ready for CC adoption. The research also aimed to explore the determinant factors affecting SEs' adoption readiness of CC. The research further sought to explore the barriers faced by SEs when considering the adoption of CC.

The success in the adoption and use of CC technology ultimately depends on how well SEs are prepared for the adoption. This readiness is determined by the determinant indicators based on requirements for cloud implementation and use. It is important to note that these readiness indicators or factors, as informed by one of the technology adoption theories (TOE) developed by Davis (1989), can be technical, organisational or environmental (Xi & Mitrovic, 2014). TAM and DOI are other theories used in determining the indicators for readiness in IS studies.

Determining adoption readiness requires SEs to understand what it is meant by "being ready for adoption", which in turn requires an understanding of what the readiness is for. In this case, the readiness is for CC adoption. Consequently, enterprises are required to analyse their level of awareness and understanding of CC in order to identify the adoption readiness indicators. Arguably, Schofield and Abrahams (2015) as well as Scholtz et al. (2016) posit that in South Africa, nothing has been done as yet to gain the level of readiness required for successful cloud adoption.

Readiness indicators influencing technology adoption must be in place and should be identified for the enterprises to determine their readiness level. CC, as any other technology, is likely to be adopted by SEs, but the requirements or adoption readiness indicators might be different depending on the technology in question.

While CC shares some adoption readiness indicators with other technologies, it has its own specifics. One thing to keep in mind is that CC is not a technology on its own, but a combination and mixture of IT technologies and services that converge to form cloud solutions. This convergence does not make the adoption readiness determination easier. Enterprises need to assess all different components in the cloud ecosystem to ensure that the prospect enterprise is ready in all aspects.

Based on the findings of the research, the majority of the interviewed enterprises are aware of the existence of CC technology at a certain level. There are a few participants who claimed not to have heard of this technology. What is surprising though is that even those who claimed to be aware of CC, did not all have a clear understanding of what CC is. According to the findings, SEs' understanding of the CC concept is minimal, which directly impacts their readiness for adoption.

Technology readiness needs to be determined, and this can only be done through a well-defined assessment. The findings of this research indicate that enterprises to some extent see the importance of conducting the readiness assessment before the adoption of new technologies. The readiness assessment enables prospective adopters to gain insight into existing system requirements, digest the expectations of the implementation, and have the opportunity to consider the required regulations compliancy once the technology has been adopted. However, there are contradicting views on the necessity of the readiness assessment in the enterprises.

Some SEs (8 of the 14) could not see the necessity of a readiness assessment, while others stated that although they find it necessary, they do not have the resources and skills to engage with readiness assessments. But in general, there seems to be a fair understanding of what adoption readiness means to SEs. It can be emphasised, as mentioned repeatedly in the findings, that the enterprises' lack of understanding influences their trust in CC. Furthermore, due to this poor understanding and awareness, the SEs do not see the advantages and benefits they can gain from CC adoption.

To summarise, adoption readiness is generally defined as the ability of enterprises to insightfully determine the requirements for the adoption, and then adopt the technology and use it optimally.

### RSQ 2.2:  What kind of assessments do SEs perform to assess their readiness for technology adoption?

Determining and understanding the readiness indicators is important for enterprises wanting to adopt CC. A clear identification of the influencing factors informs a good understanding of the CC concept. The better the enterprise understands the cloud, the clearer the readiness indicators analysis will be and the easier well-informed decisions on CC adoption will be reached. The readiness assessment thoroughly analyses the enterprise's internal systems and business processes supported by the systems, and maps IT processes and business processes in detail. The result of the assessment indicates what the enterprise's level of readiness is and where improvements might be needed for successful adoption. Also, the choice of the type of cloud solution to be adopted is clearer and easier. In this sense, the enterprise will be able to optimally harvest from their investment in the cloud environment.

 When assessing SEs' readiness for technology adoption, an analysis of the environment can only be directed by the existing IT strategy in place. The IT strategy serves as guideline for whatever changes are required and defines the process to be followed during implementation. The latter is in agreement with Alkhalil et al. (2017) who argue that the decision to adopt CC is purely strategic. It is unfortunate to realise that most SEs do not have any IT strategy, and even worse, they do not understand what an IT strategy is or what it is used for. Based on the findings of this research, not many SEs intend to develop an IT strategy. This can mostly be attributed to the lack of understanding for some, and for others, the enterprises' size makes them believe that an IT strategy is not necessary.

Findings indicate that without any policy, it is unlikely to make a sound decision that will profit the business sustainably. Without policies there is no guideline to be used as building block. Today's business environments are changing rapidly, and without a baseline, ill-informed decisions will be made, leading the enterprise into a disorganised state of operations. Clearly, the lack of strategy indicates the lack of a technology adoption assessment, which influences the outcomes of the adoption.

The findings of this study further reveal that SEs have no plan to upskill their staff. This has an impact on the understanding of the technologies available, and no proper readiness assessment can be conducted without an understanding of what is in place and what is considered. The lack of a technical development and training plan is a hampering block for SEs.

To summarise, the technology adoption readiness of SEs is not assessed before the adoption. There are no processes in place that can assist with the assessment, and the resource constraint faced by SEs contribute significantly to their lack of a technology adoption readiness assessment.

### 5.3  Discussion of theme 2: Adoption readiness indicators

The determination of readiness for technology adoption is indicated by a number of factors based on different theories. In order to successfully adopt and optimise the use of technology, it is imperative that SEs are well aware of their level of preparedness for the technology. Knowing what is required, what is available and what your capabilities are, allows for planning and implementing the right solution at the right time. The identification of requirements is essential for both the prospective adopter and the supplier to know exactly what is expected from the adoption.

According to Hassan and Nasir (2017), one of the main reasons for SMEs failing to adopt CC is to their lack of IT capabilities. The question is to know to what extent SEs are aware of the determinant factors that inform the level of cloud adoption readiness, and if these can be identified.

**RQ1:  To what extent are SEs prepared for cloud computing technology adoption?**

**RSQ 1.1:  What are determinant factors for cloud computing adoption readiness by SEs?**

Aiming to identify the factors that influence CC adoption readiness, the findings of this research help with determining what is required from the enterprises so that they can be ready for the adoption. It is important to understand that the success of technology adoption is attributed to the technology implementation requirements being met by the prospective enterprise adopters. These requirements need to be identified and analysed to highlight the extent to which the enterprises can successfully implement and profit from the implementation. The requirement identification and analysis serves as one of the main indicators of success once embarked on the adoption process. Organisations need to plan for adoption. Proper planning can only be based on the readiness assessment and evaluation of the existing environment as well as on the mapping of the needs and organisational capabilities to the requirements of the business processes. The existing environment, organisational capabilities and needs should be checked against the requirements and functionalities of the envisaged innovations.

The outcome of the assessment should be evaluated against the business values (benefits) to be derived from the innovation versus the risks that might surface during and after the adoption. According to Kauffman et al. (2016), with proper readiness assessment, enterprises are able to identify the requirements for a successful adoption together with the values to be gained for the business. From this perspective, the results of the analysis could become the stumbling block for the adoption decision making.

The findings of this research indicate that all the participants realise the importance of conducting a readiness assessment in order to succeed with the adoption process and optimal use of technology. In this case, CC is the technological innovation. The few enterprises that disagree with the necessity of the adoption readiness assessment feel that it depends on the type of adoption. However, this opinion does not seem to make much sense, as irrespective of the type of the adoption, the SE must be ready for it. Only one enterprise did not see the benefit of conducting a readiness assessment, but this can be attributed to the lack of understanding the CC concept, which reflects in the majority of interview respondents.

According to the findings of this study, it is clear that enterprises are aware of the business competitiveness that can be realised through the adoption of CC. This business competitiveness can be considered as one of the influential factors for the adoption readiness.

For the majority of enterprises that participated in this study, the main influential motivating factors to move to cloud adoption are the cost of acquiring and maintaining the systems, followed by system availability and scalability in the cloud environment. In previous research it was found that enterprises consider financial benefits first when deciding on cloud adoption (Attaran & Woods, 2018). Nevertheless, it must be mentioned that finance is an extremely sensitive topic among SEs, and the lack of a proper understanding of this paradigm has a big role to play in identifying the determinant factors.

To summarise, the determinant factors for cloud adoption readiness are:

  i) Identification and clear analysis of the adoption requirements
  ii) A clear understanding of the concept and what it entails
  iii) Proper implementation planning
  iv) Identification of the competitive advantages to gain from CC
  v) Cost analysis
  vi) Regulatory compliance

**RQ2: How do SEs determine their readiness for the adoption of cloud computing?**

**RSQ 2.1: How do SEs define adoption readiness for a given technology such as cloud computing?**

The definition and meaning associated with any technology indicates the level of its readiness. The enterprises view ICT as an irreplaceable requirement for their business, which becomes a pressing motive for technology adoption.

The findings show that SEs in Cape Town do not have the technical capacity to maintain their systems (skilled human resources and financial resources). They call upon external contractors for assistance. There is no indication from participants that they outsource their systems, but it is obvious that they outsource indirectly. Technology adoption readiness means being prepared for the adoption. Findings do not show the detail of how prepared enterprises should be. Understanding of the concept of readiness in technology adoption is absent or only partial in SEs. There was confusion in the participants' responses in terms of differentiating CC and outsourcing. Schneider and Sunyaev (2016) postulate that although CC and IT outsourcing might share the same principles, they are completely different. This indicates that a small enterprise can comfortably use cloud solutions if accurately explained to them and a proper awareness is created.

To summarise, SEs are unclear on the difference between CC and outsourcing. Readiness for adoption is perceived by SEs as being ready to adopt, but lacks a clear understanding of what technology adoption entails and how the readiness should be determined.

### RSQ 2.2: What kind of assessments do SEs perform to assess their readiness for technology adoption?

The lack of IT skills in enterprises has been mentioned by many enterprises, and the findings show that this challenge has a significant impact on cloud adoption and use. This is substantiated by the fact that dedicated ICT units do not exist in SEs. The problem is, as per the findings on this research, that readiness assessment is almost non-existent in SEs, and enterprises seem to not have the understanding of why readiness assessment is needed and what it entails.

Although the term 'readiness' is known to all, its contextualisation in technology adoption is not well understood by SEs. Enterprises are aware that adoption readiness includes planning for the adoption, but the requirements as well as the extent of the planning are unclear, which points to the lack of knowledge of the indicators for the adoption readiness of SEs.

The lack of defining and identifying the adoption readiness indicators means the benefits expected from CC adoption cannot be identified, and as a result, SEs cannot know with certainty whether CC will be of benefit to their organisation. The understanding of readiness implies understanding the SLA negotiation process. The majority of enterprises have no clear idea of how to negotiate the SLA, the latter being the binding contract between enterprises and cloud providers. Without a clear and concise SLA, SEs are likely to run the risk of losing their CC investment, which is another indication of a low level of readiness for CC adoption. All these findings indirectly suggest SEs' need for education and awareness of CC and the adoption thereof. Understanding the drivers for adoption and the challenges associated with adoption are confirmed by Yeboah-Boateng and Essandoh (2014).

To summarise, SEs do not have a mechanism to perform the readiness assessment for technology adoption. In most cases, the lack of a proper understanding of adoption readiness contributes to SEs not conducting the readiness assessment or understanding the importance thereof. Theme 3, the drivers for CC adoption, will be discussed next.

## 5.4 Discussion of theme 3: Drivers for CC adoption

Enterprises need to realise the business benefits associated with CC technology. Depending on how the business value of technology adoption has been identified, drivers for adoption can be of a negative nature, thereby becoming the factors inhibiting the adoption, or of a positive nature, thereby motivating the enterprises to adopt the technology. Enterprises need to identify CC adoption drivers inside and outside of the organisation and use them as foundation for adoption decision making.

Factors influencing the adoption of technology have been classified by many researchers according to various innovation theories: TOE, TAM, DOI, and many more. Chang and Hsu (2016) contextually categorise these factors as technical, organisational and environmental.

The adoption of new technology is mainly driven by the perceived benefits. The findings of this study reveal that the expected benefits of technology adoption range from low financial cost to systems optimisation and improved service delivery, which confirms the findings of Ali et al. (2015) who opine that CC is mainly viewed as a solution offering optimisation, improvement and services with low cost. There is no need for enterprises to invest upfront in the technology, and SEs are able to access computing resources, which they were not able to access via traditional computing environments, at a high scale and availability when adopting new technology. Capital expenditure (CAPEX) is reduced significantly, while operational expenditure (OPEX) increases. Systems access and availability anywhere at any time, systems scalability, and the elimination of the high IT skills requirement in SEs are considered the primary benefits of CC adoption.

**RQ1: To what extent are SEs prepared for cloud computing technology adoption?**

**RSQ 1.1: What are the determinant factors for cloud computing adoption readiness by SEs?**

The potential for growth and competitive business operations that enterprises find in CC offerings (or any other new technology) has a significant impact on their interest to adopt. This potentiality influences the shaping of SEs' state of readiness for adoption. The potential competitive advantage CC offers is undoubtedly of high importance to SEs (Hamburg & Bucksch, 2016; Misra & Mondal, 2011). Access to computing resources and systems flexibility increase the competitiveness of an

enterprise's business operations (Senarathna, William, Warren, Yeoh & Salzman, 2018).

According to the participants, the cost of owning ICT systems in the cloud is minimal and business operations improve, thereby leading to more sustainable business environments. SEs view this cost factor as a significant benefit to their business, which makes it a potential strong driving factor for CC adoption. Scholtz et al. (2016) supports this finding, stating that one of the primary drivers for CC adoption is the improved support to business operations.

However, as already stated in the research findings and confirmed by Chou (2015) and Abubakar et al. (2016), a major concern for many enterprises is data and system security in a cloud environment. In this research, it was found that among the SEs willing to adopt CC, there is still a non-negligible percentage of them having strong reservations about storing their data in the cloud. This finding supports the view of Alkhalil et al. (2017), who point to reluctance in business organisations to move their systems to the cloud, fearing to lose control over their systems and data. These enterprises chose to only move the supposedly non-sensitive data to the cloud. Findings indicate that data and systems sensitivity is still the main factor to consider when enterprises decide on CC adoption. One of the main reasons for this reluctance can be attributed to the lack of proper awareness and education.

In summary, SEs cannot clearly identify the main drivers for cloud adoption. There is a lack of identifying the determinant factors for CC adoption and SEs are still hesitant to move their data and systems to cloud.

### RSQ 1.2: What benefits do SEs expect to gain from cloud computing technology adoption?

The research findings show that participants have contradicting views pertaining to finance as it relates to CC adoption. The enterprises claiming to be aware of CC and have implemented this technology are divided on the financial gains from CC adoption. Fifty percent (50%) of the participants perceive CC as a technology that has huge potential financial benefits for SEs, while the other half do not see any significant benefits for their enterprises. According to the latter half, enterprises see the short-term profit in CC adoption, but in the long run it is more expensive to use than simply running their systems on the premises.

Some of the participants not using CC stated that they do see any financial benefits and they do not trust CC technology. Some openly said CC is a money-making scheme. Furthermore, a few enterprises do not seem to have sufficient understanding of CC and are therefore not able to determine the profitability of CC in their organisations.

To summarise, the financial benefits of CC adoption as perceived by SEs are short-term, and these benefits decline drastically when the cloud is used for an extended period of time. There are still enterprises that do not see any tangible financial benefits in adoption CC.

### RSQ 2.1: How do SEs define adoption readiness for a given technology such as cloud computing?

The research findings reveal that CC technology does hold many advantages for SEs. These advantages, according to a number of participants, have the potential to make business operations sustainably more competitive, which is congruent with the findings of El-Gazzar et al. (2016). The findings of this research are also in agreement with the findings of Harfoushi et al. (2016), who state that CC adoption can play an important role in enterprises maintaining their competitive position, but enterprises need a better understanding of CC adoption to increase their trust in this technology.

After adoption, SEs' business sustainability can be attributed to the significant reduction in CAPEX, which has been a burden. Not having sufficient financial resources is no longer a barrier for SEs to access computing resources, given that they CC is adopted CC correctly. Scarce resources at the disposition of the enterprises, whether financial or human, can now be used for business operations instead of ICT.

In summary, in terms of factors driving the adoption of CC, SEs understand that adoption readiness means understanding the indicators for a successful adoption. There is a sense that CC holds many benefits for SEs, including the reduction of CAPEX, although OPEX will likely increase.

### RSQ 2.2: What kind of assessments do SEs perform to assess their readiness for technology adoption?

Assessing the readiness of technology adoption triggers a deeper thinking and identification of the risks that are likely to emerge. A proper technique and tools

should be used to analyse the internal and external environments, in order to determine the extent of readiness for the envisaged technology. The result of the assessment should enable SEs to mitigate the risks and make informed decisions pertaining to the adoption.

The findings reveal that SEs do not have specific tools to assess their readiness for technology adoption, however, there are few enterprises that have plans to conduct system monitoring and internal testing on their existing systems to form an ideas of what they should adopt. Although many SEs are aware of the risks that are likely to be associated with the adoption of new technologies, they do not perform adoption readiness assessment. Without proper assessment, risks cannot be identified and without proper risk mitigation, businesses cannot plan for successful adoption. This is supported by El-Gazzar et al. (2016) who state that the only way businesses can maximise the benefits of CC adoption is to have a good understanding of the potential risks as well as the opportunities likely to rise from the adoption, and they challenges thereof.

Some enterprises conduct an assessment on the providers instead of assessing themselves (apart from the financial affordability). This does not assist at all with determining adoption readiness and is a clear indication that they cannot determine their own readiness for CC adoption and use.

In summary, SEs do not perform the readiness assessment for new technology adoption. The readiness assessment process does not even exist in most of the cases, and SEs cannot pinpoint the determinant factors that drive the adoption. The trust and interest in CC adoption as a theme is discussed in the next section.

### 5.5 Discussion of theme 4: Trust in CC technology

IT systems are used to store and manipulate enterprises' valuable data, which should be protected at all cost. Trust plays an important role in deciding on the technology to adopt and how it should be adopted in enterprises (Adjei, 2015). CC technology, due to its nature, is perceived to expose the enterprise's data and systems when access is not controlled by the enterprise self. CC adoption thus requires a level of trust from prospective adopters.

Sun, Zhang, Xiong and Zhu (2014) argue that the trustworthiness of CC technology depends on addressing the associated data security concerns, and that trustworthiness is a prerequisite for successful technology adoption and optimal use. The findings of this study are supported by the findings of Sun et al. (2014).

### RSQ 1.1: What are the determinant factors for cloud computing adoption readiness by SEs?

Well understood and clearly defined determinant factors is the ultimate foundation for CC adoption readiness of SEs. RSQ 1.1 aims to gauge the level of awareness and understanding of the factors that make SEs ready for the adoption and use of CC technology.

Irrespective of the channels used, findings of this research show that many SEs have been in contact with the CC topic before. However, although the buzzword is 'out there', the same findings reveal that the level of SEs' trusting in CC adoption is still low, and this is directly related to the level adoption readiness. CC does not seem to be trusted by SEs due to their lack of understanding the concept, and according to other research studies, many academics and practitioners agree that the main reason for this distrust can be attributed to the confusion found in the definition of CC and the adoption of CC (Adam & Musah, 2015).

Enterprises do see the benefits of CC, but the majority of participants could not clearly elaborate on the benefits during the interviews, which points to a lack of understanding the CC concept. This lack of understanding and awareness is deemed the reason for SEs' lack of trust and interest in CC adoption.

As with any other technology, the adoption of CC is subject to compliance with laws and regulations (Song, 2017). The findings of this research reveal that SEs have little understanding of CC and are deterred from adopting due to the complexity and unclear definitions of these laws. It is primarily the cross-border regulations that SEs have to be subjected to that seem to be the major obstacle.

In summary, the lack of trust enterprises have in CC technology can be attributed to their lack of understanding this concept and not being ready for CC adoption.

### RSQ 1.2: What benefits do enterprises expect to gain from cloud computing technology adoption?

In the process of making a sound decision pertaining to technology adoption, SEs need to be aware of the benefits expected to gain from the adoption. Although CC has been marketed as a solution to assist SEs, these enterprises need to know and understand the benefits of CC adoption.

SEs find it challenging to hand over their assets 'to the cloud' and lose control over their data and systems. This is especially critical when data are of sensitive nature, as data are extremely valuable to any enterprise today. To be safe, enterprises adopting CC filter their data and systems so that only the non-sensitive data or systems are moved to the cloud. The driving factor behind this is the questionable trustworthiness of CC as perceived by SEs. It can be argued that SEs' lack of trust in CC is caused by their lack of clearly understanding what CC is and how it works.

In summary, SEs are not sufficiently aware of what to expect when adopting CC. It is difficult for SEs to hand their assets over to a third party, i.e. losing control.

## RSQ 2.1: How do SEs define adoption readiness for a given technology such as cloud computing?

The availability and scalability of the system as promised by CC makes it attractive for SEs to adopt (Scholtz et al., 2016). However, at the same time the security and privacy of data issues still need to be addressed (Varghese & Buyya, 2018). Associated with SEs' lack of (or partial) understanding of CC technology, the raised issue of security and privacy makes this technology doubtful to SEs. The findings reveal that some enterprises adopt because they have no choice (risk takers), while others categorically do not want to adopt CC. The latter consider CC as a distractor, aiming to rob them of their resources.

Trust is important – without trust, there is no drive for adoption, and consequently no acceptable level of readiness. The benefits of CC do not seem to be understood by SEs, which fuels their distrust and lack of interest in CC. SEs' awareness of CC is seemingly non-existent, contributing to the lack of trust; consequently, SEs should not perceive themselves as ready for cloud adoption. Despite the distrust SEs have in cloud technology they do seem eager to adopt new technologies that will assist them in their business operations. With proper education and awareness of new technology adoption, the possibility exists that more SEs will adopt CC and use it optimally.

## RSQ 2.2: What kind of assessments do SEs perform to assess their readiness for technology adoption?

The six SEs that did not implement CC as yet, do not see the importance of conducting a CC adoption readiness assessment. According to the findings, the adoption of new technology is mainly based on the needs of the business, while the cost factor is important in decision making. Many enterprises not using CC are

also not considering CC adoption due to their lack of understanding and distrust in cloud providers.

To summarise, in terms of trust in CC, enterprises understand that without trust in the technology they are not 'adoption ready', and the adoption readiness assessment is not conducted as the technology must first be trusted. Technology is adopted in response to the business needs – there is no other assessment done.

### 5.6 Discussion of theme 5: Regulatory compliance

The adoption and use of data and systems in enterprises is subject to the laws and regulations of the countries the data are housed in. Data management has become extremely important to organisations, and the control of their data access needs to be in compliance with governance. Laws and governance acts subscribe to the boundaries of countries and once across the borders, the regulations/laws might change. Even if they were the same, the interpretations given to such regulations can be different depending on the context of the countries.

CC is a technology that houses data and systems across different locations on the globe. If data do not reside within the owner's country boundaries, compliance to the laws and regulations of the country where the data are physically housed is a requirement by law. More importantly, in many cases enterprises will not know exactly where their data are physically kept. In light of this, Jangara and Bezuidenhout (2015) propound that there are risks in transferring data beyond countries' borders over which enterprises and their countries have no control. Regulatory compliance is directly linked to the data governance in enterprises, and in some countries, especially in developing countries, data governance is almost non-existent (Al-Ruithe, Benkhelifa & Hameed, 2018) or not understood.

This research findings reveal that SEs do not have an understanding of the requirements for regulatory compliance to be applied to the adoption and use of CC technology. Many of the enterprises that participated in the research do not know what regulatory compliance is all about. This can be attributed to SEs' not having IT strategies, which should direct data governance in these enterprises. In this context Soomro, Shah and Ahmed (2016) propound compliance training as a critical way of raising the awareness and understanding of technology adoption readiness. In fact, some enterprises state that they are not aware of any law regulating IT systems and data in South Africa. This is a concern, as without being aware of the existence of any law or acts, compliance cannot be enforced.

The findings indicate that in terms of regulatory compliance, there is a lack of CC adoption readiness. It can be argued that SEs are not aware of the very basics of the laws and regulations pertaining to IT systems and data use, and these enterprises are expected to comply with the complex laws and regulations that extend beyond the borders. It is important to note that the main cloud providers have their data centre outside of Africa, which means that adopting CC requires being cognisant of the regulatory aspects in those countries where their data are housed, and ultimately being compliant. This is lacking in many SEs in Cape Town, South Africa, and it should be one of the main considerations for determining enterprises' readiness for CC adoption. It should not be about compliance only, but also about awareness, which is a requirement for effective service level agreement (SLA) negotiations with the cloud providers. Effective and successful SLA negotiations increase the chances for the enterprises to optimise the use of the adopted solution.

In summary, SEs lack understanding of the regulatory compliance associated with the adoption and use of CC. Logically, SEs cannot comply with what they do not know or are aware of, as all issues and concerns are placed in the hands of the providers to deal with. Another challenge is the complexity of the trans-border laws and regulations that the data and systems housed in the cloud are subject to.

### 5.7  Summary

The identified themes have been discussed based on the RSQs, relating them to the literature and the participants' interview responses. The five themes were discussed for each question, and the discussion was done in light of the literature and previous research findings and recommendations. The first question, RSQ 1.1, aimed to reveal the level of awareness and understanding of the factors that determine SEs' state of readiness for CC adoption. The results of the research revealed a low level of understanding of the factors influencing the adoption readiness of SEs. According to the respondents, there is not enough awareness of the CC technology concept among SEs.

The indicators for technology readiness are not identified by SEs, and they have no mechanism to identify them. The findings are in agreement with previous research studies. The drivers for CC adoption by SEs do not seem to be understood clearly, and SEs' lack of trust and interest in adopting CC holds them back from the benefits offered by this technology. In relation to RQ 1.2, which sought to uncover SEs' understanding of the benefits of CC technology, the level of awareness of CC benefits for SEs is low, and in some cases lacking. The

findings reveal SEs' need for awareness and understanding to successfully adopt and use technology such as CC.

In RQ 2.1, it was expected from respondents to indicate the level of understanding of the concept of technology adoption readiness. The findings reveal that many SEs have heard of CC, however, a clear understanding of what it is and what the requirements are for CC adoption is still a challenge. The results further indicate that determining the readiness for CC adoption by SEs is a concept that does not exist or is not understood. RQ 2.2 sought to shed light on technology adoption readiness assessment in SEs. The results of the study show that SEs do not perform the adoption readiness assessment. They do not understand and have no skills or tools to conduct such an assessment.

The next and final chapter is dedicated to the recommendations and conclusions drawn from the results of this study.

# CHAPTER SIX: CONCLUSION AND RECOMMENDATIONS

## 6.1  Introduction

Chapter Six presents answers to the research questions that were posed (Tables 1.1 and 1.2). The discussion in this chapter is directly linked to the aim and objectives of the study, which formed the backbone of the research. Recommendations of the study are provided, and future research is proposed.

Over the past decades, many studies were conducted on CC and CC adoption, both in academia and in the domains of practitioners. All these studies sought to understand the CC concept and how it can be used to overcome the technological barriers faced by enterprises in this fast-changing technological era. However, although research on the CC paradigm has been significant, there is still a gap in literature, and the CC adoption level of SEs is low. There is evidence that research on adoption readiness is lacking, especially in sub-Saharan Africa, of which South Africa is a part. In order to present the answers to the research questions in the next section, the aim of the study will be referred to continuously. Without a firm link between the aim and the findings, the posed research problem cannot be addressed.

The aim of this research was to conduct an exploratory study to determine to what extent SEs in the city of Cape Town are ready for CC adoption. The research further aimed to explore the determinant factors affecting SEs' adoption readiness of CC. The research also sought to explore the barriers faced by SEs when considering the adoption of CC. With this in mind, the objectives of the study were to:
   i)   Determine the level of CC adoption readiness of SEs.
   ii)  Examine SEs' understanding of CC and its benefits to SEs.
   iii) Identify the factors influencing CC adoption readiness specific to SEs in Cape Town.

## 6.2  Answers to the research questions

### 6.2.1  RSQ 1.1

**RSQ 1.1: What are the determinant factors for cloud computing adoption readiness by SEs?**

Linking the answer of this question to the corresponding objective, the factors having an influence on the adoption readiness of CC have been identified from the results of the study. The factors revealed by the results for RSQ 1.1 are related to

the readiness indicators, understanding of concepts, trust, and interest in CC, drivers for CC adoption, and regulatory compliance. The factors are:

i) SEs' awareness of CC and a clear understanding of what CC technology entails. Understanding this paradigm without ambiguity lays the foundation for the adoption.

ii) Awareness of the benefits to be gained by adopting CC is a requirement for SEs to prepare and move their data to the cloud environment. Identifying the driving factors and requirements becomes an essential adoption readiness determinant for enterprises. The adoption readiness assessment practice is of paramount importance to SEs.

iii) Enterprises confirming their need for external skills due to the lack of in-house skills points to the need for CC adoption. To be able to realise the achievement of a successful adoption goal, more intensive education is required for SEs. Furthermore, SEs' level of trust in CC offerings needs to increase.

### 6.2.2  RSQ 1.2

**RSQ 1.2: What benefits do SEs expect to gain from cloud computing technology adoption?**

RSQ 1.2 sought to address the question of understanding the benefits SEs gain from adopting CC technology. Without having a clear picture of what is to be achieved, there is no readiness for the technology to talk about, as one can only be ready for what is known. From the research results:

i) SEs do see financial and systems availability-related benefits in adopting CC, but more understanding on the concept is needed.

ii) The regulatory compliance in SEs is not understood, and it is difficult to determine how to comply and what the requirements are in order to be deemed compliant.

iii) SEs do not have a clear understanding of adoption readiness concepts and its indicative requirements.

iv) SEs find it difficult to release control of their data and place it in someone else's (the CC provider) hands.

### 6.2.3  Summary of RQ1

The findings outline in detail the extent of SEs' readiness for CC adoption. RQ1 has been sub-divided into two research sub-questions (RSQ 1.1 and RSQ 1.2) to ease the investigation, and the results of the investigation led to the identification of five focus areas or themes.

Overall, the findings reveal a low level of CC adoption readiness in SEs, although there are signs and acknowledgment by SEs of the need for this disruptive technology. From the results of this research it emerged that SEs do see benefits in adopting CC, however, many SEs still need to reach a certain level of understanding and awareness of CC. The determinant factors for CC adoption readiness need to be identified in order to reach an acceptable level of CC adoption readiness. The findings furthermore reveal that regulatory compliance is a perplexing concept for SEs and complying with the laws and regulations should be taken seriously, as it is a requirement in any country's law. The findings align with the acknowledgment of the Department of Trade and Industry's (DTI) Integrated SE Development Strategy, which suggests a significant improvement in developing an appropriate regulatory environment (Rogerson, 2008).

### 6.2.4 RSQ 2.1

**RSQ 2.1: How do SEs define adoption readiness for a given technology such as cloud computing?**

RSQ 2.1 was posed to determine whether SEs are able to clearly define adoption readiness for a new technology such as CC. The question aimed to measure the level of understanding enterprises have of technology adoption readiness, which is a baseline for adopting any given technology.

i) This research found that SEs have a vague understanding of the concept of technology adoption readiness.

ii) SEs do not have a clear understanding of adoption readiness concepts as well as the requirements and importance thereof.

iii) SEs are not able to point out the variable factors in the enterprises that are favourable for technology adoption.

iv) The benefits of CC offer a competitive advantage to SEs.

v) Capital expenditure (CAPEX) in SEs is significantly lowered by the adoption of CC.

vi) SEs are not able to provide an explanation of what it means to be regulations compliant terms of CC adoption.

vii) SEs understand that trust in technologies such as CC determines the readiness for a successful adoption.

viii) SEs are not capable to clearly determine whether CC adoption is profitable to their businesses.

### 6.2.5 RSQ 2.2

**RSQ 2.2: What kind of assessments do SEs perform to assess their readiness for technology adoption?**

Adoption readiness can only be determined based on set criteria, and SEs need to assess their environments against those criteria in order to determine their level of readiness. RSQ 2.2 sought to reveal whether SEs have a way of determining their readiness for technology adoption.

i) There is no mechanism to conduct technology adoption readiness assessment in SEs.

ii) SEs do not have the skills and capacity to conduct the technology adoption readiness assessment.

iii) IT strategy in enterprises should be the guideline to determine adoption readiness indicators, but many SEs do not have an IT strategy.

iv) SEs do not see the importance of conducting the readiness assessment, resulting in the failure to identify readiness indicators, which in turn leads to adoption failures.

v) A small number of enterprises perform system monitoring, but what they mainly check is the performance on the provider's side, not their internal systems.

vi) Many SEs have no understanding of and trust in CC, hence no assessment can be done on a technology they have no interest in.

vii) The research results signal a low level of preparedness of SEs for CC adoption.

viii) Regulatory compliance does not exist in SEs, and they have no understanding of what it entails.

### 6.2.6 Summary of RQ2

RQ2, aided by RSQ 2.1 and RSQ 2.2, aimed to uncover the mechanisms SEs use to determine their level of adoption readiness. The results of the study reveal that SEs, in general, have no mechanism and capabilities to conduct technology adoption readiness. The skills shortage and other resource constraints experienced in SEs make it quasi-impossible to embark on the assessment exercise in SEs.

It is evident that the lack of strategy definition in SEs is a big hindrance to adoption readiness and the assessment thereof. There is no means to identify the influencing factors for readiness and adoption. In light of the results of this study,

the concept of CC understanding and awareness is essential for successful CC implementation and use.

### 6.3  Addressing the aim and objectives of the study

In conclusion, the results of the study have addressed the aims and objectives as set out at the beginning of the study. The aim of this study was to explore to what extent SEs in the City of Cape Town are ready for CC adoption. The research also aimed at exploring the determinant factors affecting the adoption readiness of CC by SEs. The research further sought to explore the barriers faced by SEs when considering the adoption of CC.

The objectives of the research were identified as follows:
   i)   Determine the level of CC adoption readiness of SEs.
   ii)  Examine SEs' understanding of CC and its benefits to SEs.
   iii) Identify the factors influencing CC adoption readiness specific to SEs in Cape Town.

The research results reveal that SEs do not understand CC technology, nor do they know what CC technology entails. There is a high level of confusion in understanding how CC works and how it can profit their enterprises. The benefits to be gained from implementing CC cannot be clearly identified and clarified by SEs. Worst of all, there are many enterprises that do not see any benefit for CC technology adoption. The lack of SEs' trust in CC, which discourages SEs to consider adopting CC, has been emphasised repeatedly in this study.

By exploring the factors influencing the adoption of CC, the study reveals that the drivers for CC adoption in enterprises are not clearly identified. SEs do not have sufficient resources to conduct the assessments that could allow the identification of these drivers. The study furthermore reveals that SEs' lack an understanding of the determinant influencing factors for CC adoption readiness, and that in general, SEs do not have any idea of what regulatory compliance is about, and how and why they should be compliant. The SEs that do have an understanding of the influencing factors for CC adoption pointed out that the laws and regulations are a barrier to some extent, and most of the time they do not know where to draw the boundaries of responsibilities and accountability among the players in the CC environment.

Although SEs are striving for cost-effective technologies to be able to sustain themselves and compete in the market, they do not seem to have an acceptable level of readiness for the adoption and optimal use of CC. Furthermore, based on

the results of the study, which concur with many findings in previous studies, SEs need to adopt a culture of assessing themselves in order to determine their level of readiness. Knowing their level of readiness will enable SEs to make informed decisions on how to prepare themselves for the move.

### 6.4 Recommendations

Taking into consideration the findings and themes of the study, a number of recommendations can be made pertaining to CC adoption readiness by SEs.

i) SEs' understanding and awareness of the CC concept need to be enhanced.

ii) CC service providers need to find a way to approach SEs to provide education in order to change their perception and to increase trust and interest.

iii) SEs need to conduct an adoption readiness assessment in order to succeed with the adoption of CC.

iv) SEs need to be aware of the regulatory compliance as applied to CC adoption and use.

v) SEs need to conduct in-house systems evaluations to determine their profitability through CC adoption and use.

### 6.5 Limitations

The research was conducted with 14 SEs in Cape Town. If the study is extended to a larger population, the result can be more generalisable.

The respondents in the research mainly hold a management position, which means the results may not present the full picture of adoption readiness, as the opinions presented could be one-sided.

It was difficult to get enterprises to accept the invitation to participate in the research. Some organisations do not want to reveal their internal information, fearing competition.

### 6.6 Future research

i) More in-depth research dedicated to regulatory compliance is deemed necessary as the enterprises' data are a significant asset and SEs are subject to comply with specific laws and regulations.

ii) A study on adoption readiness assessment is needed as this seems to lack in the existing body of knowledge. Without assessing the environment, the chances of successful CC adoption are minimal.

iii) A more focused study on the benefits of CC in SEs and how these benefits can be realised is needed.

iv) A comparative study of Cape Town with other areas in South Africa in terms of the CC adoption readiness of SEs may generate a robust and significant understanding of the topic.

# REFERENCES

Abbate, T., Cesaroni, F., Cicini, M.C. & Villari, M. 2018. Business models for smart cities. A fuzzy set qualitative comparative analysis of an IoT platform. *Technology Forecasting and Social Change,* 142, 183-193. July. https://doi.org/10.1016/j.techfore.2018.07.031.

Abdollahzadehgan, A., Hussin, A.R.C., Gohary, M.M. & Amini, M. 2013. The organisational critical success factors for adopting cloud computing in SMEs. *Journal of Information Systems Research and Innovation*, 1-8. http://seminar.utmspace.edu.my/jisri/.

Abor, J. & Quartey, P. 2010. Issues in SME development in Ghana and South Africa. *International Research Journal of Finance and Economics,* 39(210), 1-11.

Abrahamsson, P., Helmer, S., Oyetoyan, T.D., Brocanelli, S., Cardano, F., Gadler, D., Morandini, D. et al. 2016. *Bringing the cloud to rural and remote areas – cloudlet by cloudlet.* ResearchGate.

Abubakar, A.D., Bass, J.M. & Allison, I. 2014. Cloud computing: a comparison of adoption issues between UK and sub-Saharan Africa SMEs. *Proceedings.* European, Mediterranean & Middle Eastern Conference on Information Systems 2014 (EMCIS 2014), 27-28 October, Doha, Qatar, 1-10.

Abubakar, A.D., Bass, J.M. & Allison, I. 2016. Cloud computing: adoption issues for sub-Saharan African SMEs. *Electronic Journal of Information Systems in Developing Countries*, 62(1):1-17. www.ejisdc.org.

Adam, I.O. & Musah, A. 2015. Small and medium enterprises (SMEs) in the cloud in developing countries: a synthesis of the literature and future research directions. *Journal of Management and Sustainability,* 5(1):1-21.

Adamuthe, A.C., Salunkhe, V.D., Patil, S.H. & Thampi, G.T. 2015. Cloud computing - a market perspective and research directions. *International Journal of Information Technology and Computer Science*, 10:1-12.

Adane, M. 2018. Cloud computing adoption: strategies for Sub-Sahara Africa SMEs for enhancing competitiveness. *African Journal of Science, Technology, Innovation and Development,* 10(2):197-207.

Adjei, J.K. 2015. Explaining the role of trust in cloud computing services. *Info*, 17(1):54-67. https://doi.org/10.1108/info-09-2014-0042.

Afolayan, A.O. 2014. *Adoption of new ICT innovation by SMEs in Cape Town.* MTech Dissertation, Cape Peninsula University of Technology, September.

Akar, E. 2014. Factors affecting the adoption of cloud computing. *Conference Paper.* Innovation Vision 2020: sustainable growth, Entrepreneurship, and Economic Development, University of Texas, Arlington, November.

Akaranga, S.I. & Makau, B.K. 2016. Ethical considerations and their applications to research: a case of the University of Nairobi. *Journal of Educational Policy and Entrepreneurial Research,* 3(12):1-9.

Akhusama, M. & Moturi, C. 2016. Cloud computing adoption in insurance companies in Kenya. *American Journal of Information Systems,* 4(1):11-16.

Aldawod, A. & Day, J. 2017. A critical reflection upon the postmodernist philosophical positions and issues relevant to entrepreneurship research. *Proceedings.* British Academy of Management, University of Warwick, UK, 5-7 September.

Alemeye, F. & Getahum, F. 2015. Cloud Readiness Assessment Framework and Recommendation System. *Proceedings. A*FRICON 2015, 14-17 September 2015, Addis Abeba, Ethiopia, 1-7.

Ali, M., Khan, S.U. & Vasilakos, A.V. 2015. Security in cloud computing: opportunities and challenges. *Information Sciences*, 305, 357-383. https://doi.org/10.1016/j.ins.2015.01.025.

Al Isma'ili, S.A., Li M., Shen, J. & He, Q. 2016. Cloud computing adoption decision modelling for SMEs: a conjoint analysis. *International Journal of Web and Grid Services,* 12(3):296-327.

Alkhalil, A., Sahandi, R. & John, D. 2017. An exploration of the determinants for decision to migrate existing resources to cloud computing using an integrated TOE-DOI model. *Journal of Advances, Systems and Applications*, 6(2):1-20. DOI:10.1186/s13677-016-0072-x.

Alkhater, N., Walters, R. & Wills, G. 2018. An empirical study of factors influencing cloud adoption among private sector organisations. *Telematics and Informatics,* 35:38-54.

Al Mourad, M.B. & Hussain, M. 2014. The impact of cloud computing on ITIL service strategy processes. *International Journal of Computer and Communication Engineering,* 3(5):1-5.

Al-Ruithe, M., Benkhelifa, E. & Hameed, K. 2018. *A systematic literature review of data governance and cloud data governance.* London: Springer. https://doi.org/10.1007/s00779-017-1104.

Amron, M.T., Ibrahim, R. & Chuprat, S. 2017. A review on cloud computing acceptance factors. *Procedia Computer Science*, 124, 639-646.

Armbrust, M., Fox, A., Griffith, R., Joseph, A.D., Katz, R., Konwinski, A., Lee, G. et al. 2010. A view of cloud computing. *Communications of the Association for Computing Machinery (ACM),* 53(4):50-58.

Asatiani, A. 2015. Why cloud? A review of cloud adoption determinants in organisations. *Proceedings.* Paper 13. ECIS 2015 Digital Conference. AIS eLibrary. http://aisel.aisnet.org/ecis2015_cr/13. DOI:10.18151/72172711.

Attaran, M. & Woods, J. 2018. Cloud computing technology: improving small business performance using the Internet. *Journal of Small Business & Entrepreneurship.* DOI:10.1080/08276331.2018.1466850.

Avram, M.G. 2014. Advantages and challenges of adopting cloud computing from an enterprise perspective. *Procedia Technology*, 12, 529-534. The 7th International Conference Interdisciplinarity in Engineering (INTER-ENG 2013), Petru Maior University of Tirgu Mures, Romania, 10-11 October.

Azarnik, A., Shayan, J., Alizadeh, M. & Karamizadeh, S. 2012. Associated Risks of Cloud Computing for SMEs. *Open International Journal of Informatics (OIJI),* 1, 1-9.

Aziz, K. & Yusuf, M.M. 2012. Measuring organisational readiness in Information Systems adoption. *Proceedings.* The 18th Americas Conference on Information Systems, Seattle, Washington, 9-12 August, 2742-2749.

Baxter, P. & Jack, S. 2008. Qualitative case study methodology: study design and implementation for novice researchers. *The Qualitative Report,* 13(4):544-559.

Bengtsson, P. 1999. Multiple case studies - not just more data points! Term paper in graduate course in Research Methodology, Department of Software Engineering and Computer Science, University of Karlskroma Ronneby, Sweden, 9 April, 1-9.

Berry, A.M., Van Blottnitz, R., Cassim, A., Kesper, B., Rajaratnam, B. & Van Seventer, D.E. 2002. *The Economics of SMMEs in South Africa.* Trade and Industrial Policy Strategies, Johannesburg, South Africa.

Bhattacherjee, A. & Hikmet, N. 2008. Reconceptualising organisational support and its effect on information technology usage: evidence from the Health Care sector. *The Journal of Computer Information Systems*, 48(4):69-76.

Billon, M., Ezcurra, R. & Lera-lópez, F. 2009. Spatial effects in website adoption by firms in European regions. *Growth and Change,* 40(1):54-84.

Bitta, M.N. 2012. *A framework to guide companies on adopting cloud computing technologies.* Master's Thesis, Strathmore University.

Bohn, R. 2016. Cloud Computing – A NIST perspective and beyond. NIST Cloud Computing Program. January.

Botta, A., Donato, W., Persico, V. & Pescape, A. 2016. Integration of cloud computing and Internet of Things: a survey. *Future Generation Computer Systems,* 56, 684-700.

Bryman, A. & Bell, E. 2007. *Business research methods.* 2nd ed. Oxford University Press.

Buyya, R., Yeo, C.S., Venugopal, S., Broberg, J. & Brandic, I. 2009. Cloud computing and emerging IT platforms: vision, hype, and reality for delivering computing as the 5th utility. *Future Generation Computer Systems*, 25(6):1-18.

Carcary, M., Doherty, E. & Conway, G. 2013. The adoption of cloud computing by Irish SMEs – an exploratory study. *The Electronic Journal Information Systems Evaluation,* 17(1):2-12.

Carcary, M., Doherty, E., Conway, G. & McLaughlin, S. 2014. Cloud computing adoption readiness and benefit realisation in Irish SMEs: an exploratory study. *Information Systems Management*, 31(4):13.

Cardella, M.E., Diefes-Dux, H.A. & Marbouti, F. 2016. Written feedback on design: a comparison of students and educators. *International Journal of Engineering Education,* 32(3B):1481-1491.

Cambridge Advanced English Dictionary. 2016. *Readiness.* [Online]. Available: http://dictionary.cambridge.org/dictionary/english/readiness. [Accessed: 09/08/2016].

Cass, R.C. 2012. Interdependent and conflicting objectives in South African SMME policies: competitiveness vs. employment creation. *Proceedings.* 42nd International Conference on Computers & Industrial Engineering 2012 (CIE42), 16-18 July, Cape Town, South Africa, 1-13.

Chandramouli, R. & Mell, P. 2010. State of security readiness. *Crossroads*, 16(3):23-25.

Chang, V., Walters, R.J. & Wills, G. 2013. The development that leads to the cloud computing business framework. *International Journal of Information Management*, 33(3):524-538.

Chang, Y. & Hsu, P. 2016. Investigating switching intention to cloud enterprise information systems: an analysis at the organisational level. *International Journal of Information Management,* 1-37. 1016/j.ijinfomgt.2015.11.016.

Chatzoglou, P. & Chatzoudes, D. 2016. Factors affecting e-business adoption in SMEs: an empirical research. Journal of *Enterprise Information Management*, 29(3):327-358.

Chen, X., Wills, G., Gilbert, L. & Bacigalupo, D. 2010. *Using cloud for research: a technical review.* JISC Final Report.

Chou, D.C. 2015. Cloud computing: a value creation model. *Computer Standards & Interfaces,* 38, 72-77.

Chuttur, M. 2009. Overview of the Technology Acceptance Model: origins, developments and future directions. *Working Papers on Information Systems,* 9(37):1-23.

Columbus, L. 2012. *Hype cycle for cloud computing shows enterprises finding value in big data, virtualisation.* Forbes. [Online]. Available: https://www.forbes.com/sites/louiscolumbus/2012/08/04/hype-cycle-for-cloud-computing-shows-enterprises-finding-value-in-big-data-virtualization/#256bc23f6c09. [Accessed: 10/10/2012].

Consoli, D. 2012. Literature analysis on determinant factors and the impact of ICT in SMEs. *Procedia - Social and Behavioural Sciences,* 62, 1-5.

Cooper, D.R. & Schindler, P.S. 2008. *Business research methods.* 10th ed. New York: McGraw-Hill.

Coughlan, M., Cronin, P. & Ryan, F. 2007. Step-by-step guide to critiquing research - Part 2 - Qualitative research. *British Journal of Nursing,* 16(12):1-9.

Creswell, J.W. 2013. *Qualitative inquiry and research design: choosing among five approaches.* Thousand Oaks, CA: Sage.

Cristmann, C., Falkner, J., Horch, A. & Kett, H. 2016. Identification of IT security and legal requirements regarding cloud services. P*roceedings.* Cloud Computing 2015: The Sixth International Conference on Cloud Computing, GRIDs, and Virtualisation Identification, Nice, France, 22-27 March, 1-7.

Dahiru, A.A., Bass, J.M. & Alison, I. 2014. Cloud computing: adoption issues for sub-Saharan African SMEs. *Electronic Journal of Information Systems in Developing Countries,* 62(1):1-17.

Davis, F.D. 1986. *A Technology Acceptance Model for empirically testing new end- user information systems: theory and results*. Sloan School of Management. Massachusetts Institute of Technology.

Davis, F.D. 1989. Perceived usefulness, perceived ease of use, and user acceptance of Information Technology. *Management Information Systems Quarterly*, 13(3):319-340.

DeLanda, B. 2009. *The Belmont report: history, principles and application*. Research Compliance Office. [Online]. Available: http://web.stanford.edu/dept/DoR/compliance/hs/staff_member_edu/2009_05_Belmont.pdf. [Accessed: 30/05/2019].

Deyoja, J. 2008. Software as a service (SaaS): a look at the migration of applications to the web. Unpublished manuscript.

Donou-Adonsou, F., Lim, S. & Mathey, S.A. 2016. Technological progress and economic growth in sub-Saharan Africa: evidence from telecommunications infrastructure. *International Advances in Economic Research,* 22(1):65-75.

Duncan, B. & Wittington, M. 2015. The importance of proper measurement for a Cloud Security Assurance Model. *Proceedings*. International Conference on Cloud Computing Technology and Science, Vancouver, Canada, 30 November-3 December. DOI:10.1109/CloudCom.2015.91.

Durkee, D. 2010. Why cloud computing will never be free. *Communications of the ACM*, 53(5):62-69.

Easterby-Smith, M., Thorpe, R. & Jackson, P.R. 2012. *Management research*. London: Sage Publication Ltd, 4th edition.

Easton, G. 2010. Critical realism in case study research. *Industrial Marketing Management, 39*(1):118-128. DOI:10.1016/j.indmarman.2008.06.004.

Edirisingha, P. 2012. *Interpretivism and positivism (ontological and epistemological perspectives).* [Online]. Available: https://prabash78.wordpress.com/2012/03/14/interpretivism-and-postivism-ontological-and-epistemological-perspectives/. [Accessed: 20 November 2018].

El-Gazzar R.F. 2014. A literature review on cloud computing adoption issues in enterprises. *Proceedings*. International Working Conference on Transfer and Diffusion of IT (TDIT 2014), Aalborg, Denmark, 2-4 June, 214-242. Part of the IFIP Advances in Information and Communication Technology series, Vol. 429. Heidelberg, Berlin: Springer.

El-Gazzar, R.F., Hustad, E. & Olsen, D.H. 2016. Understanding cloud computing adoption issues: a Delphi study approach. *The journal of Systems and Software,* 118, 1-21.

Etro, F. 2009. The economic impact of cloud computing on business creation, employment and output in Europe: an application of the Endogenous Market Structures Approach to a GPT innovation*. Review of Business and Economics Literature,* (2):179-208.

Fahrnberger, G. 2016. SIMS: a comprehensive approach for a Secure Instant Messaging Sifter. *Proceedings.* 2014 IEEE 13th International Conference on Trust, Security and Privacy in Computing and Communications, Beijing, China, 24-26 September. DOI:10.1109/TrustCom.2014.25.

Fathian, M., Akhavan, P. & Hoorali, M. 2008. E-readiness assessment of non-profit ICT SMEs in a developing country: The case of Iran. *Technovation*, 28(9):578-590.

Fernandes, D.A., Soares, L.F., Gomes, J.V., Freire, M.M. & Inácio, P.R. 2014. Security issues in cloud environments: a survey. *International Journal of Information Security,* 13(2):113-170.

Feuerlicht, G. & Margaris, N. 2012. Cloud computing adoption: a comparative study. *Proceedings.* 1st WSEAS International Conference, Recent Advances in Computer Engineering Series, Vienna, Austria, 10-12 November, 441-448.

Fink, A. 1998. *Conducting research literature reviews: from paper to the Internet.* 2nd ed. London: Thousand Oaks, Sage.

Flick, U. 2015. *Introducing research methodology.* 2nd ed. London: Sage.

Gangwar, H., Date, H. & Ramaswamy, R. 2015. Understanding determinants of cloud computing adoption using an integrated TAM-TOE model. *Journal of Enterprise Information Management*, 28(1):107-130. https://doi.org/10.1108/JEIM-08-2013-0065.

Garg, S.K., Versteeg, S. & Buyya, R. 2013. A framework for ranking of cloud computing services. *Future Generation Computer Systems*, 29(4):1012-1023.

Gephart, R. 1999. Paradigms and research methods. *Paper presented.* The Academy of Management Research Methods Forum.

Ghaffari, K., Delgosha, M. & Abdolvand, N. 2014. Towards cloud computing: a SWOT analysis on its adoption in SMEs. *International Journal of Information Technology Convergence and Services (IJITCS),* 4(2):1-20.

Gill, P., Stewart, K., Treasure, E. & Chadwick, B. 2008. Methods of data collection in qualitative research: interviews and focus groups. *British Dental Journal,* 204(6):291-295.

Gillwald, A. & Moyo, M. 2014. *The cloud over Africa.* Research ICT Africa. [Online]. Available: http://www.researchictafrica.net/publications/Evidence_for_ICT_Policy_Action/Policy_Paper_20_-_The_cloud_over_Africa.pdf. [Accessed: 30/06/2016].

Glesne, C. 2011. *Becoming qualitative researchers: an introduction.* 4th ed. Boston: Pearson.

Godoe, P. & Johansen, T.S. 2012. Understanding adoption of new technologies: technology readiness and technology acceptance as an integrated concept. *Journal of European Psychology Students,* 3(1):38-52. DOI: http://doi.org/10.5334/jeps.aq.

Goel S. & Sunena. 2018. Role of Information and Communication Technology in the Survival of Small Business. *International Journal of Research,* 5(4):3038-3042.

Gong, C., Liu, J., Zhang, Q., Chen, H. & Gong, Z. 2010. The characteristics of cloud computing. *Proceedings.* 39th International Conference on Parallel Processing Workshops, IEEE, September, 2010:275-279.

Gorelik, E. 2013. *Cloud computing models.* Composite Information Systems Laboratory (CISL), Massachusetts Institute of Technology.

Goundar, S. & Fiji, F. 2018. *Cloud computing: opportunities and issues for developing countries*. [Online]. Available: https://www.researchgate.net/publication/265060137_Cloud_computing_Opportunities_and_issues_for_developing_countries. [Accessed: 25/10/2018].

Grix, J. 2001. Introducing students to the generic terminology of social research. *Politics*, 22(3):175-186.

Gumbi, L.N. & Mnkandla, E. 2015. Investigating South African vendors' cloud computing value proposition to small, medium and micro enterprises: a case of the City of Tshwane Metropolitan Municipality. *The African Journal of Information Systems*, 7(4):1-17.

Gustafsson, J. 2017. *Single case studies vs. multiple case studies: a comparative study.* [Online]. Available: http://www.divaportal.org/smash/get/diva2:1064378/FULLTEXT01.pdf. [Accessed: 30/05/2019].

Hamburg, I. & Bucksch, S. 2016. Cloud computing in SMEs. *Proceedings.* The Eleventh International Conference on Internet and Web Applications and Services (CIW 2016), Valencia, Spain, 22 -26 May, 54-57.

Harfoushi, O., Akhorshaideh, A.H., Aqqad, N., Al Janini, M. & Obiedat, R. 2016. Factors affecting the intention of adopting cloud computing in Jordanian hospitals. *Communications and Network*, 8, 88-101. http://dx.doi.org/10.4236/cn.2016.82010.

Haselmann, T., Vossen, G. & Dillon, S. 2015. Cooperative hybrid cloud computing intermediaries - marketing cloud sourcing feasible for small and medium-sized enterprises. *Open Journal of Cloud Computing (OJCC),* 2(2):1-17.

Hashim, H.S. & Hassan, Z.B. 2015. Factors that influence the users' adoption of cloud computing services at Iraqi Universities: an empirical study. *Australian Journal of Basic and Applied Science,* 9(27):1-9.

Hassan, H. & Nasir, H.M. 2017. Determinants of cloud computing adoption at firm level: from the technological context. *Journal of Engineering and Applied Sciences,* 12(16):4186-4192.

Hassan, H., Nasir, M.H.M. & Khairudin, N. 2017. Cloud computing adoption in organisations: review of empirical literature. *Proceedings.* The 17th Annual Conference of the Asian Academic Accounting Association. SHS Web Conference. DOI:10.1051/shsconf/20173402001.

Hassard, J. 1999. Postmodernism, philosophy and management: concepts and controversies. *International Journal of Management Reviews*, 1(2):171-195.

Hedman, J. & Xiao, X. 2016. Transition to the cloud: a vendor perspective. *Proceedings.* IEEE International Conference on System Sciences, Hawaii, 5 January, 3989-3998. DOI:10.1109/HICSS.2016.494.

Heeks, R. 2010. ICT-for-Development research: size and growth. ICT4D blog. University of Manchester's Centre for Development Informatics. [Online]. Available: https://ict4dblog. wordpress.com/2010/02/08/ict-for-development-research-size-and-growth/. [Accessed: 10/09/2018].

Hevner, A. & Chatterjee, S. 2010. *Design research in Information Systems - theory and practice*. London: Springer Science + Business Media.

Hinde, C. & Van Belle, J.P. 2012. Cloud computing in South African SMMEs: risks and rewards for playing at altitude*. International Journal of Computer Science and Electrical Engineering* 1(1):1-10.

Hogan, M., Liu, F., Sokol, A. & Tong, J. 2011. NIST cloud computing standards roadmap. *Natl. Inst. Stand. Technol. Special Publication, Report Number 500-291r2*. 5 July. https://doi.org/10.6028/NIST.SP.500-291r2.

Hosseinian-Far, A., Ramachandran, M. & Slack, C.L. 2018. Emerging trends in cloud computing, big data, fog computing, IoT and smart living. In *Technology for Smart Futures.* Cham: Springer, 22-40. DOI:10.1007/978-3-319-60137-3_2.

Hussain, M.F., Sultan, J. & Ilyas, S. 2011. Entrepreneurship and economic growth. *Interdisciplinary Journal of Contemporary Research in Business*, 2(12):745-750.

Hsu, P.F., Ray, S. & Li-Hsieh, Y. 2014. Examining cloud computing adoption intention, pricing mechanism, and deployment model. *International Journal of Information Management,* 34(4), 2014: 474-488.

Hwang, M.I. & Thorn, R.G. 1999. The effect of user engagement on system success: a meta-analytical integration of research findings. *Information & Management,* (35):229-236.

International Organisation for Standardisation. 2013. *Technical Committee 215: Health informatics.* [Online]. Available: http://www.iso.org/iso/iso_technical_committee?commid=54960. [Accessed: 05/01/2014].

International Telecommunications Union. 2012. *Cloud computing in Africa: situation and perspectives.* ITU. [Online]. Available: http://www.itu.int/ITUD/treg/publications/Cloud_Computing_ Afrique-e.pdf [Accessed: 20/09/2017].

International Telecommunications Union. 2014. *ICT facts and figures: the world in 2014.* [Online]. Available: http://www.itu.int/en/ITUD/Statistics/Documents/f acts/ICTFactsFigures2013-e.pdf. [Accessed: 02/02/2015].

ISACA. 2009. *Model curriculum for IS audit and control.* 2nd ed. United States of America.

Ismail, R., Jeffery, R. & Van Belle, J. 2011. Using ICT as a value adding tool in South African SMEs. *Journal of African Research in Business & Technology,* Article ID 470652:1-12. DOI:10.5171/2011.470652.

ISO *see* International Organisation for Standardisation.

Jadeja, Y. & Modi, K. 2012. Cloud computing - concepts, architecture and challenges. *Proceedings.* 2012 International Conference on Computing, Electronics and Electrical Technologies (ICCEET), Kanyakumari, 21-22 March, 877- 880.

Jangara, T.B. & Bezuidenhout, H.C. 2015. Addressing emergency risks in transborder cloud computing and the protection of personal information: the role of internal auditors. *The Southern African Institute of Government Auditors (SAIGA),* 17(1):11-24.

Jede, A. &Teuteberg, F. 2016. Investigating preconditions for a financially advantageous cloud usage. *International Journal of Accounting & Information Management*, 24(2):116-134.

Jere, M.G., Jere, A.K. & Aspeling, J. 2015. A study of small, medium, and micro-sized enterprise (SMME) business owner and stakeholder perceptions of barriers and enablers in the South African retail sector. *Journal of Governance and Regulation*, 4(4-5):620-630. http://doi.org/10.22495/jgr_v4_i4_c5_p7.

Johnston, K.A. & Loot, M. 2016. The business value of cloud computing in South Africa. *The African Journal of Information Systems*, 8(2):1-18.

Johnston, K.A., Loot, M. & Esterhuyse, M.P. 2016. The business value of cloud computing in South Africa. *African Journal of Information Systems*, 8(2):1-22.

Jonas, R., Ruediger, Z., Stefan, W. & Klaus, T. 2012. Cloud requirement framework: requirements and evaluation criteria to adopt cloud solutions. *Proceedings.* European Conference on Information Systems, Paper 42, Barcelona, Spain, 10-13 June. https://aisel.aisnet.org/ecis2012/42.

Jungck, K. & Rahman, S.M. 2011. Cloud computing avoids downfall of application service providers. *International Journal of Information Technology Convergence and Services (IJITCS),* 1(3):1-20. June.

Juster, K.J. 2008. Cloud computing can close the development gaps. Unpublished work.

Kamal, M. & Qureshi, S. 2009. An approach to IT adoption in micro-enterprises: insights into development. *Proceedings.* Fourth Midwest United States Association for Information Systems Conference, Madison, USA, 1-8.

Karlsson, M. 2016. *What is a case study?* Academy of Business, Engineering and Science, Halmstad University, Sweden. [Online]. Available: www.diva-portal.org/smash/get/diva2:1051860/FULLTEXT01.pdf. [Accessed: 02/03/2018].

Kasi, P. 2009. *Research: what, why and how?* Bloomington: Author House.

Kauffman, R.J., Ma, D. & Yu, M. 2016. A metrics suite of cloud computing adoption readiness. *Electronic Markets*, 28(1):11-37.

Khajeh-Hosseini, A., Sommerville, I. & Sriram, I. 2010. Research challenges for enterprises cloud computing. *Proceedings.* ACM Symposium on cloud computing (SOCC 2010), Indianapolis, USA, 23 August, 1-11.

Kim, W., Kim, S.D., Lee, E. & Lee, S. 2009. Adoption issues for cloud computing. *Proceedings.* The 7th International Conference on Advances in Mobile Computing and Multimedia, Kuala Lumpur, Malaysia, 14-16 December, 1-4.

King, G., Schneer, B. & White, A. 2014. Methods for extremely large scale media experiments and observational studies (poster). *Presentation.* Society for Political Methodology, Athens, GA, 24 July. http://j.mp/2ox3P40.

King, W.R. & He, J. 2006. A meta-analysis of the technology acceptance model*. Information & Management,* 43(6):740-755. DOI:10.1016/j.im.2006.05.003.

Kochut, A., Deng, Y., Head, M.R., Munson, J., Sailer, A., Shaikh, H., Tang, C. et al. 2011. Evolution of the IBM Cloud: Enabling an enterprise cloud services ecosystem. *IBM Journal of Research and Development,* 55(6):1-7. December.

Koehler, P., Anandasivam, A. & Dan, M.A. 2010. Cloud services from a consumer perspective. *Proceedings.* AMCIS 2010, Lima, Peru, 12-15 August, 329.

Kothari, C. 2004. *Research methodology: methods and techniques.* New Delhi: Willey Eastern.

Kshetri, N. 2011. Cloud computing in the global South: drivers, effects and policy measures. *Third World Quarterly*, 32(6):997-1014.

Kshetri, N. 2016. Institutional and economic factors affecting the development of the Chinese cloud computing industry and market. *Telecommunications Policy,* 40, 116-129.

Kuan, K.K.Y. & Chau, P.Y.K. 2001. A perception-based model for EDI adoption in small businesses using a Technology–Organization–Environment Framework. *Information and Management*, 38(8):507-521.

Kuo, A.M. 2011. Opportunities and challenges of cloud computing to improve health care services. *Journal of Medical Internet Research,* 13(3):1- 4.

Kuziemsky, C.E. & Lau, F. 2008. A comparative analysis of computer based hospice palliative care datasets in Canada. *BMC Palliative Care*, 7(6). DOI:10.1186/1472-684X-7-6.

Kyriakou, N., Maragoudakis, M., Loukis, E. & Themistocleous, M. 2017. Prediction of propensity for enterprise cloud computing adoption. *Proceedings.* The 50th International Conference on System Sciences, Hawaii, 4 January, 4907-40916.

Lassila, A. & Pöyry, P. 2006. Taking a service-centred view on e-learning. *Proceedings.* The IADIS International Conference on Cognition and Exploratory Learning in Digital Age (CELDA 2006), Barcelona, Spain, 8-10 December, 380-385.

Laverty, A. 2011. *The cloud and Africa – indicators for growth of cloud computing.* African File. [Online]. Available: http://theafricanfile.com/academics/usc/the-cloud-and-africa-indicators-for-growth-of-cloud-computing. [Accessed: 24/12/2017].

Leavitt, N. 2009. Is cloud computing really ready for prime time*? Computer*, 42(1):15-20.

Leitch, C.M., Hill, F.M. & Harrison, R.T. 2010. The philosophy and practice of interpretivist research in entrepreneurship: quality, validation, and trust. *Organisational Research Methods*, 13(1):67-84.

Li, J., Zhang, Y., Chen, X. & Xiang, Y. 2018. Secure attribute-based data sharing for resource-limited users in cloud computing. *Computers and Security*, 72, 1-12.

Lin, A. & Chen, N. 2012. Cloud computing as an innovation: perception, attitude, and adoption. *International Journal of Information Management*, 32(6):533-540.

Lin, J.C. & Hsieh, P.L. 2006.The role of technology readiness in customers' perception and adoption of self-service technologies. *International Journal of Service Industry Management,* 17(5):497-517.

Lin, H.F. 2007. Knowledge sharing and firm innovation capability: an empirical study. *International Journal of Manpower*, 28(3/4):315-332.

Lippert, S.K. & Govindarajulu, C. 2006. Technological, organisational, and environmental antecedents to web services adoption. *Communication of International Information Management Association (IIMA)*, 6, 146-158.

Loebbecke, C., Thomas, B. & Ulrich, T. 2012. Assessing cloud readiness at Continental AG. *MIS Quarterly Executive,* 11(1):11-23.

Long, K.J. 2011. *Unit of analysis.* The Sage Encyclopedia of Social Science Research Methods. Thousand Oaks: Sage. ISBN: 9781412950589. DOI:http://dx.doi.org/10.4135/9781412950589.

Lopez-Fernandez, M.C., Serrano-Bedia, A.M. & Gómez-López, R. 2015. Determinants of innovation decision in small and medium-sized family enterprises. *Journal of Small Business and Enterprise Development*, 23(2):408-427. https://doi.org/10.1108/JSBED-02-2015-0028.

Low, C., Chen, Y. & Wu, M. 2011. Understanding the determinants of cloud computing adoption. *Industrial Management and data Systems,* 111(7):1006-1023.

Lyn, T.G., Liang, X., Gourinovitch, A. & Morrison, J.P. 2018. Understanding the determinants of cloud computing adoption for high performance computing. *Proceedings.* Hawaii International Conference on System Sciences, Hawaii, 3-6 January, 3894-3903.

Mack, N., Woodsong, C., Macqueen, K., Guest, G. & Namey, E. 2012. *Qualitative research methods: a data collector's field guide, Module 1.* USAID/Family Health International.

Malecki, E.J. 1977. Firms and innovation diffusion: examples from banking. *Environment and Planning,* 1291-1305. https://doi.org/10.1068/a091291.

Maqueira-Marín, J.M. & Bruque-Cámara, S. 2016. *Advances in data communications and networking for digital business transformation.* IGI Global.

Maqueira-Marín, J.M., Bruque-Cámara, S. & Minguela-Rata, B. 2017. Environment determinants in business adoption of Cloud Computing. *Industrial Management and data systems*, 117(1):1-19. January.

Marais, H.C. & Pienaar, M. 2010. Evolution of the South African Science, Technology and Innovation System 1994-2010: an exploration. *African Journal of Science, Technology, Innovation and Development*, 2(3):82-109.

Maresova, P., Sobeslav, V. & Krejcar, O. 2017. Cost benefit analysis evaluation model of cloud computing deployment for use in companies. *Applied Economics,* 49(6):521-533.

Marston, S., Li, Z., Bandyopadhyay, S., Zhang, J. & Ghalsasi, A. 2011. Cloud computing: the business perspective. *Decision Support Systems,* 51(1):176-189.

Martens, B., Poeppelbuss, J. & Teuteberg, F. 2011. Understanding the cloud computing ecosystem: results from a quantitative content analysis. *Proceedings.* The 10th International Conference, Wirtschaftsinformatik, Zürich, Switzerland, 16-18 February, 65.

Matthews, B. & Ross, L. 2010. *Research methods: a practical guide for the Social Sciences.* Harlow: Longman. Available as an e-book via the Library catalogue: http://prism.talis.com/derby-ac/.

Maugis, V., Choucri, N., Madrick, S.E., Siegel, M.D., Gillett, S.E., Haghseta, F., Zhu, H. & Best, L. 2005. Global e-Readiness-for what? Readiness for e-banking. *Information Technology for Development,* 11(4):313-342.

Mbuyisa, B. & Leonard, A. 2015. ICT adoption SMEs for the alleviation of poverty. *Proceedings.* International Association for Management of Technology (IAMOT 2015), Cape Town, South Africa, 8-11 June, 858-878.

McNabb, D. 2002. Research *methods in public administration and non-profit management: quantitative and qualitative approaches.* New York: Armonk.

McNiff, J. 2002. *Action research for professional development.* [Online]. Available: http://www.jeanmcniff.com/items.asp?id=11. [Accessed: 20/10/2018].

Mell, P. & Grance, T. 2009. *Effectively and securely using the cloud computing paradigm* NIST, Information Technology Laboratory. http://www.nist.gov/public_affairs/contact.htm.

Mell, P. & Grance, T. 2011. *The NIST definition of cloud computing.* NIST Technical Report SP 800-145. Gaithersburg, MD, United States, 1-8.

Misra, S.C. & Mondal, A. 2011. Identification of a company's suitability for the adoption of cloud computing and modelling its corresponding return on investment. *Mathematical and Computer Modelling*, 53(3):504-521.

Mohlameane, M.J. & Ruxwana, N.L. 2013. The potential of cloud computing as an alternative technology for SMEs in South Africa. *Journal of Economics, Business and Management,* 1(4):1-5.

Mohlameane, M.J & Ruxwana, N. 2014. The awareness of cloud computing: a case study of South African SMEs. *International Journal of Trade, Economics and Finance,* 5(1):6-11.

Motahari-Nezhad, H.R., Stephenson, B. & Singhal, S. 2009. *Outsourcing business to cloud computing services: opportunities and challenges.* Technical Report HPL-2009-23. Hewlett Packard Development Company, L.P.

Mpofu, C. & Watkins-Mathys, L. 2011. Understanding ICT adoption in the small firm sector in Southern Africa. *Journal of Systems and Information Technology*, 13 (2):179-99.

Muhammed, K., Zaharaddeen, I., Rumana, K., & Turaki, A.M. 2015. Cloud computing adoption in Nigeria: challenges and benefits. *International Journal of Scientific and Research* Publications, 5(7):17.

Muhammed, K., Zaharaddeen, I., Rumana, K. & Turaki, A.M. 2016. Cloud computing adoption in Nigeria: challenges and benefits. *International Journal of Scientific and Research Publications (IJSRP)*, 5(7):1-7. July.

Müller, S.D., Holm, S.R. & Søndergaard, J. 2015. Benefits of cloud computing: literature review in a maturity model perspective. *Communications of the Association for Information Systems,* 37(42):2-27. http://aisel.aisnet.org/cais/vol37/iss1/42.

Murray, D. 2009. *The essential Don Murray: lessons from America's greatest writing teacher*. L. Miller & T. Newkirk (Eds). Portsmouth, NH: Heinemann.

Murugesan, S. 2011. Cloud computing gives emerging markets a lift. *IIT Professional,* 13(6):60-62.

Mutula, S.M. & Van Brakel, P. 2007. ICT skills readiness for the emerging global digital economy among small businesses in developing countries: case study of Botswana. *Library Hi Tech*, 25(2):231-245.

Myers, M.D. 1997. Qualitative research in Information Systems. *MIS Quarterly,* 21(2):1-8. June. Originally published in *MISQ Discovery*, June 1997, http://www.misq.org/supplements/. Updated version, last modified 1 March 2016. www.qual.auckland.ac.nz.

Myers, M.D. 2009. *Qualitative research in business & management.* London: Sage.

Nazir, M. 2012. Cloud computing: overview & current research challenges. *IOSR Journal of Computer Engineering (IOSR-JCE),* 8(1):1-9.

Njie, B. & Asimiran, S. 2014. Case study as a choice in qualitative methodology. *IOSR Journal of Research & Method in Education (IOSR-JRME),* 4(3):35-40.

Oguntala, A.G., Abd-Alhameed, R.A. & Odeyemi, J.O., 2017. Systematic analysis of enterprise perception towards cloud adoption in the African states: the Nigerian perspective. *The African Journal of Information Systems,* 9(4):1-24, Article 1. http://digitalcommons.kennesaw.edu/ajis/vol9/iss4/1.

Oliveira, T. & Martins, M.F. 2011. Literature review of information technology adoption models at firm level. *The Electronic Journal Information Systems Evaluation,* 14(1):110-121.

Oliveira, T., Thomas, M. & Espadanal, M. 2014. Assessing the determinants of cloud computing adoption: an analysis of the manufacturing and services sectors. *Information & Management,* 51(5):1-16.

Olumide, A.A. 2014. *Assessment of cloud computing readiness of financial institutions in South Africa.* Masters Dissertation, University of Cape Town.

Omwansa, T.K., Waema, T.M. & Omwenga, B. 2014. *Cloud computing in Kenya - a baseline survey.* University of Nairobi School of Computing and Informatics (SCI) & Computing for Development Lab (C4DLab).

Oviatt, B.M. & McDougall, P. 2005. The internationalisation of entrepreneurship. *Journal of international business studies,* 36(1):1-8.

Oyelana, A.A. & Adu, E.O. 2015. Small and medium enterprises (SMEs) as a means of creating employment and poverty reduction in Fort Beaufort, Eastern Cape Province of South Africa. *Journal of Social Science,* 45(1):5-15.

Padhy, R.P., Patra, M.R. & Satapathy, S.C. 2012. Design and implementation of a cloud based Rural Healthcare Information System model. *Universal Journal of Applied Computer Science and Technology*, 2(1):149-157.

Pandey, P. & Pandey, M.M. 2015. *Research methodology: tools and techniques.* Romania: Bridge Centre.

Parasuraman, A. 2000. Technology Readiness index (TRI): a multiple-item scale to measure readiness to embrace new technologies. *Journal of Service Research,* 2(4):307-320.

Park, H., Lee, E., Park, D., Eun, J. & Kim, S. 2016. PaaS offering for the big data analysis of each individual APC. *Proceedings.* The 7th International Conference on Information and Communication Technology Convergence, Jeju Island, Korea, 19-21October. IEEE.

Petter, S. & McLean, R.E. 2009. A meta-analytic assessment of the DeLone and McLean IS success model: an examination of IS success at the individual level. *Information & Management,* 46(3):159-166.

Prasad, A., Green, P., Heales, J. & Finau, G. 2014. On cloud computing service considerations for the small and medium enterprises. *Proceedings.* Twentieth Americas Conference on Information systems, Savannah, USA, 7-9 August, 1-9.

Priyadarshinee, P., Raut, R.D., Jha, M.K. & Gardas, B.B. 2017. Examining the critical success factors of cloud computing adoption in the MSMEs by using ISM model. *The Journal of High Technology Management Research,* 28(2):125-141.

Qiang, C., Clarke, G. & Harewood, N. 2006. *The role of ICT in doing Business Information and Communication for development: global trends and policies.* Washington DC.: World Bank.

Qureshi, S. 2005. How does information technology effect development? Integrating theory and practice into a process model. *Proceeding*s. Americas Conference on Information Systems, Omaha, NE, USA, 11-15 August.

Qureshi, S. & Kamal, M. 2011. Role of cloud computing interventions for micro-enterprise growth: implications for global development. *Proceedings.* The Fourth Annual SIG Global Development Workshop, Shanghai, China, 3 December, 48. https://digitalcommons.unomaha.edu/isqafacproc/48.

Rahul, M., Haque, M.J. & Muntjir, M. 2012. Impact of cloud computing on IT Industry: a review, & analysis. *International Journal of Computer and Information Technology,* 1(2):2-5.

Ray, D. 2016. Cloud adoption decisions: benefitting from an integrated perspective. *The Electronic Journal Information Systems Evaluation,* 19(1):3-21.

Raymond, L., Bergeron, F.O. & Blili, S. 2005. The assimilation of e-business in manufacturing SMEs: determinants and effects on growth and internationalisation. *Electronic Markets,* 15(2):106-118.

Raza, M.H., Adenola, A.F., Nafarieh, A. & Robertson, W. 2015. The slow adoption of cloud computing and IT workforce. *Procedia Computer Science*, 52:1-6.

Redman-MacLaren, M. & Mills, J. 2015. Transformational Grounded Theory: theory, voice, and action. *International Journal of Qualitative Methods*, 14(3):1-12.

Repschlaeger, J., Zarnekow, R., Wind, S. & Klaus, T. 2012. Towards a cloud computing selection and evaluation environment for very large business applications.

*Proceedings.* The Eighteenth Americas Conference on Information Systems, Seattle, Washington, 9-12 August.

Resnik, D.B. 2015. *What is ethics in research & why is it important?* National Institute of Environmental Health Science. [Online]. Available: https://ahrecs.com/resources/ethics-research-important-resources-david-b-resnik-2015. [Accessed: 29/09/2018].

Riemenschneider, C., Harrison, D. & Mykytyn, P. 2003. Understanding IT adoption decisions in small business: integrating current theories. *Information and Management,* 40(4):269-285.

Robu, M. 2012. Cloud computing based information systems – present and the future. *The USV Annals of Economics and Public Administration,* 2(16):1-7.

Rogers, E.M. 1983. *Diffusion of innovation.* New York: Free Press.

Rogers, E.M. 2003. *Diffusion of innovations.* 5th ed. New York: Free Press.

Rogerson, M.C. 2008. Tracking SMME development in South Africa: issues of finance, training and the regulatory environment. *Urban Forum,* 19:61-81. DOI:10.1007/s12132-008-9025-x.

Ross, P. & Blumenstein, M. 2013. Cloud computing: the nexus of strategy and technology. *The Journal of Business Strategy,* 34(4):39-47.

Ross, V.W. & Leeser, M.E. 2014. GPGPU computing for cloud auditing. In *High performance cloud auditing and applications, 259-282.* New York: Springer Science + Business Media.

Sabi, H.M., Uzoka, F.E., Langmia, K. & Njeh, F.N. 2016. Conceptualising a model for adoption of cloud computing in education. *International Journal of Information Management,* 36(2):183-191.

Sahin, I. 2006. Detailed review of Roger's Diffusion of Innovations theory and educational technology-related studies based on Roger's theory. *The Turkish Online Journal of Educational Technology (TOJET)*, 5(2):1-10.

Salkind, N.J. 2011. *Statistics for people who think they hate statistics.* Thousand Oaks, CA: Sage.

Saunders, M. & Lewis, P. 2012. *Doing research in business & management: an essential guide to planning your project.* Essex, England: Prentice Hall.

Saunders, S., Lewis, P. & Thornhill, A. 2009. *Research methods for business students.* 5th ed. Harlow, UK: Pearson Educational.

Saunders, M., Lewis, P. & Thornhill, A. 2012. *Research methods for business students*. 6th ed. Harlow, UK: Pearson.

Saunders, M., Lewis, P. & Thornhill, A. 2016. Research methods for business students. Harlow, UK: Pearson.

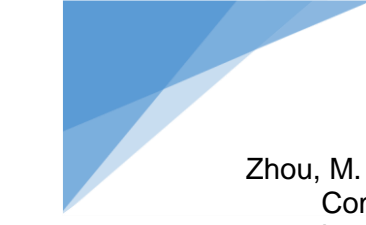Saunders, M.K. & Tosey, P.C. 2013. The layers of research design. *Rapport*, 14(4):58-59. Winter.

Schneider S. & Sunyaev, A. 2016. Determinant factors of cloud-sourcing decisions: reflecting on the IT outsourcing literature in the era of cloud computing. *Journal of Information Technology,* 31(1):1-31.

Schofield, A. & Abrahams, L. 2015. *Research study on the use of cloud services in the South African Government.* Joburg Centre for Software Engineering, Wits University. February.

Scholtz, B., Govender, J. & Gomez, J.M. 2016. Technical and environmental factors affecting cloud computing adoption in the South African public sector*. Proceedings.* International Conference on Information Resources Management (CONF-IRM 2016), Cape Town, RSA, 18-20 May, 1-14.

Schubert, L. & Jeffery, K. 2012. *Advances in clouds research in future cloud computing.* European Commission, the Cloud Expert Group, 1-84.

Scotland, J. 2012. Exploring the philosophical underpinnings of research: relating ontology and epistemology to the methodology and methods of the scientific, interpretive, and critical research paradigms. *Canadian Centre of Science and Education,* 5(9):1-8.

Selwyn, P. 2003. On learning to predict Web traffic. *Decision Support Systems*, 35(2):213-22.

Senarathna, I., William, C., Warren, M., Yeoh, W. & Salzman, S. 2018. Factors that influence adoption of cloud computing: an empirical study of Australian SMEs. *Australasian Journal of Information Systems*, 22(2018):1-31.

Senyo, P.K., Addae, E. & Boateng, R. 2018. Cloud computing research: a review of research themes, frameworks, methods and future research directions. *International Journal of Information* Management, 38(1):128-139.

Senyo, P.K., Effah, J. & Addae, J. 2016. Preliminary insight into cloud computing adoption in a developing country. *Journal of Enterprise Information Management*, 29(4):505-524. June.

Shahzad, F. 2014. State-of-the-art survey on cloud computing security challenges, approaches and solutions. *Proceedings.* The 6th International Symposium on Applications of Ad hoc and Sensor Networks (AASNET'14), *Procedia Computer Science* 37, 357-362.

Sharma, S.K., Al-Badi, A.H., Govindaluri, S.M. & Al-Kharusi, M.H. 2016. Predicting motivators of cloud computing adoption: a developing country perspective. C*omputers in Human Behaviour,* 62, 61-69.

Shojaiemehr, B., Rahmani, A.M. & Qader, N.N. 2018. Cloud computing service negotiation: a systematic review. *Computer Standards & Interfaces*, 55, 196-206.

Son, I. & Lee, D. 2011. Assessing a new IT service model, cloud computing*. Proceedings.* Association for Information Systems (AIS) Pacific Asia Conference on Information Systems (PACIS), Hyderabad, India, 9 July, 179. https://aisel.aisnet.org/pacis2011/179.

Son, I., Lee, D., Lee, J. & Chang, Y. 2011. Understanding the impact of IT service innovation on firm performance: the case of cloud computing. *Proceedings.* The 15th

Pacific Asia Conference on Information Systems: Quality Research in Pacific (PACIS 2011), Brisbane, Queensland, Australia, 7-11 July 2011. http://aisel.aisnet.org/pacis2011/180.

Song, S. 2017. Competition law and interoperability in cloud computing. *Computer Law & Security Review,* 33(2017):659-671.

Soomro, Z.A., Shah, M.H. & Ahmed, J. 2016. Information security management needs more holistic approach: A literature review. *International Journal of Information Management,* 36(2):215-225.

South Africa. 1996. National Small Business Act No. 102 of 1996. President's Office. 27 November.

South Africa. 2003. National Small Business Amendment Act No. 26 of 2003. *Government Gazette*, 461(25763):1-10.

Stake, R. 2005. Qualitative case studies. In N.K. Denzin & Y.S. Lincoln (Eds.), *The Sage handbook of qualitative research*. Sage.

Subashini, S. & Kavitha, V. 2011. A survey on security issues in service delivery models of cloud computing. *Journal of Network and Computer Applications,* 34(1):1-11.

Sultan, N.A. 2011. Reaching for the "cloud": how SMEs can manage. *International Journal of Information Management,* 31(7):1-12.

Sun, Y., Zhang, J., Xiong, Y. & Zhu, G. 2014. Data security and privacy in cloud computing. I*nternational Journal of Distributed Sensor Networks*, 6(50):1-9.

Surendran, P. 2012. Technology Acceptance Model: a survey of literature. *International* Journal of Business and Social Research (IJBSR), 2(4):2-4.

Surendro, K. & Fardani, A. 2012. Identification of SME readiness to implement cloud computing. *Proceedings.* 2012 International Conference on Cloud Computing and Social Networking (ICCCSN), Bandung, West Java, Indonesia, 26-27 April. IEEE. DOI:10.1109/ICCCSN.2012.6215757.

Tan, K., Chong, S., Lin, B. & Eze, U. 2009. Internet-based ICT adoption among SMEs: demographic versus benefits, barriers, and adoption intention. *Journal of Enterprise Information Management,* 23 (1):27-55.

Tarutė, A. & Gatautis, R. 2014. ICT impact on SMEs performance. *Procedia - Social and Behavioural Sciences,* 110:1218-1225.

Taylor, M. & Murphy, A. 2004. SMEs and e-Business. *Journal of Small Business and Enterprise Development,* 11(3):280-289.

Taylor, P. 2015. The Importance of Information and Communication Technologies (ICTs): an integration of the extant literature on ICT adoption in small and medium enterprises. *International Journal of Economics, Commerce and Management,* III(5):1-22.

Tornatzky, L. & Fleisher, M. 1990. *The process of technology innovation*. Lexington, M.A.: Lexington Books.

Trinh, T.P., Pham, C.H. & Tran, D. 2015. An adoption model of Software as a Service (SAAS) in SMEs. *Proceedings*. The 19th Pacific Asia Conference on Information Systems (PACIS 2015), Marina Bay Sands, Singapore, 5-9 July, Paper 18, 1-11. http://aisel.aisnet.org/pacis2015/18.

Twum-Darko, M. & Sibanyoni, J.L. 2014. Role of cloud computing as technology innovation in small and medium enterprises in South Africa. *Corporate Ownership and Control,* 12(1):1-6.

Vaidya, K., Sajeev, A.S.M. & Gao, J. 2005. E-procurement assimilation: an assessment of business capabilities and supplier readiness in the Australian public sector*. Proceedings* of the 7th International Conference on Electronic Commerce (ICEC 2005), Xi'an, China, 15-17August, 429-434. ACM.

Varghese, B. & Buyya, R. 2018. Next generation cloud computing: new trends and research directions. *Future Generation Computer Systems,* 79(Part 3):849-861.

Vukeya, V. 2017. *An overview of SMMEs in South Africa: an analysis of the National Small Business Act.* [Online]. Available: https://2017.essa.org.za/fullpaper/essa_3558.pdf. [Accessed: 25/10/2018].

Wainwright, D. & Waring, T. 2007. The application and adaptation of a diffusion of innovation framework for information systems research in NHS general medical practice. *Journal of Information Technology*, 22(1):44-58.

Wang, F.-K. & He, W. 2014. Service strategies of small cloud service providers: a case study of a small cloud service provider and its clients in Taiwan. *International Journal of Information Management,* 34(3):406-415. http://dx.doi.org/10.1016/j.ijinfomgt.2014.01.007.

Wang, L., Laszewski, G.V., Younge, A. & He X. 2010. Cloud computing: a perspective study. *New Generation Computing,* 28(2):137-146.

Wang, X.L., Wang, L., Bi, Z., Li, Y.Y. & Xu, Y. 2016. Cloud computing in Human Resource Management (HRM) system for small and medium enterprises (SMEs). *The International Journal of Advanced Manufacturing Technology,* 84(1-4):485-496.

Wang, Y.C. & Liu, K.J.R. 20015. Statistical delay QoS protection for primary users in cooperative cognitive radio networks. *IEEE Communications Letters*, 19(5):835-838. May.

Weber, R. 2004. Rhetoric of positivism versus interpretivism: a personal View. *Management Information systems (MIS) Quarterly,* 28(1):iii-xii.

WEF *see* World Economic Forum.

Weinhardt, C., Anandasivam, A., Blau, B., Borissov, N., Meinl, T., Michalk, W. & Stößer J. 2009. Cloud computing – a classification, business models, and research directions*. Journal of Business and Information Systems Engineering,* 1(5):391-399.

Weinhardt, C., Anandasivam, A., Blau, B. & Stößer*,* J. 2009. Business models in the service world. *IT Professional*, 11(2):28-33.

Wilkin, C., Warren, M., Yeoh, W. & Salzman, S. 2018. Factors that influence adoption of cloud computing: an empirical study of Australian SMEs. *Australasian Journal of Information Systems,* 22, 1-31. DOI:http://dx.doi.org/10.3127/ajis.v22i0.1603.

Woiceshyn, J. & Daellenbach, U. 2018. Evaluating inductive vs. deductive research in management studies: implications for authors, editors, and reviewers. *Qualitative Research in Organisations and Management: An International Journal,* 13 (2):183-195. https://doi.org/10.1108/QROM-06-2017-1538.

Wolcott, P., Kamal, M. & Qureshi, S. 2008. Meeting the challenges of ICT adoption by micro-enterprises. *Journal of Enterprise Information Management,* 21(6):616-632.

World Economic Forum. 2012. *Risk and responsibility in a hyperconnected world: pathways to global cyber resilience.* WEF Report. Prepared in collaboration with Deloitte. 31 May.

Xi, L. & Mitrovic, Z. 2014. Readiness assessment of cloud-computing adoption within a provincial government of South Africa. *Proceedings.* 4th International Conference on Design, Development & Research, 8-10 September, Cape Town, South Africa.

Xin, M. & Levina, N. 2008. Software-as-a-Service model: elaborating client-side adoption factors. *Proceedings.* 29th International Conference on Information Systems, Paris, France, 14-17 December, 1-11.

Xu, S., Zhu, K., & Gibbs, J. 2004. Global technology, local adoption: a cross-country investigation of internet adoption by companies in the United States and China. *Electronic Markets*, 14(1):13-24.

Yang, H. & Tate, M. 2012. A descriptive literature review and classification of cloud computing research. *Communications of the Association for Information Systems,* 31(2012):35-60.

Yeboah-Boateng, E.O. & Essandoh, K.A. 2014. Factors influencing the adoption of cloud computing by small and medium enterprises in developing economies. *International Journal of Emerging Science and Engineering (IJESE),* 2(4):2-8.

Yigitbasioglu, O.M. 2015. External auditors' perceptions of cloud computing adoption in Australia. *International Journal of Accounting Information Systems,* 18, 46-62.

Yigitbasioglu O.M., Mackenzie K. & Low, R. 2013. Cloud computing: how does it differ from IT outsourcing and what are the implications for practice and research? *The International Journal of Digital Accounting Research*, 13, 99-121.

Yin, R.K. 1994. *Case study research: design and methods.* Thousand Oaks, CA: Sage.

Yin, R.K. 2003. *Case study research, design and methods.* 3rd ed. Thousand Oaks, California: Sage.

Yin, R.K. 2009. Case study research – design and methods. 2nd ed. *Applied Social Research Methods Series,* 5: 1-28.

Yuvaraj, M. 2015. Inherent conceptions of cloud computing among library and information science professionals. *Library Philosophy and Practice (e-journal), Paper 1321.* http://digitalcommons.unl.edu/libphilprac/1321.

Zheng, Y., Hatakka, M., Sahay, S. & Andersson, A. 2018. Conceptualising development in information and communication technology for development (ICT4D). *Information Technology for Development*, 24(1):1-14. DOI:10.1080/02681102.2017.1396020.

Zhou, M. 2013. *Data security and integrity in cloud computing.* PhD Thesis, School of Computer Science and Software Engineering of Wollongong. http://ro.uow.edu.au/theses/3990.

# APPENDIX A1: ETHICS DOCUMENT

**Cape Peninsula
University of Technology**

P.O. Box 652 • Cape Town 8000 South Africa •Tel: +27 21 469 1012 • Fax +27 21 469 1002
80 Roeland Street, Vredehoek, Cape Town 8001

| Office of the Research Ethics Committee | Faculty of Informatics and Design |
|---|---|

Approval was granted by the Faculty Research Ethics Committee, on 15 May 2017 to Mr Philemon Ilyihamije, student number 216115000, for research activities related to the MTech: Information Technology degree at the Faculty of Informatics and Design, Cape Peninsula University of Technology.

| Title of dissertation/thesis: | Adoption of cloud computing by small and medium enterprises in Cape Town, South Africa |
|---|---|

**Comments**

Research activities are restricted to those detailed in the research proposal.

| Signed: Faculty Research Ethics Committee | Date 16/5/2017 |
|---|---|

RESEARCH ETHICS COMMITTEE
INFORMATICS AND DESIGN
ETHICS APPROVAL GRANTED
1 6 MAY 2017
Cape Peninsula
University of Technology
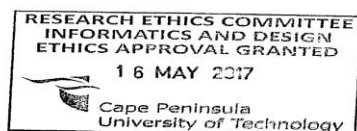
# APPENDIX A2: INVITATION LETTER TO PARTICIPATE IN THE RESEARCH

Cape Peninsula
University of Technology

**Letter of Invitation to participate in Research Study**

**Research topic**: Cloud computing adoption Readiness by Small, Enterprises in Cape Town, South Arica.

Dear Sir / Madam,

I am currently a registered student for the Masters of Technology at Cape Peninsula University of Technology (CPUT). In fulfilment of part of the requirements of this study programme, I am conducting research on the above mentioned research topic on SMEs operating in Cape Town area and surroundings.

SMEs make a huge contribution to the country's economic growth and job creation. It is highly important for SMEs to embrace, and optimise the use of technology, in order to grow and sustain their business competitiveness. Cloud computing technology claims to present this potential of providing organisations with computing capacities with a significant low financial cost, less technical skills requirements, and other high costs associated with IT infrastructure ownership.

The purpose of this research study is to explore the extent of the readiness of cloud computing technology adoption and use by SMEs operating in Cape Town and surroundings. Your Enterprise has been selected as best fit to provide valuable input to the current study.

Your contribution and participation in the research will allow the researcher to gain a deeper insight into the extent of the adoption readiness and how SMEs gain advantage of the use of available technology at affordable cost for business sustainability and competitiveness. Therefore, we are requesting your assistance in participating in a research interview session, which will take the form of a semi-structured interview. The interview will take approximately 30 to 40 minutes of your time, and your participation is of high appreciation.

The participation in this research project is voluntary. Your responses will be treated anonymously and remain confidential. If you accept to participate in this research study, the interview will be arranged with you at the time and venue convenient to you.

If you have any questions concerning this project, feel free to contact the department of Information Technology at the Cape Peninsula University of Technology, or the researchers listed below.

**Researcher(s) Contact Information**
**Research Supervisor: Dr Andre De la Harpe**
Cape Peninsula University of Technology (CPUT) - Cape Town Campus
E-mail: delaparpea@cput.ac.za / Phone: 021 4603627
Office: Room 4.1b, Business Management Building, Cape Town Campus

**Researcher: Philemon Ilyihamije**
Cape Peninsula University of Technology - Cape Town Campus
Department of Information Technology
E-mail: phil681969@gmail.com / Phone: 27722979461

Sincerely yours,
Philemon Ilyihamije

# APPENDIX A3: LETTER OF INFORMED RESEARCH CONSENT

**Research topic**: Cloud computing adoption readiness by Small Enterprises in Cape Town, South Arica.

SMMEs make a huge contribution in the country's economic growth and job creation. It is highly important for SMMEs to embrace beneficially, and optimise the use of technology, in order to grow and sustain business competitiveness. Cloud computing presents this potential of providing organisations with computing capacities with a significant low financial cost, less technical skills requirement, and other high cost associated with IT infrastructure ownership.

In partial fulfilment of a Masters study programme in Information Technology at CPUT, I am required to conduct research on the above mention topic, and your Enterprise has been selected as best fit to provide a valuable input to the study.

The purpose of this research study is to explore the extent of the readiness of cloud computing technology adoption and use by SMEs operating in Cape Town and surroundings. Your contribution and participation in the research will allow the researcher to gain a deeper insight into how SMEs gain advantage of the use of available technology at affordable cost for business sustainability and competitiveness.

Therefore we are requesting your assistance in participating in a research interview session, which will take the form of a semi-structured interview. The interview will take approximately 30 to 40 minutes of your time, and your participation is of high appreciation.

The participation in this research project is voluntary. Your responses will be treated anonymously and remain confidential.

By signing this letter, the participant acknowledges his or her informed consent as related to the study.


| | | |
|---|---|---|
| **Participant** | **Place** | **Signature/Date** |

Philemon Ilyihamije           Cape Town

| | | |
|---|---|---|
| **Participant** | **Place** | **Signature/Date** |

Dr Andre De La Harpe         Cape Town

| | | |
|---|---|---|
| **Participant** | **Place** | **Signature/Date** |

# APPENDIX B: INTERVIEW GUIDE QUESTIONS

## A. GENERAL INFORMATION

a. Name of the enterprise

b. Size of the organisation (tick):

       1 – 5 employees

       5 – 10 employees

       10 – 20 employees

       20 – 50 employees

       50 – 100 employees

       More than 100 employees

c. What is the nature of the business of your enterprise?

d. What is the industry are you in?

e. What function / position held in the organisation?

f. Geographical location of the enterprise.

## B. INTERVIEW QUESTIONS

### a) Factors for cloud computing adoption readiness by SEs

IQ 1.1.1: Did you hear about cloud computing technology before? Where and how? What does it mean for your enterprise's business operations?

IQ 1.1.2: What potential for business sustainability do you see in cloud computing adoption in your organisation?

IQ 1.1 3: Do you believe that adoption readiness assessment is necessary for the successful adoption of a new technology? In what way?

IQ 1.1.4: Is there any belief that cloud computing adoption can have an impact on your business competitiveness? Expand.

IQ 1.1.5: How do you explain regulatory compliance with regard to cloud computing adoption and use?

IQ 1.1.6: What are the system areas in your enterprise that cloud computing adoption could have a direct impact on?

IQ 1.1.7: How can this organisation profit from the use of the pay-as-you-use model when using cloud computing technologies?

IQ 1.1.8: How can you describe the requirement for internet availability for business operations in your enterprise? How good is your internet connectivity?

IQ 1.1.9a: What are the major consideration factors in your organisation that influence the choice of new technology adoption for the business?

IQ 1.1.9b: If cloud services are in use, how was decided what data / systems should be pushed into the cloud and what should remain on the premises?

## b) Benefits of cloud computing and adoption readiness

IQ 1.2.1: In your opinion, what are the main gains the enterprise should get from the use of cloud computing?

IQ 1.2.2: What category of your organisational data/systems would you be comfortable with to move to a cloud computing environment?

IQ 1.2.3: Do you see any positive financial impact on the organisational performance through the adoption of cloud computing? How do you see it be realised?

IQ 1.2.4: In your opinion, what are the technical challenges the migration to cloud computing presents to your organisation?

## c) Adoption readiness determination by enterprises

IQ 2.1.1: Does your enterprise need to have access to ICT of any sort to run the business? Please expand.

IQ 2.1.2: Do you outsource, or have you ever outsourced any IT systems / services in your organisation? What is the reason for choosing outsourcing?

IQ 2.1.3: What is the level of IT skills in your enterprise's work force? Choose one.
- High
- Intermediate
- Basic
- None

IQ 2.1.4: Do you use or are you aware of any form of cloud computing use in the organisation?

IQ 2.1.5: How do you trust promised cloud computing services for the competitiveness of your business?

IQ 2.1.6: If cloud computing is not being used in your organisation, is there any consideration of adopting it in the future? Why?

IQ 2.1.7: What potential benefits do you see in conducting the cloud computing adoption readiness assessment?

IQ 2.1.8: Is your organisation open to technological change? How and why?

IQ 2.1.9: How can you explain readiness for adoption of a technology such as cloud computing, putting it into the context of your organisation and business?

IQ 2.1.10: How advantageous do you think cloud computing is for small businesses such as yours?

IQ 2.1.11: What financial gain can your organisation enjoy from cloud computing adoption? Explain.

IQ 2.1.12: If moved to the cloud environment, what are your considerations for the service continuity and recovery plans? In your opinion, who should be held responsible for data loss in case there is a breach relating to data stored in the cloud?

### d) Adoption readiness assessment

IQ 2.2.1: Is there a dedicated IT unit in your organisation (enterprise)?

IQ 2.2.2: What is the main role played by IT staff in your organisation pertaining to technology adoption decision making?
- IT staff have a say
- Exclusively Management decides
- Management decides, informed by advice from IT staff

IQ 2.2.3: How do you determine whether a new technology such as cloud computing is ready for adoption?

IQ 2.2.4: What would you consider to be critically important when deciding to move your applications to the cloud? Is there any pre-defined process in place?

IQ 2.2.5: Who is in charge of the maintenance of your organisational IT assets?

IQ 2.2.6: What cloud computing deployment model has been implemented in your organisation so far? How was it decided on?

IQ 2.2.7: Was there any pre-assessment performed? What were the challenges encountered in the implementation process, if any?

IQ 2.2.8: Is there a clear IT strategy in your organisation? If yes, how is it in line with your business strategy?

IQ 2.2.9: Any new technology or process gets adopted because of the perceived business value it can provide. Is there any way to assess the value to be brought by the new innovations in the organisation before embarking on the adoption? Please expand.

IQ 2.2.10: What are the criteria you have in place for the selection of a cloud provider in your organisation, if needed?

IQ 2.2.11: How do you plan to protect the organisational assets moved to the cloud?

IQ 2.2.12: What type of cloud service has been adopted in your enterprise, and what is the likelihood of cloud computing being adopted if it is not in use yet?

IQ 2.2.13: Do you have an IT staff training plan in your organisation, especially when a new technology is to be adopted? Expand if needed.

IQ 2.2.14: How risk aware is your organisation with regard to the enterprise's digital assets? Select the most appropriate option.

- High
- Medium
- Low
- Not sure
- Don't care

# APPENDIX C1: INTERVIEW TRANSCRIPT OF I1

## A. GENERAL INFORMATION

a. Name of the enterprise: P1

b. Size of the organisation (tick):

    1 – 5 employees

    5 – 10 employees

    10 – 20 employees

    **<u>20 – 50 employees</u>**

    50 – 100 employees

    More than 100 employees

c. What is the nature of the business of your enterprise? Financial Software Services

d. What is the industry are you in? Software Development

e. What function / position do hold in the organisation? Managing Director

f. Geographical location of the enterprise: Cape Town

## B. INTERVIEW QUESTIONS

### a) Factors for cloud computing adoption readiness by SEs

IQ 1.1.1:    Did you hear about cloud computing technology before? Where and how? What does it mean for your enterprise's business operations?

- At school / college. I did information systems as part of my academic training
- Use of computing as a utility, which computing is accessed via internet

IQ 1.1.2:    What potential for business sustainability do you see in cloud computing adoption in your organisation?

- Allow to access the same advanced IT resources / standardisation
- Promoting / access to the same opportunities
- Taking opportunities much quicker, regardless of the financial capabilities
- Brings the flexibility for change
- Business can grow as the focus is on the business processes not on technical side
- We have access to advanced and up to date computing applications, allowing us to keep seeking for improvement, no worries of financial cost involved
- Access to the same resources as the big enterprises allow us to compete on the market
- Cloud allows us to stay current in terms of technology, which allows us to sustain our business processes while we introduce service improvements

IQ 1.1.3:  Do you believe that adoption readiness assessment is necessary for the successful adoption of a new technology? In what way?
- Yes it is very important
- It allows taking into consideration the organisation as a whole during decision making process
- Allows to map the business processes to the IT process (process alignment)
- Prepare upfront and understand the level of technical compatibilities
- Allow to plan and properly develop required skills / staff training
- Measure compliance processes

IQ 1.1.4:  Is there any belief that cloud computing adoption can have an impact on your business competitiveness? Expand.
- Cost of running business System scalability made easy / Allowing speed to market

IQ 1.1.5:  How do you explain regulatory compliance with regard to cloud computing adoption and use?
- Different and various acts exists in RSA (compliance Act, Bank act, Financial intelligence Act, POPI) which we are obliged to comply with in order to successfully run business
- There is a problem with the cross-border regulatory compliance as most of the time there is conflict between the local law and regulations and other countries. This is a big problem. We leave it in the hands of the service provider

IQ 1.1.6:  What are the system areas in your enterprise that cloud computing adoption could have a direct impact on?
- High availability system (system access and availability): multi region database
- Networking
- Sometime the application integration is an issue

IQ 1.1.7:  How can this organisation profit from the use of the pay-as-you-use model when using cloud computing technologies?
- There is no need for upfront financial investment
- Entry cost is much cheaper
- Financial area
- Technological skills

IQ 1.1.8:  How can you describe the requirement for internet availability for business operations in your enterprise? How good is your internet connectivity?
- The availability of internet is highly required in order to run business. All our services are accesses online, hence without internet there is no business
- Internet is required 24/7 for the nature of business we run. Our client requires to be in constant sync with our system all the time

IQ 1.1.9a: What are the major consideration factors in your organisation that influence the choice of new technology adoption for the business?
- Cost of infrastructure and ownership
- Is the technology fit for purpose?
- Support model, whether it is in-house or by the service provider
- Ease of maintenance
- Robust and secure system
- System deployment time

IQ 1.1.9b: If cloud services are in use, how was decided what data / systems should be pushed into the cloud and what should remain on the premises?
- Investment cost
- Speed of having the system up and running
- Building required IT infrastructure affordability

## b) Benefits of cloud computing and adoption readiness

IQ 1.2.1: In your opinion, what are the main gains the enterprise should get from the use of cloud computing?
- The use of CC allows small enterprises to access the same playing fields and the big organisations, making it much easier for them to compete in the same market
- Access the reliable and up to date IT infrastructure
- Access up to standard computing resources without any need of upfront investment

IQ 1.2.2: What category of your organisational data/systems would you be comfortable with to move to a cloud computing environment?
- We can and do have all our stuff in the cloud environment.

IQ 1.2.3: Do you see any positive financial impact on the organisational performance through the adoption of cloud computing? How do you see it be realised?
- Yes, we see a positive impact on our finances
- We do not need to pay big amounts of money to access advanced computing resources, we pay as our finances allow us and we can use the little available money for business processes
- The use of cloud allows us to provide service of quality to our clients, because we have access to the up to date computing resources all the time

IQ 1.2.4: In your opinion, what are the technical challenges the migration to cloud computing presents to your organisation?
- The legal compliance side is a big challenge for us, most of the time our customers do not understand the legal implications involved in using cloud computing as they do not understand how CC operates. We try to train our customers too in order to minimise the risk of legal compliance

- There is no local presence of cloud computing service providers
- Stay up time for SLA's is another problem as the agreement gets mapped to the (trans-continental) laws and regulation – regulations are interpreted differently in different parts of the world

## c) Adoption readiness determination by enterprises

IQ 2.1.1: Does your enterprise need to have access to ICT of any sort to run the business? Please expand.
- Yes, we are an ICT services offering company, ICT is what we do

IQ 2.1.2: Do you outsource, or have you ever outsourced any IT systems / services in your organisation? What is the reason for choosing outsourcing?
- Some of our IT resources are partly outsourced. When we need in house system configuration we have outside technicians who come to perform the tasks for us. But there is no permanent contract with any company to maintain our infrastructure, when the work involved is not too demanding we do it ourselves
- We outsource some area of our systems when there is technical maintenance required on-premises and  much technical / specialised involvement
- We outsource physical Network installation
- The reason is the lack of in-house specialised skills

IQ 2.1.3: What is the level of IT skills in your enterprise's work force? Choose one.
- **<u>High</u>**
- Intermediate
- Basic
- None

IQ 2.1.4: Do you use or are you aware of any form of cloud computing use in the organisation?
- Yes, we use SaaS for all our applications

IQ 2.1.5: How do you trust promised cloud computing services for the competitiveness of your business?
- We trust cloud highly, service high availability
- Security is assured, and the cloud system is always patched with updated patches
- In time of disaster, the system is much easier to recover and quicker

IQ 2.1.6: If cloud computing is not being used in your organisation, is there any consideration of adopting it in the future? Why?
- We have cloud already. We used cloud because it was easy to set up, and access the system without the need of much financial investment
- It allowed us to market and use existing high end technology to run our business
- The cost was one of the main drivers and advanced skills development was not necessary at the start up stage

IQ 2.1.7:   What potential benefits do you see in conducting the cloud computing adoption readiness assessment?

- The assessment for cloud readiness if one wants to move to cloud is important. But for us we did not do any assessment as we started our business using cloud services

IQ 2.1.8:   Is your organisation open to technological change? How and why?

- We are very open
- Looking for scalable systems
- Need to stay current
- Constant exploration of how we can cut cost, while we improve the quality of the service to our client, and expand our customer base

IQ 2.1.9:   How can you explain readiness for adoption of a technology such as cloud computing, putting it into the context of your organisation and business?

- Being prepared for the adoption
- Having of the required tools and infrastructure ready
- Understand all the processes, IT and business and know how they can be integrated to use the technology to run business

IQ 2.1.10:  How advantageous do you think cloud computing is for small businesses such as yours?

- We took advantage of the existing infrastructure, which we could not afford to build
- We are not limited to what computing resources we can access in order to compete in the market

IQ 2.1.11:  What financial gain can your organisation enjoy from cloud computing adoption? Explain.

- No need for investment infrastructure
- System maintenance and operational costs

IQ 2.1.12:  If moved to the cloud environment, what are your considerations for the service continuity and recovery plans? In your opinion, who should be held responsible for data loss in case there is a breach relating to data stored in the cloud?

- Shared responsibility between us and provider
- Constant system monitoring
- Test SLAs all the time before taking the subscription

**d) Adoption readiness assessment**

IQ 2.2.1:   Is there a dedicated IT unit in your organisation (enterprise)?

- Most of employees are IT professionals somehow, as we provide IT related services

**IQ 2.2.2:** What is the main role played by IT staff in your organisation pertaining to technology adoption decision making?

- IT staff have a say
- **Exclusively Management decides:** COO, CTO, and CFO in consultation
- Management decides, informed by advice from IT staff

**IQ 2.2.3:** How do you determine whether a new technology such as cloud computing is ready for adoption?

- Constantly monitor the environment, and business needs will dictate.

**IQ 2.2.4:** What would you consider to be critically important when deciding to move your applications to the cloud? Is there any pre-defined process in place?

- Security
- Skills availability
- Feasibility assessment

**IQ 2.2.5:** Who is in charge of the maintenance of your organisational IT assets?

- We do it ourselves / external company

**IQ 2.2.6:** What cloud computing deployment model has been implemented in your organisation so far? How was it decided on?

- SaaS using AWS
- We did not have any infrastructure in place, and we wanted to just connect and access the services

**IQ 2.2.7:** Was there any pre-assessment performed? What were the challenges encountered in the implementation process, if any?

- There was no pre-assessment done

**IQ 2.2.8:** Is there a clear IT strategy in your organisation? If yes, how is it in line with your business strategy?

- Yes, there is a strategy
- We are a software service offering business
- Our business is fully supported by IT, without an IT strategy we will not be able to deliver services
- There is a business strategy which is in sync with IT strategy. The two must be always interlinked and they must be kept in sync / integrated

**IQ 2.2.9:** Any new technology or process gets adopted because of the perceived business value it can provide. Is there any way to assess the value to be brought by the new innovations in the organisation before embarking on the adoption? Please expand.

- Analyse and understand the service required by customers
- Conduct cost analysis per each customer

- Analyse all the expenses that will be involved in acquiring the product and delivering the service to the customer
- Much the product offering to the service needed by the customer
- Look at the usability of the product, and the level of support for the supplier / provider

IQ 2.2.10: What are the criteria you have in place for the selection of a cloud provider in your organisation, if needed?
- Type of service we need
- Support provided
- Clarity of SLAs
- Interoperability with some legacy systems if any

IQ 2.2.11: How do you plan to protect the organisational assets moved to the cloud?
- Service provider should do it, and SLAs must include clearly a section explaining how this will be done

IQ 2.2.12: What type of cloud service has been adopted in your enterprise, and what is the likelihood of cloud computing being adopted if it is not in use yet?
- Cloud computing is in use already
- Software as a Service is the type of cloud that we have adopted (public SaaS)

IQ 2.2.13: Do you have an IT staff training plan in your organisation, especially when a new technology is to be adopted? Expand if needed.
- Yes there is a plan
- Staff involved meet the vendor to brief them on the technology, and there after individuals are required to get the deep understanding by themselves

IQ 2.2.14: How risk aware is your organisation with regard to the enterprise's digital assets? Select the most appropriate option
- **<u>High</u>**
- Medium
- Low
- Not sure
- Don't care
- Keep risk register
- Perform risk analysis
- Comply with ISO2700

# APPENDIX C2: INTERVIEW TRANSCRIPT OF I2

## A. GENERAL INFORMATION

a. Name of the enterprise: P2

b. Size of the organisation (tick):

   1 - 5 employees

   5 – 10 employees

   10 – 20 employees

   20 – 50 employees

   **50 – 100 employees:  60 employees**

   More than 100 employees

c. What is the nature of the business of your enterprise? Manufacturing

d. What is the industry are you in? Construction

e. What function / position do you hold in the organisation? Business owner / Managing Director

f. Geographical location of the enterprise. Cape Town, Table View

## B.  INTERVIEW QUESTIONS

### a) Factors for cloud computing adoption readiness by SEs

IQ 1.1.1:  Did you hear about cloud computing technology before? Where and how? What does it mean for your enterprise's business operations?

- Yes
- Publications and marketing
- Free from hardware and software maintenance

IQ 1.1.2:  What potential for business sustainability do you see in cloud computing adoption in your organisation?

- There is a potential of growth and competitiveness
- Easy and efficient delivery of service
- Use of applications of features not available on on-premises systems (ex. On QuickBooks accounting solution)
- Allow effective way for customers to access information for business transactions

IQ 1.1.3:  Do you believe that adoption readiness assessment is necessary for the successful adoption of a new technology? In what way?

- Yes, it is necessary
- For a convenient move
- To allow a smooth implementation

IQ 1.1.4:    Is there any belief that cloud computing adoption can have an impact on your business competitiveness? Expand.

- Yes CC adoption can have a big impact on my organisation. We are already using some aspects of CC
- CC can allow us to competitively run business, due to information being available to customers, suppliers, through the availability of information, ease of communication, and access to specialised application software
- Better service delivery to customers
- Not be worried of IT-related maintenance, patching and upgrades
- Hand over the burden of troubleshooting faults and have the data much secure as it is maintained by dedicated and professional individuals. However the cost can be high in the long run

IQ 1.1.5:    How do you explain regulatory compliance with regard to cloud computing adoption and use?

- Not sure about the regulations in RSA, as there is no law at my knowledge protecting our data. We need to rely on American law where providers are and hope that our data will be secure (CONCERN)
- No law or guidelines for access and use of bandwidth (expensive and not reliable enough)
- The security is a big issue, data protection (in store or in transit) ex. One transaction was intercepted by hackers, and they channelled the payment to their account instead of our account recently; our customer did not have another choice than paying twice. There was no way to get the hackers and the money is gone like that. This can be complicated when transaction is done in the cloud. Big concern
- I do not know if there are any regulations in place
- All is about trust (we take risk)

IQ 1.1.6:    What are the system areas in your enterprise that cloud computing adoption could have a direct impact on?

- Accounting system (QuickBooks), Stock management, Human resource processes
- NB: We would like to have our data both in cloud and keep the copy on premise in case something happens or cannot access the data for some reason

IQ 1.1.7:    How can this organisation profit from the use of the pay-as-you-use model when using cloud computing technologies?

- We do not see any financial profit from the use of pay as you use model in the long run. It can be profitable only to those who need the service for a short-determined time. For us it is all the time, and even if you do not pay the infrastructure upfront, the little you pay periodically end up being more expensive
- The only benefit is the flexibility, security, and freeing up time for other business activities, and not be worried about the highly technical skills needed

IQ 1.1.8:  How can you describe the requirement for internet availability for business operations in your enterprise? How good is your internet connectivity?

- Internet is required in order to run business effectively (conduct business operations). Internet reliability is necessary for smooth business operations / transaction. That is one of the issues we have as the landline get stolen, Wi-Fi is not all the time up / stable

IQ 1.1.9a:  What are the major consideration factors in your organisation that influence the choice of new technology adoption for the business?

- In adopting a new technology, security of the technology is key. How it is reliable, and its availability as any new technology should allow us to improve the way we do things
- Ease of use (usability), and of course, the cost involved in acquiring and running the technology
- Access to computing software
- Competitiveness and efficiency as well as security of data or systems
- Maintainability / cost of ownership

IQ 1.1.9b:  If cloud services are in use, how was decided what data / systems should be pushed into the cloud and what should remain on the premises?

- To decide on what to move to cloud, there was no well-defined reassessment. We moved stuff as the opportunity arose, and it was just a random selection

## b) Benefits of cloud computing and adoption readiness

IQ 1.2.1:  In your opinion, what are the main gains the enterprise should get from the use of cloud computing?

- Simplicity in IT operations, supporting business operations
- Security of data as systems are protected by the service providers
- Financial gain comes last as I do not see much financial gain as organisation, if the adoption is taken in a long period (run). Cost can be much higher than the traditional way of acquiring IT systems
- Efficiency of business processes, leading to business competitiveness
- CC can bring some sustainability in the business, as the systems and data are supposedly more secure and up to date
- Customer can access the required information / or data much quicker (reliably)

IQ 1.2.2:  What category of your organisational data/systems would you be comfortable with to move to a cloud computing environment?

- I will be happy to move the accounting system, stock and supplier data-related system

IQ 1.2.3:  Do you see any positive financial impact on the organisational performance through the adoption of cloud computing? How do you see it be realised?

- In terms of the cost associated with IT operations and acquisitions, I do not see much benefits, as the longer the enterprise use cloud, the cost can go much higher than the upfront payment cost that should have been put on IT assets
- On other hand, the use of cloud can free up some time, which could be used on other business processes, and improve the business competitiveness

IQ 1.2.4:  In your opinion, what are the technical challenges the migration to cloud computing presents to your organisation?

- Not many. There is less technical challenges as we would opt for everything in the cloud (SaaS) for simplicity
- The technical challenge that could affect us is the reliability on internet access

## c) Adoption readiness determination by enterprises

IQ 2.1.1:  Does your enterprise need to have access to ICT of any sort to run the business? Please expand.

- Yes
- The business we run relies on communication, and this needs to be reliable and effective / prompt. In this regard, ICT is a key factor
- For administration work, and all other systems that make up the business, ICT is required. We use technology in some instances of manufacturing, although the main part of the manufacturing work is manual / phones for instance (land lines and VOIP)

IQ 2.1.2:  Do you outsource, or have you ever outsourced any IT systems / services in your organisation? What is the reason for choosing outsourcing?

- No
- We do not see any gain in IT outsourcing
- Never outsourced
- No need to outsource, as it comes sometimes with more problems
- The cost associated with the professional support is high and not all the time matching the level of service you receive

IQ 2.1.3:  What is the level of IT skills in your enterprise's work force? Choose one.

- High
- **<u>Intermediate</u>**
- Basic
- None

IQ 2.1.4: Do you use or are you aware of any form of cloud computing use in the organisation?
- Yes
- Email system (Gmail)
- We use some cloud storage system i.e. One drive, Google drive
- Quick books (accounting system), it is hybrid at the moment

IQ 2.1.5: How do you trust promised cloud computing services for the competitiveness of your business?
- Forced to accept what they say as there is no other way to check. I believe it is flexible for us as compared to the traditional way of using IT systems
- However, I do not think it is as cheap as they market it, rather it is expensive if you look at it closely

IQ 2.1.6: If cloud computing is not being used in your organisation, is there any consideration of adopting it in the future? Why?
- CC is in use and we chose it based on the flexibility and security of data it offers

IQ 2.1.7: What potential benefits do you see in conducting the cloud computing adoption readiness assessment?
- Gives room to building trust
- Permits a smooth adoption or implementation
- Trust big organisation
- NB: For small businesses, it is almost impossible to assess readiness

IQ 2.1.8: Is your organisation open to technological change? How and why?
- Yes, to promote efficiency in business operations
- Keep up to date
- Adapt to new trends for business competitiveness

IQ 2.1.9: How can you explain readiness for adoption of a technology such as cloud computing, putting it into the context of your organisation and business?
- Assessment of the system requirements
- Getting the understanding of how the effectiveness of business processes can be affected by the adoption
- Clear understanding of the expectation from the adoption
- Get to know what is required for a smooth implementation

IQ 2.1.10: How advantageous do you think cloud computing is for small businesses such as yours?
- Enhance the effectiveness of business processes and service delivery to customer
- Data in the cloud can be more secure than when it is locally hosted
- Save time that can be allocated to business operations

IQ 2.1.11: What financial gain can your organisation enjoy from cloud computing adoption? Explain.
- Business competitiveness
- Satisfaction to customers (better delivery of service to customers)

IQ 2.1.12: If moved to the cloud environment, what are your considerations for the service continuity and recovery plans? In your opinion, who should be held responsible for data loss in case there is a breach relating to data stored in the cloud?
- Not sure
- Trust service provider, although we should be responsible for our data
- Mainly a hybrid environment is suitable, keep a copy of all the data locally

## d) Adoption readiness assessment

IQ 2.2.1: Is there a dedicated IT unit in your organisation (enterprise)?
- We have no dedicated IT staff (Owner/ Directing Manager looks after the system)

IQ 2.2.2: What is the main role played by IT staff in your organisation pertaining to technology adoption decision making?
- IT staff have a say
- **<u>Exclusively Management decides</u>**
- Management decide, informed by advice from IT staff
- No IT personnel in the organisation
- Whatever decision is unanimously and implemented by the business owner / Directing Manager

IQ 2.2.3: How do you determine whether a new technology such as cloud computing is ready for adoption?
- There are no predefined criteria that inform the decisions. Whatever gets done may be opportunities rising, or a great need by the business at a given time

IQ 2.2.4: What would you consider to be critically important when deciding to move your applications to the cloud? Is there any pre-defined process in place?
- There is no process in place, not even sure of what the process can be made of
- Not sure of criticality when it comes to decision making

IQ 2.2.5: Who is in charge of the maintenance of your organisational IT assets?
- Business Owner / Directing Manager

IQ 2.2.6: What cloud computing deployment model has been implemented in your organisation so far? How was it decided on?
- SaaS
- Business need and convenience / Ease of system us

IQ 2.2.7:   Was there any pre-assessment performed? What were the challenges encountered in the implementation process, if any?

- No assessment done / No challenges encountered

IQ 2.2.8:   Is there a clear IT strategy in your organisation? If yes, how is it in line with your business strategy?

- There is no IT strategy in place, everything is done as it is seems fit
- As there is no strategy, we cannot talk about the alignment (no clear understanding of the business / IT strategy)

IQ 2.2.9:   Any new technology or process gets adopted because of the perceived business value it can provide. Is there any way to assess the value to be brought by the new innovations in the organisation before embarking on the adoption? Please expand.

- No way to assess before the implementation
- Get information on the security of data and it is easy and convenient to use (from vendor)
- NB: But it is not possible to rely on the vendors promises. Just trust what they say, but we know it is not all true

IQ 2.2.10: What are the criteria you have in place for the selection of a cloud provider in your organisation, if needed?

- Price / Cost involved
- Type of service
- Support mechanism

IQ 2.2.11: How do you plan to protect the organisational assets moved to the cloud?

- Only trust providers, relying on their operations

IQ 2.2.12: What type of cloud service has been adopted in your enterprise, and what is the likelihood of cloud computing being adopted if it is not in use yet?

- It is already in use / We adopted SaaS

IQ 2.2.13: Do you have an IT staff training plan in your organisation, especially when a new technology is to be adopted? Expand if needed.

- No training planning plan in place, we do Self-training.

IQ 2.2.14: How risk aware is your organisation with regard to the enterprise's digital assets? Select the most appropriate option.

- **<u>High</u>**
- Medium
- Low
- Not sure
- Don't care

# APPENDIX C3: INTERVIEW TRANSCRIPT OF I3

## A. GENERAL INFORMATION

a. Name of the enterprise: P3

b. Size of the organisation (tick):

     1 - 5 employees

     5 – 10 employees

     10 – 20 employees

     20 – 50 employees

     **50 – 100 employees**

     More than 100 employees

a) What is the nature of the business of your enterprise? IT Technical training

b) What is the industry are you in? Education

c) What function / position do hold in the organisation? Managing Director

d) Geographical location of the enterprise. Cape Town

## B. INTERVIEW QUESTIONS

### a) Factors for cloud computing adoption readiness by SEs

IQ 1.1.1:    Did you hear about cloud computing technology before? Where and how? What does it mean for your enterprise's business operations?

- Yes
- College
- Accessing services over internet

IQ 1.1.2:    What potential for business sustainability do you see in cloud computing adoption in your organisation?

- Access to training material for students
- Help in a Quick design of workflows
- Finance, operations
- Experience growth / expansion

IQ 1.1.3:    Do you believe that adoption readiness assessment is necessary for the successful adoption of a new technology? In what way?

- Yes
- Building the needed systems
- Allows a better planning

IQ 1.1.4:   Is there any belief that cloud computing adoption can have an impact on your business competitiveness? Expand.

- Yes. CC can ease the system access
- Organisation expansion
- Allow flexibility
- Less people involvement is systems administration
- Business growth

IQ 1.1.5:   How do you explain regulatory compliance with regard to cloud computing adoption and use?

- There is not enough policies in place
- There is a lack of standardisation of services
- Should be left in the hands of service provider
- We don't understand really what the regulations to be complied with are

IQ 1.1.6:   What are the system areas in your enterprise that cloud computing adoption could have a direct impact on?

- Administration system
- HR system
- Registrar system

IQ 1.1.7:   How can this organisation profit from the use of the pay-as-you-use model when using cloud computing technologies?

- Many users can access the system at the same time
- Mobility
- Overhead cost is less

IQ 1.1.8:   How can you describe the requirement for internet availability for business operations in your enterprise? How good is your internet connectivity?

- There is a need for internet in order to run the business successfully
- Internet is a valuable tool as we use it to keep in touch with customers
- Tool for education

IQ 1.1.9a: What are the major consideration factors in your organisation that influence the choice of new technology adoption for the business?

- Security
- Business requirements
- Business need
- Customer requirements

IQ 1.1.9b: If cloud services are in use, how was decided what data / systems should be pushed into the cloud and what should remain on the premises?

- Business need

### b) Benefits of cloud computing and adoption readiness

IQ 1.2.1:  In your opinion, what are the main gains the enterprise should get from the use of cloud computing?

- System access
- Bigger business growth
- System cost of ownership is low

IQ 1.2.2:  What category of your organisational data/systems would you be comfortable with to move to a cloud computing environment?

- Administration system

IQ 1.2.3:  Do you see any positive financial impact on the organisational performance through the adoption of cloud computing? How do you see it be realised?

- There is a positive impact on the business finances:
    o Less overhead
    o No upfront payment
    o Get what you want when you need it

IQ 1.2.4:  In your opinion, what are the technical challenges the migration to cloud computing presents to your organisation?

- Understanding the technology
- Negotiations with the service provider

### c) Adoption readiness determination by enterprises

IQ 2.1.1:  Does your enterprise need to have access to ICT of any sort to run the business? Please expand.

- Yes, for efficient and accurate service delivery, in order to provide services to the customers

IQ 2.1.2:  Do you outsource, or have you ever outsourced any IT systems / services in your organisation? What is the reason for choosing outsourcing?

- Yes, we outsource high tech work when required, because of the need of the standard of support
- We outsourced the phone system (Voice services) and internet, but the service received has not been good
- There was a need and there was no capital to invest in it available

IQ 2.1.3:  What is the level of IT skills in your enterprise's work force? Choose one.

- **<u>High</u>**
- Intermediate
- Basic
- None

IQ 2.1.4:   Do you use or are you aware of any form of cloud computing use in the organisation?
- SaaS

IQ 2.1.5:   How do you trust promised cloud computing services for the competitiveness of your business?
- I do not see any problem with using it
- Issue of SLAs

IQ 2.1.6:   If cloud computing is not being used in your organisation, is there any consideration of adopting it in the future? Why?
- N/A
- Need for business
- Reliability

IQ 2.1.7:   What potential benefits do you see in conducting the cloud computing adoption readiness assessment?
- The readiness assessment will allow determining what and why they need it

IQ 2.1.8:   Is your organisation open to technological change? How and why?
- Very open
- We are always ready to embrace change as long as it allow to improve the service delivery

IQ 2.1.9:   How can you explain readiness for adoption of a technology such as cloud computing, putting it into the context of your organisation and business?
- It can allow growth and flexibility and mobility

IQ 2.1.10: How advantageous do you think cloud computing is for small businesses such as yours?
- Save money
- Be able to access computing resources much easier and cheaper

IQ 2.1.11: What financial gain can your organisation enjoy from cloud computing adoption? Explain.
- No need to pay upfront to use technology

IQ 2.1.12: If moved to the cloud environment, what are your considerations for the service continuity and recovery plans? In your opinion, who should be held responsible for data loss in case there is a breach relating to data stored in the cloud?
- Disaster recovery plan
- Proper SLA negotiation

### d) Adoption readiness assessment

IQ 2.2.1: Is there a dedicated IT unit in your organisation (enterprise)?
- No
- Use of IT interns
- Trainers do technical work

IQ 2.2.2: What is the main role played by IT staff in your organisation pertaining to technology adoption decision making?
- IT staff have a say
- Exclusively Management decides
- **Management decide, informed by advice from IT staff**

IQ 2.2.3: How do you determine whether a new technology such as cloud computing is ready for adoption?
- Needs of the business
- Calculation of the value to be brought to the business (benefits)
- Financial overhead analysis

IQ 2.2.4: What would you consider to be critically important when deciding to move your applications to the cloud? Is there any pre-defined process in place?
- Plan the move
- There is no specific process, but the project planning can help

IQ 2.2.5: Who is in charge of the maintenance of your organisational IT assets?
- Staff members (Trainers)

IQ 2.2.6: What cloud computing deployment model has been implemented in your organisation so far? How was it decided on?
- SaaS
- Recommended from experienced friends

IQ 2.2.7: Was there any pre-assessment performed? What were the challenges encountered in the implementation process, if any?
- No pre-assessment was done

IQ 2.2.8: Is there a clear IT strategy in your organisation? If yes, how is it in line with your business strategy?
- There is a business strategy in place
- An IT strategy is being developed and the two strategies must go hand in hand (integration)

IQ 2.2.9:  Any new technology or process gets adopted because of the perceived business value it can provide. Is there any way to assess the value to be brought by the new innovations in the organisation before embarking on the adoption? Please expand.

- We monitor the system and analyse performance reports against the signed SLA
- We use feedback from customers and users' evaluations to position ourselves

IQ 2.2.10: What are the criteria you have in place for the selection of a cloud provider in your organisation, if needed?

- Provider local presence
- Type of infrastructure requirement and support
- Service level agreement (SLA)

IQ 2.2.11: How do you plan to protect the organisational assets moved to the cloud?

- The protection of the data in the cloud is left to the provider, as the agreement should include it
- Risk assessment is conducted before signing the agreement

IQ 2.2.12: What type of cloud service has been adopted in your enterprise, and what is the likelihood of cloud computing being adopted if it is not in use yet?

- No CC has been adopted and we are not planning to adopt it

IQ 2.2.13: Do you have an IT staff training plan in your organisation, especially when a new technology is to be adopted? Expand if needed.

- No, staff are IT people

IQ 2.2.14: How risk aware is your organisation with regard to the enterprise's digital assets? Select the most appropriate option.

- High
- **Medium**
- Low
- Not sure
- Don't care

# APPENDIX C4: INTERVIEW TRANSCRIPT OF I4

## A. GENERAL INFORMATION

a. Name of the enterprise: P4

b. Size of the organisation (tick):

       1 - 5 employees

       5 – 10 employees

       **<u>10 – 20 employees</u>**

       20 – 50 employees

       50 – 100 employees

       More than 100 employees

c. What is the nature of the business of your enterprise? Property Technology company. We are a digital rental management company that services landlords and tenants using scalable technology and efficient services throughout the rental value chain.

d. What is the industry are you in? Real Estate / Technology

e. What function / position do hold in the organisation? Chief Executive

f. Geographical location of the enterprise. National; head office is Cape Town

## B. INTERVIEW QUESTIONS

### a) Factors for cloud computing adoption readiness by SEs

IQ 1.1.1:    Did you hear about cloud computing technology before? Where and how? What does it mean for your enterprise's business operations?

- Our team runs it, so this was based on the CTO's experience in his previous role in another company
- There is a lot of material available for students to upskill before entering the working world and we've hired development graduates to keep us on the cutting edge

IQ 1.1.2:    What potential for business sustainability do you see in cloud computing adoption in your organisation?

- Safeguarding of client files
- Ability to work remote
- Office setup in various locations with same desktop / access
- Decrease in server downtime
- It enables us to pay as we grow so keep our margins variable and grow as the demand for our services grow
- We are able to compete on a global scale and against incumbents due to the accessibility of cloud computing and the lack of initial capital required

IQ 1.1.3: Do you believe that adoption readiness assessment is necessary for the successful adoption of a new technology? In what way?

- Yes, as it affects a variety of teams across the business whenever new technologies are implemented and needs to be scoped out for these inevitable process changes
- The CTO needs to fully appreciate what adoption means in terms of downtime and changes to process

IQ 1.1.4: Is there any belief that cloud computing adoption can have an impact on your business competitiveness? Expand.

- No – as a technology company any competition will have similar use of CC and it will therefore not differentiate us to have a competitive edge

IQ 1.1.5: How do you explain regulatory compliance with regard to cloud computing adoption and use?

- I do not know very much about this, and typically rely on our service providers for updates on best practise
- We use Microsoft Azure and have a number of contacts in networks that assist in monitoring changes in law

IQ 1.1.6: What are the system areas in your enterprise that cloud computing adoption could have a direct impact on?

- None – we are a start-up and don't view the technology as disruptive in any way

IQ 1.1.7: How can this organisation profit from the use of the pay-as-you-use model when using cloud computing technologies?

- Server support and consulting would be valuable on pay-as-you-use but we believe in owning as much as possible of the core systems and services in house

IQ 1.1.8: How can you describe the requirement for internet availability for business operations in your enterprise? How good is your internet connectivity?

- It is critical as we are a digital / online platform that functions as a marketplace for tenants and landlords

IQ 1.1.9a: What are the major consideration factors in your organisation that influence the choice of new technology adoption for the business?

- Level of integration with current technology solutions employed
- Skills and comfort of tech team with the adoption of the new technology
- Ability of the new technology to offer what we currently cannot provide

IQ 1.1.9b: If cloud services are in use, how was decided what data / systems should be pushed into the cloud and what should remain on the premises?

- We built it with the cloud in mind – all core processes, servers, platform, domains and emails are in the cloud
- We keep daily communications, non-closed deals and transactions on our desktops until the deal closes – then we move to cloud
- We use local storage solutions for smaller items
- Level of integration with current technology solutions employed
- Skills and comfort of tech team with the adoption of the new technology
- Ability of the new technology to offer what we currently cannot provide
- The decision making and needs analysis conducted by the CTO
- Requirements for storage and secure remote access
- We originally built the business for cloud – so we've never moved
- Digital platforms must operate on the best possible support structure, which means that to scale the most cost-effective option is to rely on cloud partners

## b) Benefits of cloud computing and adoption readiness

IQ 1.2.1: In your opinion, what are the main gains the enterprise should get from the use of cloud computing?

- There is a high potential for SMEs due to cost savings, however there are some limitations in scope for customisation

IQ 1.2.2: What category of your organisational data/systems would you be comfortable with to move to a cloud computing environment?

- All of our platform systems and backups

IQ 1.2.3: Do you see any positive financial impact on the organisational performance through the adoption of cloud computing? How do you see it be realised?

- We are already on the cloud – we are able to scale, work remote, and keep costs down to (large but consistent) overheads

IQ 1.2.4: In your opinion, what are the technical challenges the migration to cloud computing presents to your organisation?

- NA

## c) Adoption readiness determination by enterprises

IQ 2.1.1: Does your enterprise need to have access to ICT of any sort to run the business? Please expand.

- Yes, we are an entirely digital platform as mentioned

IQ 2.1.2: Do you outsource, or have you ever outsourced any IT systems / services in your organisation? What is the reason for choosing outsourcing?
- We outsourced our MVP because as a start-up we wanted to build a cheap, quick and easy product to test our assumptions against
- Yes, our original MVP was outsourced to a development house in India
- MVP product based on our wireframes, due to cost and speed

IQ 2.1.3: What is the level of IT skills in your enterprise's work force? Choose one.
- **<u>High</u>**
- Intermediate
- Basic
- None

IQ 2.1.4: Do you use or are you aware of any form of cloud computing use in the organisation?
- Yes, as explained

IQ 2.1.5: How do you trust promised cloud computing services for the competitiveness of your business?
- We rely on the brand and user experience as well as our team's personal experience of using these services

IQ 2.1.6: If cloud computing is not being used in your organisation, is there any consideration of adopting it in the future? Why?
- NA

IQ 2.1.7: What potential benefits do you see in conducting the cloud computing adoption readiness assessment?
- Assists us in understanding what elements of the business could be conducted on the cloud and what the steps and procedures would be to migrate successfully

IQ 2.1.8: Is your organisation open to technological change? How and why?
- We are bringing tech change through our disruptive business model – and are therefore always very open to change where it improves our efficiency

IQ 2.1.9: How can you explain readiness for adoption of a technology such as cloud computing, putting it into the context of your organisation and business?
- We pivot our service and product offering every quarter – so are very able to adopt new technology at least four times / year

IQ 2.1.10: How advantageous do you think cloud computing is for small businesses such as yours?
- Answered above

IQ 2.1.11: What financial gain can your organisation enjoy from cloud computing adoption? Explain.
- We can centralise our data and allow for cheaper access from new offices
    o It will be cheaper to set up other offices across the country

IQ 2.1.12: If moved to the cloud environment, what are your considerations for the service continuity and recovery plans? In your opinion, who should be held responsible for data loss in case there is a breach relating to data stored in the cloud?
- We have worked hard to ensure there is no such possibility but hold the tech development team responsible for such security measures
- We keep data stored with Azure so as to ensure no downtime and full secure accessibility

## d) Adoption readiness assessment

IQ 2.2.1: Is there a dedicated IT unit in your organisation (enterprise)?
- Yes

IQ 2.2.2: What is the main role played by IT staff in your organisation pertaining to technology adoption decision making?
- IT staff have a say
- Exclusively Management decides
- **Management decide, informed by advice from IT staff**

IQ 2.2.3: How do you determine whether a new technology such as cloud computing is ready for adoption?
- Our CTO proposes this to management and to the Board before voting on the appropriateness of adoption

IQ 2.2.4: What would you consider to be critically important when deciding to move your applications to the cloud? Is there any pre-defined process in place?
- These days unless your business operates at massive scale, moving operations to the cloud is usually the correct decision
- Periodically assign resources and time to question and explore new approaches to existing processes

IQ 2.2.5: Who is in charge of the maintenance of your organisational IT assets?
- Our CTO reviews annually

IQ 2.2.6: What cloud computing deployment model has been implemented in your organisation so far? How was it decided on?
- We followed continuous integration using Azure services. These allows us to quickly and seamlessly push new features to our clients.

IQ 2.2.7:   Was there any pre-assessment performed? What were the challenges encountered in the implementation process, if any?

- No the team was too small to work out any pre-assessment beyond personal experience
- There was an initial learning curve as you have to understand the system you deciding to host with. Also, there are always challenges when using a remote server vs. a server box you have physical access to.

IQ 2.2.8:   Is there a clear IT strategy in your organisation? If yes, how is it in line with your business strategy?

- Yes to both

IQ 2.2.9:   Any new technology or process gets adopted because of the perceived business value it can provide. Is there any way to assess the value to be brought by the new innovations in the organisation before embarking on the adoption? Please expand.

- We work on a feature list and project savings in cost and growth in revenue when prioritising these changes / adoptions

IQ 2.2.10: What are the criteria you have in place for the selection of a cloud provider in your organisation, if needed?

- Credible, have had previous experience, and scope of feature roll-out (performed or in future)

IQ 2.2.11: How do you plan to protect the organisational assets moved to the cloud?

- We have encrypted the sensitive data and have strict security protocols in terms of password management as that essentially grants access to our data.

IQ 2.2.12: What type of cloud service has been adopted in your enterprise, and what is the likelihood of cloud computing being adopted if it is not in use yet?

- N/A, we have CC in use already. We have adopted Azure services

IQ 2.2.13: Do you have an IT staff training plan in your organisation, especially when a new technology is to be adopted? Expand if needed.

- No, as we hire software developers already skilled in the function area required
  o   Any training is ad-hoc

IQ 2.2.14: How risk aware is your organisation with regard to the enterprise's digital assets? Select the most appropriate option.

- High
- **Medium**
- Low
- Not sure
- Don't care

## A. GENERAL INFORMATION

a. Name of the enterprise: P5

b. Size of the organisation (tick):
    1 - 5 employees
    5 – 10 employees
    **<u>10 – 20 employees</u>**
    20 – 50 employees
    50 – 100 employees
    More than 100 employees

c. What is the nature of the business of your enterprise? IT consulting / service advisory

d. What is the industry are you in? IT

e. What function / position do hold in the organisation? IT Managing

f. Geographical location of the enterprise. Cape Town

## B. INTERVIEW QUESTIONS

### a) Factors for cloud computing adoption readiness by SEs

IQ 1.1.1: Did you hear about cloud computing technology before? Where and how? What does it mean for your enterprise's business operations?
- Yes, work-related

IQ 1.1.2: What potential for business sustainability do you see in cloud computing adoption in your organisation?
- Allow to remain profitable
- Cost of ownership lowered
- Allow sufficient time to focus on business processes, rather that IT support
- Reduction of cost of access and use IT
- Flexibility
- Scale up and down

IQ 1.1.3: Do you believe that adoption readiness assessment is necessary for the successful adoption of a new technology? In what way?
- Not necessary. It depends on the solution being implemented and what it is being implemented for.

IQ 1.1.4:   Is there any belief that cloud computing adoption can have an impact on your business competitiveness? Expand.

- Yes
- Stay current with technology and be able to scale

IQ 1.1.5:   How do you explain regulatory compliance with regard to cloud computing adoption and use?

- It is about meeting the legal requirements for data storage and access
- Regulate pricing and data ownership-related matters

IQ 1.1.6:   What are the system areas in your enterprise that cloud computing adoption could have a direct impact on?

- Everything we have is in the cloud

IQ 1.1.7:  How can this organisation profit from the use of the pay-as-you-use model when using computing technologies?

- Easy scaling up and down
- Operational cost reduction
- Note that the cost can be much higher in a long run

IQ 1.1.8:   How can you describe the requirement for internet availability for business operations in your enterprise? How good is your internet connectivity?

- Not necessary
- Internet availability is a requirement for the business, without it there is no business

IQ 1.1.9a:  What are the major consideration factors in your organisation that influence the choice of new technology adoption for the business?

- Budget (on-going cost of ownership)
- Affordability
- Technology that does not come with complicated Regulatory compliance

IQ 1.1.9b:  If cloud services are in use, how was decided what data / systems should be pushed into the cloud and what should remain on the premises?

- Business started using cloud; there was nothing to decide on

## b) Benefits of cloud computing and adoption readiness

IQ 1.2.1:   In your opinion, what are the main gains the enterprise should get from the use of cloud computing?

- Flexibility in access to IT resources
- It speeds up implementation of new systems/services
- Comes with new feature set: faster to market and system updates
- Cost, flexibility / Being able to scale up and down

**IQ 1.2.2:** What category of your organisational data/systems would you be comfortable with to move to a cloud computing environment?

- All is in the cloud and we are happy so far

**IQ 1.2.3:** Do you see any positive financial impact on the organisational performance through the adoption of cloud computing? How do you see it be realised?

- There is a financial impact, the capital expenditure (CAPEX) gets reduced tremendously, but the operation expenditure keeps growing
- Flexibility of use and affordability

**IQ 1.2.4:** In your opinion, what are the technical challenges the migration to cloud computing presents to your organisation?

- Lack of well-structured business requirements, not up to date
- Strategy can be a stumbling block
- Infrastructural structure not present for many small business
- No IT department/technical skills
- Connectivity can be an issue

## c) Adoption readiness determination by enterprises

**IQ 2.1.1:** Does your enterprise need to have access to ICT of any sort to run the business? Please expand.

- Yes, we consult in IT / sell concept, and we cannot work without IT

**IQ 2.1.2:** Do you outsource, or have you ever outsourced any IT systems / services in your organisation? What is the reason for choosing outsourcing?

- We do not outsource IT Services

**IQ 2.1.3:** What is the level of IT skills in your enterprise's work force? Choose one.

- **<u>High</u>**
- Intermediate
- Basic
- None

**IQ 2.1.4:** Do you use or are you aware of any form of cloud computing use in the organisation?

- Yes, all our IT resources are run in cloud

**IQ 2.1.5:** How do you trust promised cloud computing services for the competitiveness of your business?

- We blindly trust what they market
- We only follow the public perception
- Sometime the marketed promises (solutions) are not immediately available

IQ 2.1.6:    If cloud computing is not being used in your organisation, is there any consideration of adopting it in the future? Why?

- N/A. We are fully cloud
- That is what we could afford that the time and start operating without any delay caused by the financial and technical problems

IQ 2.1.7:    What potential benefits do you see in conducting the cloud computing adoption readiness assessment?

- The assessment is important as it allows you to get the real picture of how much you can reach in the adoption
- You get to understand the details of implementation requirements

IQ 2.1.8:    Is your organisation open to technological change? How and why?

- We are very open
- We need to keep up to date with technology, so any new development will be considered with interest
- We have no fear of operations (technical), we can do it ourselves

IQ 2.1.9:    How can you explain readiness for adoption of a technology such as cloud computing, putting it into the context of your organisation and business?

- Being prepared for implementation and use
- Having the understanding of what CC is, what do you need to implement and use it

IQ 2.1.10:   How advantageous do you think cloud computing is for small businesses such as yours?

- Speed of implementation
- Elimination of overheads
- Time to focus on business processes

IQ 2.1.11:   What financial gain can your organisation enjoy from cloud computing adoption? Explain.

- If CC is to be used for a short period, that can be profitable, but if the implementation is for a significantly long period, on-premise solutions can be cost effective

IQ 2.1.12:   If moved to the cloud environment, what are your considerations for the service continuity and recovery plans? In your opinion, who should be held responsible for data loss in case there is a breach relating to data stored in the cloud?

- Service continuity is unpredictable
- Down time is minimised as scheduled down time are eliminated

**d) Adoption readiness assessment**

IQ 2.2.1: Is there a dedicated IT unit in your organisation (enterprise)?
- No dedicated IT

IQ 2.2.2: What is the main role played by IT staff in your organisation pertaining to technology adoption decision making?
- IT staff have a say
- Exclusively Management decides
- **Management decide, informed by advice from IT staff**
- No IT staff, management makes decisions

IQ 2.2.3: How do you determine whether a new technology such as cloud computing is ready for adoption?
- Constantly testing environment, and business need will dictate

IQ 2.2.4: What would you consider to be critically important when deciding to move your applications to the cloud? Is there any pre-defined process in place?
- Business needs
- No process in place

IQ 2.2.5: Who is in charge of the maintenance of your organisational IT assets?
- Ourselves

IQ 2.2.6: What cloud computing deployment model has been implemented in your organisation so far? How was it decided on?
- SaaS

IQ 2.2.7: Was there any pre-assessment performed? What were the challenges encountered in the implementation process, if any?
- There was nothing before, hence no pre-assessment done

IQ 2.2.8: Is there a clear IT strategy in your organisation? If yes, how is it in line with your business strategy?
- No, we do not think an IT strategy is necessary, a business strategy will suffice

IQ 2.2.9: Any new technology or process gets adopted because of the perceived business value it can provide. Is there any way to assess the value to be brought by the new innovations in the organisation before embarking on the adoption? Please expand.
- No

IQ 2.2.10: What are the criteria you have in place for the selection of a cloud provider in your organisation, if needed?

- Cost is the main drive, may be support model
- Ease of system integration, all is done by the provider, we are not worried about that
- Reduced effort of marketing
- Compliance-related matters

IQ 2.2.11: How do you plan to protect the organisational assets moved to the cloud?

- Service provider should do it. There is no other plan to protect data in the cloud

IQ 2.2.12: What type of cloud service has been adopted in your enterprise, and what is the likelihood of cloud computing being adopted if it is not in use yet?

- N/A. Cloud has been already adopted SaaS

IQ 2.2.13: Do you have an IT staff training plan in your organisation, especially when a new technology is to be adopted? Expand if needed.

- There is no proper plan, but as part of the job requirement, staff members are expected to keep themselves up to date with technology in order to offer services
- Self-training

IQ 2.2.14: How risk aware is your organisation with regard to the enterprise's digital assets? Select the most appropriate option.

- **<u>High</u>**
- Medium
- Low
- Not sure
- Don't care

# APPENDIX C6: INTERVIEW TRANSCRIPT OF I6

## A. GENERAL INFORMATION

a. Name of the enterprise: P6

b. Size of the organisation (tick):

    1 - 5 employees

    5 – 10 employees

    10 – 20 employees

    **20 – 50 employees**

    50 – 100 employees

    More than 100 employees

c. What is the nature of the business of your enterprise? Training

d. What is the industry are you in? Education

e. What function / position do hold in the organisation? IT Engineer / Professional

f. Geographical location of the enterprise. Cape Town

## B. INTERVIEW QUESTIONS

### a) Factors for cloud computing adoption readiness by SEs

IQ 1.1.1: Did you hear about cloud computing technology before? Where and how? What does it mean for your enterprise's business operations?
- Yes, at college

IQ 1.1.2: What potential for business sustainability do you see in cloud computing adoption in your organisation?
- Systems integration
- Allow openness and mobility
- Competitiveness, mobility and flexibility

IQ 1.1.3: Do you believe that adoption readiness assessment is necessary for the successful adoption of a new technology? In what way?
- Yes, a readiness assessment is a necessity if you need to successfully adopt a new technology
- It allows to determine / be aware of the technology in use in the organisation
- Better understanding of business objectives in order to advance competitiveness
- Allow to gather the requirements

IQ 1.1.4: Is there any belief that cloud computing adoption can have an impact on your business competitiveness? Expand.

- Yes, there is a big impact of CC on business competitiveness
- High availability / system downtime is highly reduced
- Allow to meet organisational objectives
- Efficiency and flexibility

IQ 1.1.5: How do you explain regulatory compliance with regard to cloud computing adoption and use?

- It is about licencing and high availability
- There is no problem of regulatory compliance

IQ 1.1.6: What are the system areas in your enterprise that cloud computing adoption could have a direct impact on?

- Email system
- Directory services (AD)

IQ 1.1.7: How can this organisation profit from the use of the pay-as-you-use model when using cloud computing technologies?

- Not sure

IQ 1.1.8: How can you describe the requirement for internet availability for business operations in your enterprise? How good is your internet connectivity?

- Without internet, we cannot run business successfully. A reliable internet access is crucial for the business

IQ 1.1.9a: What are the major consideration factors in your organisation that influence the choice of new technology adoption for the business?

- Business requirements, feasibility, mobility, competitiveness
- Business objectives and future projections
- System availability

IQ 1.1.9b: If cloud services are in use, how was decided what data / systems should be pushed into the cloud and what should remain on the premises?

- We are in the process of moving
- The business needs and financial constraints drive the decision

## b) Benefits of cloud computing and adoption readiness

IQ 1.2.1: In your opinion, what are the main gains the enterprise should get from the use of cloud computing?

- Business competitiveness
- High availability
- Mobility and flexibility

IQ 1.2.2:  What category of your organisational data/systems would you be comfortable with to move to a cloud computing environment?

- Email system
- Directory services (AD)

IQ 1.2.3:  Do you see any positive financial impact on the organisational performance through the adoption of cloud computing? How do you see it be realised?

- Yes, business competitiveness, no need for upfront payment for IT infrastructure

IQ 1.2.4:  In your opinion, what are the technical challenges the migration to cloud computing presents to your organisation?

- Compatibility issues
- Lack of user training

## c) Adoption readiness determination by enterprises

IQ 2.1.1:  Does your enterprise need to have access to ICT of any sort to run the business? Please expand.

- Yes, no IT no business

IQ 2.1.2:  Do you outsource, or have you ever outsourced any IT systems / services in your organisation? What is the reason for choosing outsourcing?

- No outsourcing

IQ 2.1.3:  What is the level of IT skills in your enterprise's work force? Choose one.

- **<u>High</u>**
- Intermediate
- Basic
- None

IQ 2.1.4:  Do you use or are you aware of any form of cloud computing use in the organisation?

- Yes
- SaaS (Office 365)

IQ 2.1.5:  How do you trust promised cloud computing services for the competitiveness of your business?

- All depends on the SLAs and how they are negotiated

IQ 2.1.6:  If cloud computing is not being used in your organisation, is there any consideration of adopting it in the future? Why?

- N/A
- We have cloud in use and business requirements drove the decision to adopt (business needs and competitiveness requirements)

IQ 2.1.7: What potential benefits do you see in conducting the cloud computing adoption readiness assessment?
- Being aware of the system requirement and expectation of the adoption
- Email system and identity management systems (directory services)

IQ 2.1.8: Is your organisation open to technological change? How and why?
- Yes, business requirements
- Business opportunities

IQ 2.1.9: How can you explain readiness for adoption of a technology such as cloud computing, putting it into the context of your organisation and business?
- Getting the basic requirement skills
- Getting a good understanding of the infrastructure requirement in order to implement the technology

IQ 2.1.10: How advantageous do you think cloud computing is for small businesses such as yours?
- Improve business competitiveness

IQ 2.1.11: What financial gain can your organisation enjoy from cloud computing adoption? Explain.
- Save on Service purchase and maintenance

IQ 2.1.12: If moved to the cloud environment, what are your considerations for the service continuity and recovery plans? In your opinion, who should be held responsible for data loss in case there is a breach relating to data stored in the cloud?
- All should be handled by the service provider

## d) Adoption readiness assessment

IQ 2.2.1: Is there a dedicated IT unit in your organisation (enterprise)?
- Yes, the IT staff

IQ 2.2.2: What is the main role played by IT staff in your organisation pertaining to technology adoption decision making?
- IT staff have a say
- Exclusively Management decides
- **Management decide, informed by advice from IT staff**

IQ 2.2.3: How do you determine whether a new technology such as cloud computing is ready for adoption?
- Adoption is dictated by the business needs

IQ 2.2.4:    What would you consider to be critically important when deciding to move your applications to the cloud? Is there any pre-defined process in place?
- System availability
- Security
- No process in place

IQ 2.2.5:    Who is in charge of the maintenance of your organisational IT assets?
- We do it ourselves

IQ 2.2.6:    What cloud computing deployment model has been implemented in your organisation so far? How was it decided on?
- SaaS (O365)

IQ 2.2.7:    Was there any pre-assessment performed? What were the challenges encountered in the implementation process, if any?
- There was no pre-assessment

IQ 2.2.8:    Is there a clear IT strategy in your organisation? If yes, how is it in line with your business strategy?
- There is business strategy, but no clear IT strategy in place

IQ 2.2.9:    Any new technology or process gets adopted because of the perceived business value it can provide. Is there any way to assess the value to be brought by the new innovations in the organisation before embarking on the adoption? Please expand.
- There is no established way of measuring the value gained from the technology adoption

IQ 2.2.10: What are the criteria you have in place for the selection of a cloud provider in your organisation, if needed?
- SLA definition
- Type and level of support
- Type of services provided
- Provider local presence

IQ 2.2.11: How do you plan to protect the organisational assets moved to the cloud?
- Left in the hands of the service(cloud) provider

IQ 2.2.12: What type of cloud service has been adopted in your enterprise, and what is the likelihood of cloud computing being adopted if it is not in use yet?
- SaaS / hybrid

IQ 2.2.13: Do you have an IT staff training plan in your organisation, especially when a new technology is to be adopted? Expand if needed.
- No, staff self-trained on new technologies

IQ 2.2.14:  How risk aware is your organisation with regard to the enterprise's digital assets? Select the most appropriate option.

- **<u>High</u>**
- Medium
- Low
- Not sure
- Don't care

# APPENDIX C7: INTERVIEW TRANSCRIPT OF I7

## A. GENERAL INFORMATION

a. Name of the enterprise: P7

b. Size of the organisation (tick):

    1 - 5 employees

    5 – 10 employees

    10 – 20 employees

    **20 – 50 employees**

    50 – 100 employees

    More than 100 employees

c. What is the nature of the business of your enterprise? Tour operations

d. What is the industry are you in? Tourism

e. What function / position do hold in the organisation? IT Professional

f. Geographical location of the enterprise. Cape Town

## B. INTERVIEW QUESTIONS

### a) Factors for cloud computing adoption readiness by SEs

IQ 1.1.1:    Did you hear about cloud computing technology before? Where and how? What does it mean for your enterprise's business operations?

- Yes, informal / technical conversations and self-training
- It is mostly an alternative option to the in-house IT

IQ 1.1.2:    What potential for business sustainability do you see in cloud computing adoption in your organisation?

- Not sure, I do not see any
- There is a high potential for SMEs due to cost savings, however there are some limitations in scope for customisation

IQ 1.1.3:    Do you believe that adoption readiness assessment is necessary for the successful adoption of a new technology? In what way?

- Yes, reduced cost outweighs any restriction (reduction of cost of implementation)

IQ 1.1.4:    Is there any belief that cloud computing adoption can have an impact on your business competitiveness? Expand.

- It can go either way, either by reducing costs and improving efficiency or restricting in house abilities to customers

IQ 1.1.5:   How do you explain regulatory compliance with regard to cloud computing adoption and use?

- Not sure of what regulatory compliance is about.

IQ 1.1.6:   What are the system areas in your enterprise that cloud computing adoption could have a direct impact on?

- Not sure as there is no assessment that has been done.

IQ 1.1.7:   How can this organisation profit from the use of the pay-as-you-use model when using cloud computing technologies?

- Do not understand clearly how a pay as you use model can be applied in the organisation

IQ 1.1.8:   How can you describe the requirement for internet availability for business operations in your enterprise? How good is your internet connectivity?

- The internet availability is a requirement for the business operations to run. Without internet access the business will suffer
- The internet reliability is vital for smooth business operations. It is one of the main requirements for work

IQ 1.1.9a:   What are the major consideration factors in your organisation that influence the choice of new technology adoption for the business?

- Cost factor, and whether the new technology will contribute to the efficiency improvement
- Cost of running IT systems (procurement and operation)
- Simplicity in practice as there is no need for high technical skilled specialist on site

IQ 1.1.9b:   If cloud services are in use, how was decided what data / systems should be pushed into the cloud and what should remain on the premises?

- There is no cloud service in use as I understand. N/A

## b) Benefits of cloud computing and adoption readiness

IQ 1.2.1:   In your opinion, what are the main gains the enterprise should get from the use of cloud computing?

- Cost saving on infrastructure and training

IQ 1.2.2:   What category of your organisational data/systems would you be comfortable with to move to a cloud computing environment?

- The telephone system should be a good one to move to cloud as it has less sensitive data/information

IQ 1.2.3:   Do you see any positive financial impact on the organisational performance through the adoption of cloud computing? How do you see it be realised?

- Yes, due to the reduction of cost of ownership, the finances of the organisation will be impacted positively

IQ 1.2.4:   In your opinion, what are the technical challenges the migration to cloud computing presents to your organisation?

- Lack of a clear understanding of cloud computing
- Management support in technical-related decision making

## c) Adoption readiness determination by enterprises

IQ 2.1.1:   Does your enterprise need to have access to ICT of any sort to run the business? Please expand.

- Yes, there is a requirement of ICT systems in order to operate. Without ICT, operations will stop. It is not only having ICT, but a reliable IT system, especially reservation systems, as the manual operations are not possible

IQ 2.1.2:   Do you outsource, or have you ever outsourced any IT systems / services in your organisation? What is the reason for choosing outsourcing?

- Yes
- With outsource, we can access a pool of expert skills, rather than being restricted to in-house staff with a constant defined set of skills Yes. We currently use an external company to maintain our system
- All systems across the board are outsourced
- Lack/shortage of skills and management complexity in the systems administration

IQ 2.1.3:   What is the level of IT skills in your enterprise's work force? Choose one.

- High
- Intermediate
- **Basic**
- None

IQ 2.1.4:   Do you use or are you aware of any form of cloud computing use in the organisation?

- Currently there is no cloud computing in use I am aware of

IQ 2.1.5:   How do you trust promised cloud computing services for the competitiveness of your business?

- We have not adopted cloud computing as yet, I am not sure of how to answer this question. But in general, I do not think it is easy to find the one you can trust fully as you lose control of your system

IQ 2.1.6:   If cloud computing is not being used in your organisation, is there any consideration of adopting it in the future? Why?

- The telephone (voice) system is to be considered for migration due to the cost associated with telephone system, which is very a big requirement for business operations

IQ 2.1.7:   What potential benefits do you see in conducting the cloud computing adoption readiness assessment?

- I do not see any tangible benefit associated with the assessment of the readiness

IQ 2.1.8:   Is your organisation open to technological change? How and why?

- Not really
- It is a management decision and sometimes they do not see the need for changing to the new technology as it is seen an unnecessary cost to the company
- Most of the time the technical recommendations are turned down by management, with reason of not having budgeted for the requested technology

IQ 2.1.9:   How can you explain readiness for adoption of a technology such as cloud computing, putting it into the context of your organisation and business?

- As I understand, technology readiness is about getting ready for the use of the technology in question

IQ 2.1.10: How advantageous do you think cloud computing is for small businesses such as yours?

- Reduction of cost of running IT, and improved operations efficiency
- Access to high technical skills without having them in house

IQ 2.1.11: What financial gain can your organisation enjoy from cloud computing adoption? Explain.

- The reduction of financial cost in some business operations is a gain/benefit of using CC

IQ 2.1.12: If moved to the cloud environment, what are your considerations for the service continuity and recovery plans? In your opinion, who should be held responsible for data loss in case there is a breach relating to data stored in the cloud?

- Not sure, but I guess the service provider should be taking care of service continuity

## d)  Adoption readiness assessment

IQ 2.2.1:   Is there a dedicated IT unit in your organisation (enterprise)?

- There is only one individual in the company looking after the system (it falls under me), otherwise there is an outsourced company that performs complex maintenance tasks and troubleshooting when needed

**IQ 2.2.2:** What is the main role played by IT staff in your organisation pertaining to technology adoption decision making?

- IT staff have a say
- Exclusively Management decides
- **Management decide, informed by advice from IT staff**

**IQ 2.2.3:** How do you determine whether a new technology such as cloud computing is ready for adoption?

- There is no mechanism in place; the determination is driven by the opportunity

**IQ 2.2.4:** What would you consider to be critically important when deciding to move your applications to the cloud? Is there any pre-defined process in place?

- To be able to move to cloud, it is important to consider the skills available for a smooth transition, have the clear understanding of the system requirements
- There is no process in place that guides the adoption of new innovation at the moment (no clear guidance)

**IQ 2.2.5:** Who is in charge of the maintenance of your organisational IT assets?

- The maintenance of IT assets is done by myself together with the outsourced company

**IQ 2.2.6:** What cloud computing deployment model has been implemented in your organisation so far? How was it decided on?

- None

**IQ 2.2.7:** Was there any pre-assessment performed? What were the challenges encountered in the implementation process, if any?

- N/A

**IQ 2.2.8:** Is there a clear IT strategy in your organisation? If yes, how is it in line with your business strategy?

- We have no IT strategy in place as there is no IT department as such

**IQ 2.2.9:** Any new technology or process gets adopted because of the perceived business value it can provide. Is there any way to assess the value to be brought by the new innovations in the organisation before embarking on the adoption? Please expand.

- The is no way to perform the value assessment gained from technology adoption

**IQ 2.2.10:** What are the criteria you have in place for the selection of a cloud provider in your organisation, if needed?

- We have no cloud, but the selection of any technology provider should be based on the service to be offered and the support expected to be provided as it is mapped to the business need

IQ 2.2.11:       How do you plan to protect the organisational assets moved to the cloud?
- If we happen to move to cloud, the provider should take all in charge, but the decision is always taken by management

IQ 2.2.12: What type of cloud service has been adopted in your enterprise, and what is the likelihood of cloud computing being adopted if it is not in use yet?
- Probably in the future, but it depends on the management decisions and priorities

IQ 2.2.13: Do you have an IT staff training plan in your organisation, especially when a new technology is to be adopted? Expand if needed.
- No training plan in place

IQ 2.2.14: How risk aware is your organisation with regard to the enterprise's digital assets? Select the most appropriate option.
- High
- Medium
- **<u>Low</u>**
- Not sure
- Don't care

# APPENDIX C8: INTERVIEW TRANSCRIPT OF I8

## A. GENERAL INFORMATION

a. Name of the enterprise: P8

b. Size of the organisation (tick):

    1 - 5 employees

    **<u>5 – 10 employees</u>**

    10 – 20 employees

    20 – 50 employees

    50 – 100 employees

    More than 100 employees

c. What is the nature of the business of your enterprise? Services

d. What is the industry are you in? Printing and office stationery

e. What function / position do hold in the organisation? Owner

f. Geographical location of the enterprise. Cape Town, Southern suburbs (Plumstead)

## B. INTERVIEW QUESTIONS

## a) Factors for cloud computing adoption readiness by SEs

IQ 1.1.1: Did you hear about cloud computing technology before? Where and how? What does it mean for your enterprise's business operations?

- Did not hear about CC before. You are the first to introduce me to this technology. What we knew is outsourcing

IQ 1.1.2: What potential for business sustainability do you see in cloud computing adoption in your organisation?

- No sure, but can allow access to technology
- Do not understand what CC is

IQ 1.1.3: Do you believe that adoption readiness assessment is necessary for the successful adoption of a new technology? In what way?

- Yes, the assessment allows choosing the right product that fits your need

IQ 1.1.4: Is there any belief that cloud computing adoption can have an impact on your business competitiveness? Expand.

- Do not understand what CC is

IQ 1.1.5:   How do you explain regulatory compliance with regard to cloud computing adoption and use?

- Do not know what those regulatory are, but whatever it is, it should be the responsibility of the provider

IQ 1.1.6:   What are the system areas in your enterprise that cloud computing adoption could have a direct impact on?

- Not sure

IQ 1.1.7:   How can this organisation profit from the use of the pay-as-you-use model when using cloud computing technologies?

- Don't see how, as I don't understand

IQ 1.1.8:   How can you describe the requirement for internet availability for business operations in your enterprise? How good is your internet connectivity?

- Internet is a requirement for us to run business
- Allow us to deliver services on time and with quality and allows us to compete in the market

IQ 1.1.9a:  What are the major consideration factors in your organisation that influence the choice of new technology adoption for the business?

- The choice of new technology is influenced by the need in the organisation and the affordability. CC is not in use by us and there is no plan

IQ 1.1.9b:  If cloud services are in use, how was decided what data / systems should be pushed into the cloud and what should remain on the premises?

- Cloud is not in use in our enterprise
- We use outlook installed on our machines
- Telkom provides us with telephone services and internet

## b) Benefits of cloud computing and adoption readiness

IQ 1.2.1:   In your opinion, what are the main gains the enterprise should get from the use of cloud computing?

- Not sure

IQ 1.2.2:   What category of your organisational data/systems would you be comfortable with to move to a cloud computing environment?

- Not sure

IQ 1.2.3:   Do you see any positive financial impact on the organisational performance through the adoption of cloud computing? How do you see it be realised?

- Not sure. Don't understand what CC is

**IQ 1.2.4:** In your opinion, what are the technical challenges the migration to cloud computing presents to your organisation?

- Not sure

## c) Adoption readiness determination by enterprises

**IQ 2.1.1:** Does your enterprise need to have access to ICT of any sort to run the business? Please expand.

- Definitely. We offer service using the ITC

**IQ 2.1.2:** Do you outsource, or have you ever outsourced any IT systems / services in your organisation? What is the reason for choosing outsourcing?

- No. Everything we have is in-house. We pay maintenance where we cannot do it ourselves
- No outsourcing, we only call in technicians for support when experiencing difficult technical issues. No agreement existing between us and them

**IQ 2.1.3:** What is the level of IT skills in your enterprise's work force? Choose one.

- High
- Intermediate
- **Basic**
- None

**IQ 2.1.4:** Do you use or are you aware of any form of cloud computing use in the organisation?

- No

**IQ 2.1.5:** How do you trust promised cloud computing services for the competitiveness of your business?

- No comment. Do not see what it can help us with

**IQ 2.1.6:** If cloud computing is not being used in your organisation, is there any consideration of adopting it in the future? Why?

- No need. We are happy with our system. When we need more we pay upfront and install on premise
- CC is not in use in our organisation yet, no decision has been made in that regard

**IQ 2.1.7:** What potential benefits do you see in conducting the cloud computing adoption readiness assessment?

- Service improvement
- Success in implementation
- Adopt the rights product that meets real needs
- Resulting in customer satisfaction
- Cost saving

IQ 2.1.8:    Is your organisation open to technological change? How and why?

- Yes, very open
- As needs shift according to customers' request, efficient application must be quickly adopted to respond promptly to customers' demands
- We look for whatever can help to improve our service and improve productivity
- Time saving

IQ 2.1.9:    How can you explain readiness for adoption of a technology such as cloud computing, putting it into the context of your organisation and business?

- CC specifically, no comment. In general, readiness allows to implement the rights technology in order to meet the demand / needs
- The readiness for technology is required in order to get the good understanding of the product being adopted
- Demo, trainings required before deciding on the adoption
- Needs to be well understood, and match them to the financial affordability / skills
- Vendor selection: selecting the appropriate provider makes you ready (knowing vendors and what they can offer based on the needs)

IQ 2.1.10:   How advantageous do you think cloud computing is for small businesses such as yours?

- DO not know exactly what CC is, cannot comment on the advantages

IQ 2.1.11:   What financial gain can your organisation enjoy from cloud computing adoption? Explain.

- No benefit for now as we do not have a good understanding of the technology.

IQ 2.1.12:   If moved to the cloud environment, what are your considerations for the service continuity and recovery plans? In your opinion, who should be held responsible for data loss in case there is a breach relating to data stored in the cloud?

- We have worked hard to ensure there is no such possibility but hold the tech development team responsible for such security measures
- We keep data stored with Azure so as to ensure no downtime and full secure accessibility
- I guess, should there be a breach, the provider should be responsible

## d) Adoption readiness assessment

IQ 2.2.1:    Is there a dedicated IT unit in your organisation (enterprise)?

- No dedicated IT staff

IQ 2.2.2:    What is the main role played by IT staff in your organisation pertaining to technology adoption decision making?

- IT staff have a say / Exclusively Management decide
- **Management decide, informed by advice from IT staff**

IQ 2.2.3:   How do you determine whether a new technology such as cloud computing is ready for adoption?

- Need of the business dictates whether a new technology is needed

-

IQ 2.2.4:   What would you consider to be critically important when deciding to move your applications to the cloud? Is there any pre-defined process in place?

- N/A

IQ 2.2.5:   Who is in charge of the maintenance of your organisational IT assets?

- Owner of business and call out for technical issues beyond our understanding

IQ 2.2.6:   What cloud computing deployment model has been implemented in your organisation so far? How was it decided on?

- N/A

IQ 2.2.7:   Was there any pre-assessment performed? What were the challenges encountered in the implementation process, if any?

- N/A

IQ 2.2.8:   Is there a clear IT strategy in your organisation? If yes, how is it in line with your business strategy?

- No IT strategy in place. We do things as we feel at a specific moment in time, based on the needs and demand

IQ 2.2.9:   Any new technology or process gets adopted because of the perceived business value it can provide. Is there any way to assess the value to be brought by the new innovations in the organisation before embarking on the adoption? Please expand.

- Find what we need to adopt based on the need
- Confirm affordability
- Cost of ownership analysis/ and support
- Supplier/ vendor
- Demo and trainings before the implementation

IQ 2.2.10: What are the criteria you have in place for the selection of a cloud provider in your organisation, if needed?

- Cost involved
- Quality of product
- Delivery and support after delivery
- Test before adoption

IQ 2.2.11: How do you plan to protect the organisational assets moved to the cloud?

- No plan to move

IQ 2.2.12: What type of cloud service has been adopted in your enterprise, and what is the likelihood of cloud computing being adopted if it is not in use yet?

- No plan as there is a lack of understanding of what it is and what it can do differently for us

IQ 2.2.13: Do you have an IT staff training plan in your organisation, especially when a new technology is to be adopted? Expand if needed.

- No

IQ 2.2.14: How risk aware is your organisation with regard to the enterprise's digital assets? Select the most appropriate option.

- High
- Medium
- **Low**
- Not sure
- Don't care

- We do not see much to secure. So, there is no issue of security

# APPENDIX C9: INTERVIEW TRANSCRIPT OF I9

## A. GENERAL INFORMATION

a. Name of the enterprise: P9

b. Size of the organisation (tick):

    1 - 5 employees

    5 – 10 employees

    **<u>10 – 20 employees</u>**

    20 – 50 employees

    50 – 100 employees

    More than 100 employees

c. What is the nature of the business of your enterprise? Cleaning Services

d. What is the industry are you in? Service in Corporate Sector

e. What function / position do hold in the organisation? Owner

f. Geographical location of the enterprise. Cape Town

## B. INTERVIEW QUESTIONS

### a) Factors for cloud computing adoption readiness by SEs

IQ 1.1.1: Did you hear about cloud computing technology before? Where and how? What does it mean for your enterprise's business operations?

- Yes … For my present business it is of no use … I am starting an internet online business and it could be useful there

IQ 1.1.2: What potential for business sustainability do you see in cloud computing adoption in your organisation?

- CC will not help as I am an employee based business

IQ 1.1.3: Do you believe that adoption readiness assessment is necessary for the successful adoption of a new technology? In what way?

- For companies going to use CC … yes, definitely

IQ 1.1.4: Is there any belief that cloud computing adoption can have an impact on your business competitiveness? Expand.

- No

IQ 1.1.5: How do you explain regulatory compliance with regard to cloud computing adoption and use?

- NA

IQ 1.1.6:   What are the system areas in your enterprise that cloud computing adoption could have a direct impact on?
- None

IQ 1.1.7:   How can this organisation profit from the use of the pay-as-you-use model when using cloud computing technologies?
- I believe pay-as-you-go is an excellent concept

IQ 1.1.8:   How can you describe the requirement for internet availability for business operations in your enterprise? How good is your internet connectivity?
- NA

IQ 1.1.9a:  What are the major consideration factors in your organisation that influence the choice of new technology adoption for the business?
- The cost can be the driving factor for the choice of the new technology, but it is not applicable to us

IQ 1.1.9b:  If cloud services are in use, how was decided what data / systems should be pushed into the cloud and what should remain on the premises?
- NA

## b) Benefits of cloud computing and adoption readiness

IQ 1.2.1:   In your opinion, what are the main gains the enterprise should get from the use of cloud computing?
- NA

IQ 1.2.2:   What category of your organisational data/systems would you be comfortable with to move to a cloud computing environment?
- Admin systems

IQ 1.2.3:   Do you see any positive financial impact on the organisational performance through the adoption of cloud computing? How do you see it be realised?
- No

IQ 1.2.4:   In your opinion, what are the technical challenges the migration to cloud computing presents to your organisation?
- NA

## c) Adoption readiness determination by enterprises

IQ 2.1.1:   Does your enterprise need to have access to ICT of any sort to run the business? Please expand.
- No

IQ 2.1.2: Do you outsource, or have you ever outsourced any IT systems / services in your organisation? What is the reason for choosing outsourcing?
- No

IQ 2.1.3: What is the level of IT skills in your enterprise's work force? Choose one.
- High
- Intermediate
- **Basic**
- None

IQ 2.1.4: Do you use or are you aware of any form of cloud computing use in the organisation?
- No

IQ 2.1.5: How do you trust promised cloud computing services for the competitiveness of your business?
- Yes … I am sure it is well-tested and safe

IQ 2.1.6: If cloud computing is not being used in your organisation, is there any consideration of adopting it in the future? Why?
- NA

IQ 2.1.7: What potential benefits do you see in conducting the cloud computing adoption readiness assessment?
- NA

IQ 2.1.8: Is your organisation open to technological change? How and why?
- NA

IQ 2.1.9: How can you explain readiness for adoption of a technology such as cloud computing, putting it into the context of your organisation and business?
- NA

IQ 2.1.10: How advantageous do you think cloud computing is for small businesses such as yours?
- NA

IQ 2.1.11: What financial gain can your organisation enjoy from cloud computing adoption? Explain.
- NA

IQ 2.1.12: If moved to the cloud environment, what are your considerations for the service continuity and recovery plans? In your opinion, who should be held responsible for data loss in case there is a breach relating to data stored in the cloud?
- NA

**d) Adoption readiness assessment**

IQ 2.2.1:   Is there a dedicated IT unit in your organisation (enterprise)?

- No

IQ 2.2.2:   What is the main role played by IT staff in your organisation pertaining to technology adoption decision making?

- IT staff have a say
- **<u>Exclusively Management decides</u>**
- Management decide, informed by advice from IT staff

IQ 2.2.3:   How do you determine whether a new technology such as cloud computing is ready for adoption?

- Get further information and test it

IQ 2.2.4:   What would you consider to be critically important when deciding to move your applications to the cloud? Is there any pre-defined process in place?

- Easiness of the move.

IQ 2.2.5:   Who is in charge of the maintenance of your organisational IT assets?

- NA

IQ 2.2.6:   What cloud computing deployment model has been implemented in your organisation so far? How was it decided on?

- NA

IQ 2.2.7:   Was there any pre-assessment performed? What were the challenges encountered in the implementation process, if any?

- NA

IQ 2.2.8:   Is there a clear IT strategy in your organisation? If yes, how is it in line with your business strategy?

- NA

IQ 2.2.9:   Any new technology or process gets adopted because of the perceived business value it can provide. Is there any way to assess the value to be brought by the new innovations in the organisation before embarking on the adoption? Please expand.

- NA

IQ 2.2.10: What are the criteria you have in place for the selection of a cloud provider in your organisation, if needed?

- I will do research and seek a reliable company

IQ 2.2.11: How do you plan to protect the organisational assets moved to the cloud?

- NA

IQ 2.2.12: What type of cloud service has been adopted in your enterprise, and what is the likelihood of cloud computing being adopted if it is not in use yet?

- NA

IQ 2.2.13: Do you have an IT staff training plan in your organisation, especially when a new technology is to be adopted? Expand if needed.

- NA

IQ 2.2.14: How risk aware is your organisation with regard to the enterprise's digital assets? Select the most appropriate option.

- High
- Medium
- **<u>Low</u>**
- Not sure
- Don't care

# APPENDIX C10: INTERVIEW TRANSCRIPT OF I10

## A. GENERAL INFORMATION

a. Name of the enterprise: P10

b. Size of the organisation (tick):

     1 - 5 employees

     5 – 10 employees

     10 – 20 employees

     **20 – 50 employees**

     50 – 100 employees

     More than 100 employees

c. What is the nature of the business of your enterprise? Training and Development Services

d. What is the industry are you in? Education

e. What function / position do hold in the organisation? Managing Director / Owner

f. Geographical location of the enterprise. Cape Town

## B. INTERVIEW QUESTIONS

### a) Factors for cloud computing adoption readiness by SEs

IQ 1.1.1:   Did you hear about cloud computing technology before? Where and how? What does it mean for your enterprise's business operations?

-   Yes, in the social gatherings, and on internet / information conversations with friends and colleagues

IQ 1.1.2:   What potential for business sustainability do you see in cloud computing adoption in your organisation?

-   Data / information access
-   Systems availability
-   As a Business we do not see any at the moment, We have not much understanding clearly of what it is and what it can offer for us

IQ 1.1.3:   Do you believe that adoption readiness assessment is necessary for the successful adoption of a new technology? In what way?

-   Yes, it allows to understand the implementation process

IQ 1.1.4:   Is there any belief that cloud computing adoption can have an impact on your business competitiveness? Expand.

-   No, my business cannot be impacted by CC, as I have the software I need on my computers

IQ 1.1.5:   How do you explain regulatory compliance with regard to cloud computing adoption and use?
- I do not see any regulatory compliance required
- Do not understand what regulatory should be applied to CC

IQ 1.1.6:   What are the system areas in your enterprise that cloud computing adoption could have a direct impact on?
- Administration system
- Financial system / accounts management

IQ 1.1.7:   How can this organisation profit from the use of the pay-as-you-use model when using cloud computing technologies?
- Cost effectiveness
- It is affordable

IQ 1.1.8:   How can you describe the requirement for internet availability for business operations in your enterprise? How good is your internet connectivity?
- Internet availability is a requirement for the business, without it there is no business
- Internet is required in order to run business, but because the application we use for training is already installed, we cannot stop working because there is no internet

IQ 1.1.9a:  What are the major consideration factors in your organisation that influence the choice of new technology adoption for the business?
- Budget, affordability, data security
- Cost and mobility (access data from anywhere any time)

IQ 1.1.9b:  If cloud services are in use, how was decided what data / systems should be pushed into the cloud and what should remain on the premises?
- We did not adopt CC as such, only we were advised by reliable friends to use it for backing up data

## b) Benefits of cloud computing and adoption readiness

IQ 1.2.1:   In your opinion, what are the main gains the enterprise should get from the use of cloud computing?
- We do not see any tangible benefit for our business

IQ 1.2.2:   What category of your organisational data/systems would you be comfortable with to move to a cloud computing environment?
- Administration-related data

IQ 1.2.3:   Do you see any positive financial impact on the organisational performance through the adoption of cloud computing? How do you see it be realised?
- No financial impact we see on our business by using CC

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**IQ 1.2.4:** In your opinion, what are the technical challenges the migration to cloud computing presents to your organisation?

- It is not a concern for us, but the skills can be an issue if we decide to move

## c) Adoption readiness determination by enterprises

**IQ 2.1.1:** Does your enterprise need to have access to ICT of any sort to run the business? Please expand.

- Yes, we are an ICT-based training centre, so ICT is a requirement because that is what we teach

**IQ 2.1.2:** Do you outsource, or have you ever outsourced any IT systems / services in your organisation? What is the reason for choosing outsourcing?

- We have no contract, but we call external technical assistance from time to time
- We call technicians for technical work as needed / system maintenance
- System installation and on-going maintenance

**IQ 2.1.3:** What is the level of IT skills in your enterprise's work force? Choose one.

- High
- Intermediate
- **<u>Basic</u>**
- None

**IQ 2.1.4:** Do you use or are you aware of any form of cloud computing use in the organisation?

- Yes, data storage? Back up (Google drive)

**IQ 2.1.5:** How do you trust promised cloud computing services for the competitiveness of your business?

- We trust them for keeping our data in case we have a problem on our local system
- We do not know really what they promise
- Recommended by reliable friend

**IQ 2.1.6:** If cloud computing is not being used in your organisation, is there any consideration of adopting it in the future? Why?

- No idea of adopting it further; we do not see the benefit for our business
- Security is another concern
- It was recommended, but it is not even critical to our business

**IQ 2.1.7:** What potential benefits do you see in conducting the cloud computing adoption readiness assessment?

- The adoption readiness assessment is necessary as it allows to understand the prerequisites for implementation

IQ 2.1.8: Is your organisation open to technological change? How and why?

- We are very open
- Business needs drive it
- Need to stay current

IQ 2.1.9: How can you explain readiness for adoption of a technology such as cloud computing, putting it into the context of your organisation and business?

- Being prepared for implementation and use
- Gathering systems requirements

IQ 2.1.10: How advantageous do you think cloud computing is for small businesses such as yours?

- Not necessarily advantageous to us. We do not see a need for it for us

IQ 2.1.11: What financial gain can your organisation enjoy from cloud computing adoption? Explain.

- None

IQ 2.1.12: If moved to the cloud environment, what are your considerations for the service continuity and recovery plans? In your opinion, who should be held responsible for data loss in case there is a breach relating to data stored in the cloud?

- Do not know, but provider should be able to handle it

## d) Adoption readiness assessment

IQ 2.2.1: Is there a dedicated IT unit in your organisation (enterprise)?

- No dedicated IT. Outsource when needed

IQ 2.2.2: What is the main role played by IT staff in your organisation pertaining to technology adoption decision making?

- IT staff have a say
- **Exclusively Management decides:** IT staff, management makes decisions
- Management decide, informed by advice from IT staff

IQ 2.2.3: How do you determine whether a new technology such as cloud computing is ready for adoption?

- Constantly monitor environment, and business need will dictate

IQ 2.2.4: What would you consider to be critically important when deciding to move your applications to the cloud? Is there any pre-defined process in place?

- No idea at the moment

IQ 2.2.5: Who is in charge of the maintenance of your organisational IT assets?

- External technicians

IQ 2.2.6: What cloud computing deployment model has been implemented in your organisation so far? How was it decided on?
- Not sure (SaaS / DaaS)

IQ 2.2.7: Was there any pre-assessment performed? What were the challenges encountered in the implementation process, if any?
- There was no pre-assessment done

IQ 2.2.8: Is there a clear IT strategy in your organisation? If yes, how is it in line with your business strategy?
- No strategy. We just do what business needs dictate us to

IQ 2.2.9: Any new technology or process gets adopted because of the perceived business value it can provide. Is there any way to assess the value to be brought by the new innovations in the organisation before embarking on the adoption? Please expand.
- No

IQ 2.2.10: What are the criteria you have in place for the selection of a cloud provider in your organisation, if needed?
- Cost is the main drive, may be support model

IQ 2.2.11: How do you plan to protect the organisational assets moved to the cloud?
- Service provider should do it. There is no other plan to protect data in the cloud

IQ 2.2.12: What type of cloud service has been adopted in your enterprise, and what is the likelihood of cloud computing being adopted if it is not in use yet?
- N/A. Not sure

IQ 2.2.13: Do you have an IT staff training plan in your organisation, especially when a new technology is to be adopted? Expand if needed.
- No there is no plan

IQ 2.2.14: How risk aware is your organisation with regard to the enterprise's digital assets? Select the most appropriate option.
- High
- Medium
- Low
- **<u>Not sure</u>**
- Don't care

# APPENDIX C11: INTERVIEW TRANSCRIPT OF I11

## A. GENERAL INFORMATION

a. Name of the enterprise: P11

b. Size of the organisation (tick):

      1 - 5 employees

      **5 – 10 employees**

      10 – 20 employees

      20 – 50 employees

      50 – 100 employees

      More than 100 employees

c. What is the nature of the business of your enterprise? Services / Installation / Maintenance

d. What is the industry are you in? Electrical and Metalwork / Painting

e. What function / position do hold in the organisation? Owner

f. Geographical location of the enterprise. Cape Town, Northern suburbs (Parow)

## B. INTERVIEW QUESTIONS

### a) Factors for cloud computing adoption readiness by SEs

IQ 1.1.1: Did you hear about cloud computing technology before? Where and how? What does it mean for your enterprise's business operations?

- No

IQ 1.1.2: What potential for business sustainability do you see in cloud computing adoption in your organisation?

- It might be a good thing for access to technology that support the business
- Because you can access the technology even if you do not have the money to buy the full solution upfront, it can allow you to compete on the market

IQ 1.1.3: Do you believe that adoption readiness assessment is necessary for the successful adoption of a new technology? In what way?

- The readiness is important to understand the requirements for the technology to be used better

IQ 1.1.4: Is there any belief that cloud computing adoption can have an impact on your business competitiveness? Expand.

- Not much, but we still need to use it for marketing and office support applications

**IQ 1.1.5:** How do you explain regulatory compliance with regard to cloud computing adoption and use?

- No idea

**IQ 1.1.6:** What are the system areas in your enterprise that cloud computing adoption could have a direct impact on?

- Office applications

**IQ 1.1.7:** How can this organisation profit from the use of the pay-as-you-use model when using cloud computing technologies?

- Less capital investment upfront for IT use. Pay for what you use

**IQ 1.1.8:** How can you describe the requirement for internet availability for business operations in your enterprise? How good is your internet connectivity?

- Internet is required for our business, mainly for office operations, and marketing.
- Reliable internet access is needed, although it does not affect the actual business much

**IQ 1.1.9a:** What are the major consideration factors in your organisation that influence the choice of new technology adoption for the business?

- Not sure, but I suppose the need is the main factor

**IQ 1.1.9b:** If cloud services are in use, how was decided what data / systems should be pushed into the cloud and what should remain on the premises?

- No CC in use

**b) Benefits of cloud computing and adoption readiness**

**IQ 1.2.1:** In your opinion, what are the main gains the enterprise should get from the use of cloud computing?

- Saving on the cost of running IT infrastructure

**IQ 1.2.2:** What category of your organisational data/systems would you be comfortable with to move to a cloud computing environment?

- Not sure

**IQ 1.2.3:** Do you see any positive financial impact on the organisational performance through the adoption of cloud computing? How do you see it be realised?

- Yes, pay as you need and as you can afford

**IQ 1.2.4:** In your opinion, what are the technical challenges the migration to cloud computing presents to your organisation?

- Do not know

**c) Adoption readiness determination by enterprises**

IQ 2.1.1:  Does your enterprise need to have access to ICT of any sort to run the business? Please expand.

- Yes, use of specialised application for business

IQ 2.1.2:  Do you outsource, or have you ever outsourced any IT systems / services in your organisation? What is the reason for choosing outsourcing?

- No, we call people from time to time for technical support, but there is no permanent contract in place

IQ 2.1.3:  What is the level of IT skills in your enterprise's work force? Choose one.

- High
- Intermediate
- **<u>Basic</u>**
- None

IQ 2.1.4:  Do you use or are you aware of any form of cloud computing use in the organisation?

- Do not understand

IQ 2.1.5:  How do you trust promised cloud computing services for the competitiveness of your business?

- Cannot trust what I do not understand clearly. But if what they say is true, it is good

IQ 2.1.6:  If cloud computing is not being used in your organisation, is there any consideration of adopting it in the future? Why?

- CC is not being used in the organisation

IQ 2.1.7:  What potential benefits do you see in conducting the cloud computing adoption readiness assessment?

- Save money, spend money on the right product due to the understanding of the requirements before making the decision

IQ 2.1.8:  Is your organisation open to technological change? How and why?

- We need technology to run business (install and maintain security systems), any technology that can allow us to be effective and efficient in responding to our customers demand, we are open to it

IQ 2.1.9:  How can you explain readiness for adoption of a technology such as cloud computing, putting it into the context of your organisation and business?

- Readiness for technology is the ability to install the system and use it in the organisation, i.e. having computers, internet and know how to operate the computers in order to use the technology for business

IQ 2.1.10: How advantageous do you think cloud computing is for small businesses such as yours?

- I am not sure, do not knowwhat it really means

IQ 2.1.11: What financial gain can your organisation enjoy from cloud computing adoption? Explain.

- Based on what I heard, we can save some money by paying only what we use, and stop paying when we are not using the system (when there is no work)

IQ 2.1.12: If moved to the cloud environment, what are your considerations for the service continuity and recovery plans? In your opinion, who should be held responsible for data loss in case there is a breach relating to data stored in the cloud?

- I am not sure. But service provider must solve those problems

## d) Adoption readiness assessment

IQ 2.2.1: Is there a dedicated IT unit in your organisation (enterprise)?

- No, we do our own stuff

IQ 2.2.2: What is the main role played by IT staff in your organisation pertaining to technology adoption decision making?

- IT staff have a say
- **Exclusively Management decides**
- Management decide, informed by advice from IT staff
- There is no IT staff
-

IQ 2.2.3: How do you determine whether a new technology such as cloud computing is ready for adoption?

- Do not know. The determination is dictated by the need and opportunities plus affordability

IQ 2.2.4: What would you consider to be critically important when deciding to move your applications to the cloud? Is there any pre-defined process in place?

- There is no process, we do things as we see them fit our budget in relation to our needs

IQ 2.2.5: Who is in charge of the maintenance of your organisational IT assets?

- We try to maintain ourselves, and call technicians if anything is broken

IQ 2.2.6: What cloud computing deployment model has been implemented in your organisation so far? How was it decided on?

- None

IQ 2.2.7:    Was there any pre-assessment performed? What were the challenges encountered in the implementation process, if any?

- N/A

IQ 2.2.8:    Is there a clear IT strategy in your organisation? If yes, how is it in line with your business strategy?

- There is no IT strategy as we have no IT department, we just use computers to do some  work

IQ 2.2.9:    Any new technology or process gets adopted because of the perceived business value it can provide. Is there any way to assess the value to be brought by the new innovations in the organisation before embarking on the adoption? Please expand.

- Not really, but the system must allow us to be efficient when rendering the service to our customers

IQ 2.2.10:   What are the criteria you have in place for the selection of a cloud provider in your organisation, if needed?

- N/A

IQ 2.2.11:   How do you plan to protect the organisational assets moved to the cloud?

- Service provider responsibility I guess

IQ 2.2.12:   What type of cloud service has been adopted in your enterprise, and what is the likelihood of cloud computing being adopted if it is not in use yet?

- Need to understand clearly what it is and how it works. No clear idea

IQ 2.2.13:   Do you have an IT staff training plan in your organisation, especially when a new technology is to be adopted? Expand if needed.

- No. we have no IT staff, but when we buy a new program, the vendor must initialise us and teach us how to use it. Then we use the user manual on a daily basis until we are in the full swing

IQ 2.2.14:   How risk aware is your organisation with regard to the enterprise's digital assets? Select the most appropriate option.

- High
- Medium
- Low
- Not sure
- **<u>Don't care</u>**

# APPENDIX C12: INTERVIEW TRANSCRIPT OF I12

## A.  GENERAL INFORMATION

a. Name of the enterprise: P12

b. Size of the organisation (tick):

     1 - 5 employees

     **<u>5 – 10 employees</u>**

     10 – 20 employees

     20 – 50 employees

     50 – 100 employees

     More than 100 employees

c. What is the nature of the business of your enterprise? Computer Accessories, Printing Services and Supply, Office Accessories

d. What is the industry are you in? Sale and Services / Printing / Copying

e. What function / position do hold in the organisation? Owner / Managing Director

f. Geographical location of the enterprise. Cape Town, Southern suburbs (Diep River)

## B.  INTERVIEW QUESTIONS

### a) Factors for cloud computing adoption readiness by SEs

IQ 1.1.1: Did you hear about cloud computing technology before? Where and how? What does it mean for your enterprise's business operations?

- Yes I heard about CC before friends in informal conversations and gatherings
- It does not mean much to me as I consider it as a money-making scheme, people try their luck to get access to my money, and once in, no easy way out

IQ 1.1.2:  What potential for business sustainability do you see in cloud computing adoption in your organisation?

- I do not see any potential

IQ 1.1.3:  Do you believe that adoption readiness assessment is necessary for the successful adoption of a new technology? In what way?

- Yes, the assessment is important to avoid the waste of organisational resources, and to determine and understand the use of the new technology to be adopted

IQ 1.1.4:  Is there any belief that cloud computing adoption can have an impact on your business competitiveness? Expand.

- No impact as they believe that it is better to have our system under our control
- No trust of other people handling our system
- We only use basic systems

IQ 1.1.5: How do you explain regulatory compliance with regard to cloud computing adoption and use?

- I do not know any law regulating the use of computing technologies/ communication

IQ 1.1.6: What are the system areas in your enterprise that cloud computing adoption could have a direct impact on?

- We do not trust cloud computing, so we do not see any impact it can have on our enterprise. It seems to be a money-making scheme

IQ 1.1.7: How can this organisation profit from the use of the pay-as-you-use model when using cloud computing technologies?

- There is no tangible benefit from the pay-as-you-use. It cost more in the long run

IQ 1.1.8: How can you describe the requirement for internet availability for business operations in your enterprise? How good is your internet connectivity?

- Internet is a requirement for our business otherwise we lose connection with customers and suppliers. Marketing, orders, advertising, etc.
- Internet is very important for everyday business. We cannot run without reliable internet

IQ 1.1.9a: What are the major consideration factors in your organisation that influence the choice of new technology adoption for the business?

- The need for the business, product availability and maintenance, affordability, ease of use, security, cost saving

IQ 1.1.9b: If cloud services are in use, how was decided what data / systems should be pushed into the cloud and what should remain on the premises?

- We do not use CC in our enterprise

## b) Benefits of cloud computing and adoption readiness

IQ 1.2.1: In your opinion, what are the main gains the enterprise should get from the use of cloud computing?

- No gain

IQ 1.2.2: What category of your organisational data/systems would you be comfortable with to move to a cloud computing environment?

- None. Don't trust this technology

IQ 1.2.3: Do you see any positive financial impact on the organisational performance through the adoption of cloud computing? How do you see it be realised?

- No impact I can see on our enterprise at the moment. We do not understand / trust fully this new technology

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IQ 1.2.4: In your opinion, what are the technical challenges the migration to cloud computing presents to your organisation?

- No plan to move to cloud, but if we do the issue should be able to find the right provider we can trust

## c) Adoption readiness determination by enterprises

IQ 2.1.1: Does your enterprise need to have access to ICT of any sort to run the business? Please expand.

- Yes, our business relies on ICT to succeed. We do marketing, printing and design, so we need some software and hardware to run business

IQ 2.1.2: Do you outsource, or have you ever outsourced any IT systems / services in your organisation? What is the reason for choosing outsourcing?

- We do not outsource our system. We pay for what we want and maintain it ourselves. Where we cannot, we call in technicians to assist and pay for the work done

IQ 2.1.3: What is the level of IT skills in your enterprise's work force? Choose one.

- High
- Intermediate
- **Basic to medium**
- None

IQ 2.1.4: Do you use or are you aware of any form of cloud computing use in the organisation?

- No, CC is not in use

IQ 2.1.5: How do you trust promised cloud computing services for the competitiveness of your business?

- No trust, and not clear understanding of what it is and does

IQ 2.1.6: If cloud computing is not being used in your organisation, is there any consideration of adopting it in the future? Why?

- No, cloud is not in use. We have no need for it. We do not see any benefit for our business

IQ 2.1.7: What potential benefits do you see in conducting the cloud computing adoption readiness assessment?

- The adoption readiness itself is necessary for any innovation as it prepares you for the use of the technology you want to buy. It allows you to buy the right product
- We do not know about cloud hence no plan to adopt it, but if we were to adopt it, we should run an assessment before we buy it

IQ 2.1.8:    Is your organisation open to technological change? How and why?
- Yes we are very open to technology change
- We need to always meet the customer's needs, if there is a new technology that can improve our service delivery, we must move to it. Business needs dictate change

IQ 2.1.9:    How can you explain readiness for adoption of a technology such as cloud computing, putting it into the context of your organisation and business?
- Readiness for technology adoption means you are prepared
- Looking for better way to improve business, can identify new stuff in the technology
- Know the supply chain and support
- Availability of the technology
- Identify the interest in the technology

IQ 2.1.10:   How advantageous do you think cloud computing is for small businesses such as yours?
- No advantage to our business. They want to suck our money without much to gain

IQ 2.1.11:   What financial gain can your organisation enjoy from cloud computing adoption? Explain.
- None

IQ 2.1.12:   If moved to the cloud environment, what are your considerations for the service continuity and recovery plans? In your opinion, who should be held responsible for data loss in case there is a breach relating to data stored in the cloud?
- The data in the hands of someone else cannot be trusted. We cannot let our information be managed by other people without control

**d) Adoption readiness assessment**

IQ 2.2.1:    Is there a dedicated IT unit in your organisation (enterprise)?
- No dedicated IT staff

IQ 2.2.2:    What is the main role played by IT staff in your organisation pertaining to technology adoption decision making?
- IT staff have a say
- **Exclusively Management decides**
- Management decide, informed by advice from IT staff

IQ 2.2.3:    How do you determine whether a new technology such as cloud computing is ready for adoption?
- Business need (need for business)
- If it allows for competitiveness in the market
- The requirement for the business determines the technology

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IQ 2.2.4: What would you consider to be critically important when deciding to move your applications to the cloud? Is there any pre-defined process in place?
- No consideration as we do not see any value in moving to cloud

IQ 2.2.5: Who is in charge of the maintenance of your organisational IT assets?
- We maintain the system ourselves, and call technicians for difficult problems

IQ 2.2.6: What cloud computing deployment model has been implemented in your organisation so far? How was it decided on?
- No cloud has been implemented

IQ 2.2.7: Was there any pre-assessment performed? What were the challenges encountered in the implementation process, if any?
- No comment

IQ 2.2.8: Is there a clear IT strategy in your organisation? If yes, how is it in line with your business strategy?
- We have no IT strategy in place. The business direction dictates us what to do

IQ 2.2.9: Any new technology or process gets adopted because of the perceived business value it can provide. Is there any way to assess the value to be brought by the new innovations in the organisation before embarking on the adoption? Please expand.
- Comments from the public / Talk to supplier
- Demonstrate the system
- Check performance of the new technology

IQ 2.2.10: What are the criteria you have in place for the selection of a cloud provider in your organisation, if needed?
- The one that works / Accepted by the larger community (comment for public)
- Pricing / cost involved
- Service delivery and service improvement

IQ 2.2.11: How do you plan to protect the organisational assets moved to the cloud?
- No need. We are not interested

IQ 2.2.12: What type of cloud service has been adopted in your enterprise, and what is the likelihood of cloud computing being adopted if it is not in use yet?
- Cloud has not been adopted and there is no plan at the moment

IQ 2.2.13: Do you have an IT staff training plan in your organisation, especially when a new technology is to be adopted? Expand if needed.
- No, when new technology, vendor supports with installation and shows us how to maintain

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IQ 2.2.14:  How risk aware is your organisation with regard to the enterprise's digital assets? Select the most appropriate option.

- **<u>High</u>**
- Medium
- Low
- Not sure
- Don't care

- Cannot leave our stuff in the hands of someone else

# APPENDIX C13: INTERVIEW TRANSCRIPT OF I13

## A. GENERAL INFORMATION

a. Name of the enterprise: P13

b. Size of the organisation (tick):

1 - 5 employees

5 – 10 employees

10 – 20 employees

20 – 50 employees

**50 – 100 employees**

More than 100 employees

c. What is the nature of the business of your enterprise? Software Systems Services

d. What is the industry are you in? IT Software development

e. What function / position do hold in the organisation? Managing Director / Business Owner

f. Geographical location of the enterprise. Cape Town, Kenilworth

## B. INTERVIEW QUESTIONS

### a) Factors for cloud computing adoption readiness by SEs

IQ 1.1.1: Did you hear about cloud computing technology before? Where and how? What does it mean for your enterprise's business operations?

- Yes, I am [an] IT pro. It is about outsourcing underlying IT servers; instead of buying physical hardware and put it in the data centre, you buy the service from the company that has and maintains the hardware (this is the level one basic)

- Instead of buying the physical servers, you buy virtual machines, which will run from different physical infrastructure, which will support high availability and redundancy

- The next level is the abstraction, like a compute engine where you write your software against [an] abstractive platform that manage the scaling and look at the server less solutions.

- My definition goes with the lowest level of infrastructure, but another part that is more relevant is the Software as a Service. Depending on the kind of the business the company is in, they will start looking at cloud computing in terms of what they spend the money on and the business needs, the system reliability and allowing to solve the problem they have at a low cost.

IQ 1.1.2: What potential for business sustainability do you see in cloud computing adoption in your organisation?

- For some organisation, CC is not the drivers – it depends on what you are looking at. The use of CC solutions that affect positively the service/ business operations is what the company will look at. Reducing cost of using systems and access high end software platforms. Business benefits is what drives company when adopting technology, not the technology per say. Because CC offers advantages of more scalability, and availability and reliability, it allows the business to sustain itself; and also from a financial perspective, you get away from CAPEX vs. OPEX

- Many companies prefer to run their physical servers in their data centres, because their data will be seating on foreign systems. There is complexity of sending data off to the provider's system, and you do not know where it is housed, which subjects to different legislations where the servers are located. Legislation pertaining to data storage and access is the concern for many enterprises, without forgetting the cost involved and restrictions in accessing the data. Governments are passing laws regarding confidentiality and how personal data are kept accessed and maintained

- Example. If you have a South African company hosting data in the cloud located physically in Europe data centres, the question is does the European law applies to that data? If someone wants to access the data for criminal investigation, do you follow the European legal process, because that's where the data physically is located or you follow the South African process, because the data belong to a South African firm/ citizen? Some companies have specific requirements around that, and we have not much (no huge number of) physical infrastructure present in South Africa/Africa. Irrespective of the location, the data are at the end located somewhere on physical hardware, and it must comply with the country's law where it is housed. With regards to complexity around the data. Sometimes some companies look at the legal complexities around data storage, and access and the cost that can be incurred, and compare it with the physical infrastructure where you have full control and one single law is applied and choose to stay away from cloud computing.

- Good option from many dimensions. Anyone can do it; there are some advantages for both options. Cloud computing being a competitive advantage for SEs, It helps because it increases uptime and reliability. But if on premises stack is done properly, it is not necessarily worst. Ultimately, it is about how good your local kit is. The main advantage will be the lower cost and uptime. If your applications support as the legislation does, CC means lower cost for business gives flexibility on pricing. It also depends on how much the cost factor has on your business (budget of IT spent). Improved uptime can be the key, and I think it is one of the drivers. There is advantage of having reliable IT infrastructure as a business. Other driver is the need for reliable of internet connection for cloud computing, Even if you can get a gig for a reasonable price today, it is not everywhere – that is the reality. Microsoft is pushing its customers to use cloud, by paying on the prices, and limiting other options in order to get people to O365

IQ 1.1.3:  Do you believe that adoption readiness assessment is necessary for the successful adoption of a new technology? In what way?

- Different factors to be considered, scalability, increased reliability, application must be CC ready. Map the business value to the cloud offerings, business decides to adopt because there is business value. Scalability, and get the infrastructure quickly, increased reliability
- Assess if applications to be used are cloud computing ready, which is not often in business control
- Allow to determine the cheaper option, better redundancy and better uptime, and if there is no legislation preventing you from doing that
- Assess and determine the skills availability at the company's disposal
- The definition of readiness is being ready for use, in terms of internal infrastructure, legislation to be complied with, and company's strategy

IQ 1.1.4:   Is there any belief that cloud computing adoption can have an impact on your business competitiveness? Expand.

- Yes there is an impact, with cloud computing anyone can do it, meaning no high technical skills requirement in the organisation. CC is in some way a competitive advantage for small enterprises, it offers reliability, uptime and availability. If on premise stack is done properly, it is not necessarily worse. Main advantage is the lower cost, increased uptime (availability), giving you more flexibility. There is an advantage of having a reliable IT infrastructure for a business

IQ 1.1.5:  How do you explain regulatory compliance with regard to cloud computing adoption and use?

- It is about the laws, pertaining to data storage and access of the country
- When you cross the borders, you need to comply with the laws of those foreign countries
- There are reasons why some companies do not want to subject themselves to foreign laws
- Cross-borders, there are two factors to consider:
  - South African legislation, the minute you cross the border, you are subject to legislation where the server is seating, you need to consider that
  - There is an issue, and that is the reason why some companies will opt to not use CC, as they are not prepared to take the risk of having their data subject to the foreign law

IQ 1.1.6:  What are the system areas in your enterprise that cloud computing adoption could have a direct impact on?

- Mail and data sharing / File sharing
- IaaS (in Germany) running on Google apps

IQ 1.1.7: How can this organisation profit from the use of the pay-as-you-use model when using cloud computing technologies?

- It allows to control the cash flow much better. Administration and maintenance is important because you don't have to maintain the physical infrastructure. Reduction in administration cost

IQ 1.1.8: How can you describe the requirement for internet availability for business operations in your enterprise? How good is your internet connectivity?

- It is very important to have internet in order to use cloud. Not only access but the bandwidth must be big enough to not create a bottleneck. Problem is that some of the SEs do not access to that reliable internet availability. Internet is important, and it must be reliable. Sufficient pipe is required

IQ 1.1.9b: If cloud services are in use, how was decided what data / systems should be pushed into the cloud and what should remain on the premises?

- Cost is the main driver, strategic driver (internal IT strategy), make sure the software is supported, the infrastructural business need

IQ 1.1.9a: What are the major consideration factors in your organisation that influence the choice of new technology adoption for the business?

- Cost is the factor, the deployment time required to move, and strategic driver. Redundancy, accessibility, reliability, and cost reduction on the administration side

## b) Benefits of cloud computing and adoption readiness

IQ 1.2.1: In your opinion, what are the main gains the enterprise should get from the use of cloud computing?

- Increased reliability/availability, scalability, lower operational/ maintenance cost, you do not have a system administrator to maintain the physical infrastructure, because the provider does all the maintenance; for a small company, you cannot employ a server admin, or 2 to only look after the infrastructure, the salary cost is significant for those SEs
- Cloud is not cheaper than physical systems, it's cheaper to buy your own machine and build your own infrastructure
- Fast to deploy is another benefit of CC

IQ 1.2.2: What category of your organisational data/systems would you be comfortable with to move to a cloud computing environment?

- We are happy to have all our systems in the cloud, and far as the proper selection of the provider is done
- System must be redundant, available, and scalable.

**IQ 1.2.3:** Do you see any positive financial impact on the organisational performance through the adoption of cloud computing? How do you see it be realised?

- Not really, the physical infrastructure can be much cheaper than being in the cloud in the long term, specifically on the bottom line cost. You do not pay upfront physical infrastructure, but the monthly instalments end up being too high. It is cheaper to buy your own machines and build your own system/infrastructure

**IQ 1.2.4:** In your opinion, what are the technical challenges the migration to cloud computing presents to your organisation?

- It can be software requirements, it can be specialised hardware, but there are different options for everything, or customer requirements

## c) Adoption readiness determination by enterprises

**IQ 2.1.1:** Does your enterprise need to have access to ICT of any sort to run the business? Please expand.

- Yes, we highly require ICT to run business as without IT no business. We provide ICT services; we use ICT to deliver those services

**IQ 2.1.2:** Do you outsource, or have you ever outsourced any IT systems / services in your organisation? What is the reason for choosing outsourcing?

- CC is a kind of outsourcing

**IQ 2.1.3:** What is the level of IT skills in your enterprise's work force? Choose one.

- **High (We are IT engineers)**
- Intermediate
- Basic
- None

**IQ 2.1.4:** Do you use or are you aware of any form of cloud computing use in the organisation?

- Yes, SaaS, IaaS

**IQ 2.1.5:** How do you trust promised cloud computing services for the competitiveness of your business?

- We use contract-based (SLAs); we check the service offered by the provider before being involved with them. Make sure that the infrastructure has redundancy built in, and the service can be delivered. Make sure we are not locked in to one provider

**IQ 2.1.6:** If cloud computing is not being used in your organisation, is there any consideration of adopting it in the future? Why?

- We are in the cloud already. We moved to cloud because we were looking for scalability offered by cloud, improved reliability

**IQ 2.1.7:** What potential benefits do you see in conducting the cloud computing adoption readiness assessment?

- Readiness assessment is about determining the software being used, if you are ready for it, it creates awareness and makes people to think of what they want to adopt, and why not to do it

**IQ 2.1.8:** Is your organisation open to technological change? How and why?

- Yes, we are open to change, but we evaluate and conduct testing before we decide to move. We change for what we know works, not for the sake of changing

**IQ 2.1.9:** How can you explain readiness for adoption of a technology such as cloud computing, putting it into the context of your organisation and business?

- It is about the software they are using, being ready for it, and it depends on what the internal strategy is; whether you are planning to continue with the physical servers or not

**IQ 2.1.10:** How advantageous do you think cloud computing is for small businesses such as yours?

- Improved reliability, scalability and availability, lower operating cost and cost of maintenance is low; there are high skilled resources available all the time in the cloud. Cost and scalability / availability

**IQ 2.1.11:** What financial gain can your organisation enjoy from cloud computing adoption? Explain.

- The adoption of CC allows lowering the operational cost, as there is no physical infrastructure maintenance cost to pay, and we do not have to be worried about the specialised IT skills and the systems are looked after by the provider. CAPEX is minimised while OPEX increases

**IQ 2.1.12:** If moved to the cloud environment, what are your considerations for the service continuity and recovery plans? In your opinion, who should be held responsible for data loss in case there is a breach relating to data stored in the cloud?

- We have redundancy in our provider's infrastructure

## d) Adoption readiness assessment

**IQ 2.2.1:** Is there a dedicated IT unit in your organisation (enterprise)?

- No dedicated IT unit, but all of us are IT professionals

**IQ 2.2.2:** What is the main role played by IT staff in your organisation pertaining to technology adoption decision making?

- IT staff have a say
- Exclusively Management decides
- **<u>Management decide, informed by advice from IT staff</u>**

**IQ 2.2.3:** How do you determine whether a new technology such as cloud computing is ready for adoption?

- It will be determined by the needs of the business, it has been tested and proved to be working and all the infrastructure requirements are in place

**IQ 2.2.4:** What would you consider to be critically important when deciding to move your applications to the cloud? Is there any pre-defined process in place?

- Reliable Internet availability. Is there infrastructure redundancy built in the provider's infrastructure? We must have conducted a full test on the application to ensure integration and inter-operability; and the support and cost involved
- The process we have is to conduct a test, and make sure scalability and redundancy is built in the infrastructure based on the SLA drawn by the providers

**IQ 2.2.5:** Who is in charge of the maintenance of your organisational IT assets?

- We maintain ourselves

**IQ 2.2.6:** What cloud computing deployment model has been implemented in your organisation so far? How was it decided on?

- We have SaaS and IaaS. We bought servers located in Europe. We pay about R1000 per month. We use Google drive and Office 365

**IQ 2.2.7:** Was there any pre-assessment performed? What were the challenges encountered in the implementation process, if any?

- We conducted a test; we did not encounter any challenges

**IQ 2.2.8:** Is there a clear IT strategy in your organisation? If yes, how is it in line with your business strategy?

- Yes we have an IT strategy in place and it is in line with our business strategy. Whatever we implement in IT must match the business needs, and address some system inefficiencies, or bring in some new features / functionalities and improve the service; mapping it to the business strategy

**IQ 2.2.9:** Any new technology or process gets adopted because of the perceived business value it can provide. Is there any way to assess the value to be brought by the new innovations in the organisation before embarking on the adoption? Please expand.

- We do not conduct any evaluation, but we know it works based on the feedback from clients; and the new implemented system allows us to accomplish our goal by meeting the customers' expectations

**IQ 2.2.10:** What are the criteria you have in place for the selection of a cloud provider in your organisation, if needed?

- To select the provider will depend on the infrastructure that has redundancy, which increases the system reliability and availability. We look at the application support and the support model, and cost involved

IQ 2.2.11: How do you plan to protect the organisational assets moved to the cloud?
- We trust the providers for the protection, but we keep a local copy onsite. The system availability is one of the main considerations we look at when selecting the provider

IQ 2.2.12: What type of cloud service has been adopted in your enterprise, and what is the likelihood of cloud computing being adopted if it is not in use yet?
- N/A – We are in the cloud already, we adopted IaaS and SaaS

IQ 2.2.13: Do you have an IT staff training plan in your organisation, especially when a new technology is to be adopted? Expand if needed.
- Staff members are technical savvy, but they are required to keep themselves up to date. There are online training available these days

IQ 2.2.14: How risk aware is your organisation with regard to the enterprise's digital assets? Select the most appropriate option.
- **<u>High</u>**
- Medium
- Low
- Not sure
- Don't care

# APPENDIX C14: INTERVIEW TRANSCRIPT OF I14

## A. GENERAL INFORMATION

a. Name of the enterprise: P14

b. Size of the organisation (tick):

      1 - 5 employees

      5 – 10 employees

      **<u>10 – 20 employees</u>**

      20 – 50 employees

      50 – 100 employees

      More than 100 employees

c. What is the nature of the business of your enterprise? Financial Systems Software Development

d. What is the industry are you in? IT / Software Development

e. What function / position do hold in the organisation? Owner / Managing Director

f. Geographical location of the enterprise. Cape Town, Bellville

## B. INTERVIEW QUESTIONS

### a) Factors for cloud computing adoption readiness by SEs

IQ 1.1.1:    Did you hear about cloud computing technology before? Where and how? What does it mean for your enterprise's business operations?

- Yes, I did hear about CC through our suppliers; distributed from adverts and the requests for our clients

- Infrastructure as a Service, there are different levels of service offerings, it could be an infrastructure of service offering on one side, to a full service and hosted environment. Instead of having computers on site, you use applications hosted in the cloud

- X as a Service for us the company means flexibility, providing more options, importantly, we do not have to lay out CAPEX (capital expenditure)

IQ 1.1.2:    What potential for business sustainability do you see in cloud computing adoption in your organisation?

- There is sustainability observed. CC provides more functionality and availability which comes with new options, which allows us to be more flexible in meeting our clients' needs

- The flexibility of the system and high availability, and up to date and reliable systems allow us to provide better services to our customers, which points to the competitive advantage for the business

**IQ 1.1.3:** Do you believe that adoption readiness assessment is necessary for the successful adoption of a new technology? In what way?

- Yes, it is important to conduct readiness assessment before adopting a new technology. But for us we are already in the cloud; we are busy taking our clients to the cloud as well

- Absolutely yes, there could be some governance issue, there could be legislations, and it could be the internal system not allowing you to go to cloud. One of the issues can be the move of mass volume for on-premises to cloud, back and forth. You need a big pipe (internet bandwidth) to the internet; this can be one of the assessments to be done. For example, Australia has a law that you cannot host Australian citizens' information data outside the country (regulatory compliance)

**IQ 1.1.4:** Is there any belief that cloud computing adoption can have an impact on your business competitiveness? Expand.

- Yes, there is competitiveness. Using CC keeps your system up to date, is not obsolete which allows you to effectively address the needs of the customers, and this is a competitive advantage

**IQ 1.1.5:** How do you explain regulatory compliance with regard to cloud computing adoption and use?

- It is about compliance with the law that regulates data protection and access, i.e. the protection of personal information (you comply or you don't comply). The compliance adds a cost to our business operations. It is about what you are required to do in line with the law pertaining to the data storage and access

**IQ 1.1.6:** What are the system areas in your enterprise that cloud computing adoption could have a direct impact on?

- All our systems are in the cloud

**IQ 1.1.7:** How can this organisation profit from the use of the pay-as-you-use model when using cloud computing technologies?

- The pay-as-you-use model allows to reduce the CAPEX in terms of profitability, but at the same time it increases the operational cost (OPEX)

- We have not done any comparative calculations (percentages) to determine how much is spent vs. how much we gain, but definitely, it is more expensive to run the system in cloud than on premises

**IQ 1.1.8:** How can you describe the requirement for internet availability for business operations in your enterprise? How good is your internet connectivity?

- Internet availability is critical, and if you do not have enough internet bandwidth, you cannot use cloud computing; it is a requirement

- Internet access is acceptably reliable, and it is a requirement for our business. We have all our systems in the cloud and without sufficient reliable internet bandwidth, cloud cannot be used

IQ 1.1.9a: What are the major consideration factors in your organisation that influence the choice of new technology adoption for the business?
- The main consideration factors are finances and up to date functionalities, and service high availability (24/7), which results from the redundancy of the providers' system
- Low capital investment, system availability and up to date systems with new functionalities available

IQ 1.1.9b: If cloud services are in use, how was decided what data / systems should be pushed into the cloud and what should remain on the premises?
- It is definitely finances, relating to CAPEX versus OPEX. I do not have to buy servers, I do not have to invest in IT personnel, It is much easier, quicker and convenient to buy a service they maintain and update all the time, and get up and running in no time
- Service availability is key

## b) Benefits of cloud computing and adoption readiness

IQ 1.2.1: In your opinion, what are the main gains the enterprise should get from the use of cloud computing?
- System is highly available, the system is up to date, and I do not have to worry about system patching. This allows to provide high quality service to customers
- Finances and system performance and flexibility

IQ 1.2.2: What category of your organisational data/systems would you be comfortable with to move to a cloud computing environment?
- Everything we have is in the cloud, we are comfortable with cloud

IQ 1.2.3: Do you see any positive financial impact on the organisational performance through the adoption of cloud computing? How do you see it be realised?
- There is a positive impact on the organisation as CAPEX is significantly lowered. The requirement of having a significant amount of financial budget to invest in IT infrastructure I removed and you get to use an infrastructure that is up to standard. In the long run it can be expensive but for small businesses it is sometimes difficult to afford huge upfront investment in IT infrastructure
- Continually updating the systems

### c) Adoption readiness determination by enterprises

IQ 2.1.1:   Does your enterprise need to have access to ICT of any sort to run the business? Please expand.

- Absolutely, ICT is a requirement for business. We provide IT service and we must have it before we can provide it to others

IQ 2.1.2:   Do you outsource, or have you ever outsourced any IT systems / services in your organisation? What is the reason for choosing outsourcing?

- We do outsource some of our IT systems, especially for the specialised high technical skills, due to the capacity reasons shortage
- The outsourcing is referred to as the use of hosted provider, who comes to operate the system for us. We have no dedicated IT unit
- Cloud computing and outsourcing are different terms; outsourcing is where someone else works on your system based on the contract you have, but CC is a service you buy, as pre-packaged service. We outsource backup, technical support (network) services

IQ 2.1.3:   What is the level of IT skills in your enterprise's work force? Choose one.

- **<u>High</u>**
- Intermediate
- Basic
- None

IQ 2.1.4:   Do you use or are you aware of any form of cloud computing use in the organisation?

- SaaS and IaaS, both in use, because we do not have capacity to build infrastructure, SaaS functionality

IQ 2.1.5:   How do you trust promised cloud computing services for the competitiveness of your business?

- We trust providers because we must protect our relationship in order to give credit to the business

IQ 2.1.6:   If cloud computing is not being used in your organisation, is there any consideration of adopting it in the future? Why?

- N/A. We are in the cloud
- We started the business with the cloud, but the motive is the availability and upfront capital investment. The availability and functionality is very important and without investing in infrastructure and skill development

IQ 2.1.7:   What potential benefits do you see in conducting the cloud computing adoption readiness assessment?

- The readiness assessment allows us to get insight into what the system is about, get understanding; it becomes a business use case

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IQ 2.1.8: Is your organisation open to technological change? How and why?

- As an IT service offering business, it is a requirement to be open to technological change, otherwise you became obsolete as technology changes quickly. As a business owner in the modern world, you have to embrace technology. You may have to be like a parachute, as you will be obsolete within no time

IQ 2.1.9: How can you explain readiness for adoption of a technology such as cloud computing, putting it into the context of your organisation and business?

- Having the required systems and understanding of the technology to be able to access and use it

IQ 2.1.10: How advantageous do you think cloud computing is for small businesses such as yours?

- It allows us to access the system with high availability, and up to date functionalities. Upfront cost is very limited, and deployment time is very minimal combined with the flexibility
- RI conducted

IQ 2.1.11: What financial gain can your organisation enjoy from cloud computing adoption? Explain.

- CAPEX is almost eliminated

IQ 2.1.12: If moved to the cloud environment, what are your considerations for the service continuity and recovery plans? In your opinion, who should be held responsible for data loss in case there is a breach relating to data stored in the cloud?

- The responsibility is left to the provider, as it is part of the SLA, but we make sure there is redundancy in the system before we sign, high availability  with good backup processes

## d) Adoption readiness assessment

IQ 2.2.1: Is there a dedicated IT unit in your organisation (enterprise)?

- We have no dedicated IT staff

IQ 2.2.2: What is the main role played by IT staff in your organisation pertaining to technology adoption decision making?

- IT staff have a say
- **Exclusively Management decides**
- Management decide, informed by advice from IT staff

IQ 2.2.3: How do you determine whether a new technology such as cloud computing is ready for adoption?

- Justification of the governance, to make sure that all the staff that should stop you from going are cleared. Check the issues that stop you from going, for example do

you have reliable internet connection and enough bandwidth, internal policy-related issues

- There is big resistance for some application to move to cloud, due to compatibility and integration of legacy systems with cloud platforms. Companies with traditional systems mainly refuse to move their stuff to cloud, it is risky. Risk of mindset of people.

IQ 2.2.4:   What would you consider to be critically important when deciding to move your applications to the cloud? Is there any pre-defined process in place?
- All we do, all we have done has been in the cloud all the time

IQ 2.2.5:   Who is in charge of the maintenance of your organisational IT assets?
- We are responsible for our assets, and the staff in the cloud, we trust the provider as before entering in we must make sure the provider we choose is reliable

IQ 2.2.6:   What cloud computing deployment model has been implemented in your organisation so far? How was it decided on?
- IaaS and SaaS
- The decision was based on the needs and the budget available at that time

IQ 2.2.7:   Was there any pre-assessment performed? What were the challenges encountered in the implementation process, if any?
- There was no pre-assessment in our case as we started our business in the cloud. The assessment that was made was to understand the services provided by different providers and the regulation to comply with before we could decide on which one to go with

IQ 2.2.8:   Is there a clear IT strategy in your organisation? If yes, how is it in line with your business strategy?
- There is an IT strategy and it is in sync with our business strategy. There is no way we can provide IT services without having IT strategy

IQ 2.2.9:   Any new technology or process gets adopted because of the perceived business value it can provide. Is there any way to assess the value to be brought by the new innovations in the organisation before embarking on the adoption? Please expand.
- We have no tool or process that evaluates the gain from using cloud computing

IQ 2.2.10: What are the criteria you have in place for the selection of a cloud provider in your organisation, if needed?
- Service offered, redundancy of their infrastructure, he cost involved and the support model

IQ 2.2.11: How do you plan to protect the organisational assets moved to the cloud?

- When it comes to security, we rely on the service provider, but we have a shared responsibility in securing our data that are in the cloud. The provider will secure the infrastructure, but the actual data, we must make sure that it incepted and protected, as we are accountable to our customers and government, hence we have a shared responsibility

- We do on site back up ourselves in case there is a problem with the provider

IQ 2.2.12: What type of cloud service has been adopted in your enterprise, and what is the likelihood of cloud computing being adopted if it is not in use yet?

- SaaS and IaaS have been adopted and in use

IQ 2.2.13: Do you have an IT staff training plan in your organisation, especially when a new technology is to be adopted? Expand if needed.

- Internal training, perform formal training

- Yes we have a plan, on-going training (online)

IQ 2.2.14: How risk aware is your organisation with regard to the enterprise's digital assets? Select the most appropriate option.

- **<u>High</u>**
- Medium
- Low
- Not sure
- Don't care