The Dynamic Processes of the Adoption and Use of Cloud Computing by Small, Medium Enterprises in South Africa.

By

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Thesis Submitted in fulfilment of the requirement for the degree of Doctor of Philosophy in Information Systems

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April 2025

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Declaration

1. All the works used in this project have been appropriately cited and referenced.
2. This thesis is my own work. My supervisor and colleagues acted on advisory roles only.
3. I will not allow anyone to copy this research and pretend that it is their own work.

Signed by candidate

Ayanda Pekane Date: 16 April 2025

Dedication

In loving memory of my late mother Ms. Joyce, Nomalizo Pekane and my grandmother Ms. Letitia Nontsikelelo Pekane. You taught me to value education, to embrace my authentic self and empowered me to engage with world with confidence.

Acknowledgements

To Jesus Christ, my Lord and Savoir, thank you for keeping me and carrying me throughout my life.

To Prof. Ojelanki Ngewnyama, thank you for your guidance and support throughout this PhD process. I have gained so much from your insights and guidance, and I hope to continue learning from you in the future.

To Prof. Elsje Scott, thank you for your support, encouragement and guidance in my academic journey.

To Ms. Dumazile Ndaba, thank you for supporting me and embracing me with the care of a mother. I am grateful.

Malume uDyonase (Mcwerha), Enkosi ngokundixhasa.

To my friends Sipho Maphosa, Jane Kgorane, Cebisa Mtsi, Nokuthula Thembekwayo, and Dr. Nompilo Ndlovu, thank you for your support and encouragement in this journey.

Dr. Hubeidatu Nuhu, Zainab Ruhwanya, Dr. Tendani Chimboza, Carl Jacobs. Your presence and support throughout this journey have been invaluable, and for that, I am grateful.

To Ndumso Tseeke, Thank you for your support throughout this journey.

My Colleagues at the Department of Information Systems at UCT, thank you for your support, advice and guidance.

Prof. Robert Morrell and Prof. Mary Masehela, thank you for your support throughout this journey, I can't forget the writing retreats of course, and for your invaluable guidance and encouragement.

To the nGAP Cohort, thank you for your support, for sharing your experiences, and fostering an inclusive and safe environment.

Publications

Part of this thesis has been presented at conferences and has appeared in conference proceedings:

- Pekane, A., & Ngwenyama, O. (2023). Organizational Learning Mechanisms Applied in the Adoption and Use of Cloud Computing by Small and Medium Enterprises in South Africa. *Published Online by the SAICSIT 2023 Organising Committee Potchefstroom: South African Institute of Computer Scientists & In-formation Technologists*, 71.

- Pekane, A., & Tanner, M. (2017). A Systematic Literature Review on Cloud Computing and Small and Medium Enterprises (SMEs) in Africa. In *The European Conference on Information Systems Management* (pp. 272-279). Academic Conferences International Limited.

Abstract

Small and Medium Enterprises are vital contributors to economic development in middle-income countries like South Africa. SMEs adopt and use various information and communication technologies, such as cloud computing. This is to compete in the information age characterised by the rapidly changing environment due to ICTs. Cloud computing is a platform where organisations can access a pool of ICT resources through the Internet. Research of CC focusing on the SME sector is generally limited, particularly in middle-income countries. The factors driving the evolution and advancement of the adoption of CC by SMEs in SA have not been adequately articulated within the existing literature. There is a gap in understanding the dynamic processes involved in SMEs' adoption and use of CC in SA. As a result, this research aimed to investigate these dynamic processes, focusing on three aspects. Firstly, the challenges of SMEs' adoption and use of CC. Secondly, the organisational learning processes that lead to the adoption and use of CC. Lastly, the organisational changes experienced by SMEs when adopting and using CC. This research aims to advance the understanding of the African landscape, providing a potential resource for other countries in similar situations to access and utilise this knowledge.

A multi-method strategy (induction, abduction and retroduction) was adopted, with three research strategies used to interrogate the phenomenon. Participatory observations and ethnographic interviews were applied research methods. Findings indicated that there may be a limited view of the challenges of adopting and using CC by SMEs in middle-income countries like SA. The challenges not found in the literature encompassed substandard CC provision and financial constraints. Some challenges included insufficient knowledge and skills and a lack of support. The findings associated with OL indicated that SMEs employed OL mechanisms, such as investigative and inquiring activities, training, collaborative learning, and alliances, for the exploration and exploitation learning processes. SMEs faced resource allocation challenges of concurrently managing exploration and exploitation activities in learning. The findings associated with OC revealed that SMEs experienced distinct adoption phases, encompassing pre-adoption, mid-adoption, and post-adoption phases. The transition from pre-adoption to mid-adoption corresponded with OC in communication channels, business processes, human resource management, and a shift in the learning culture and employee mindset. The transition from mid-adoption to post-adoption corresponded with OC in organisational structure and culture.

Keywords: Cloud computing, adoption and use, SMEs

List of Acronyms

Concept/term	Abbreviation
SA	South Africa
SMEs	Small and Medium Enterprises
IT	Information Technology
ICT	Information and Communication technology
IS	Information Systems
CC	Cloud Computing
SaaS	Software as a Service
PaaS	Platform as a Service
IaaS	Infrastructure as a Service
OL	Organisational Learning
OC	Organisational Change
CIOs	Chief Information Officers
IOs	Information Officers
KZN	Kwazulu-Natal
JHB	Johannesburg
CCSP	Cloud Computing Service Provider
AWS	Amazon Web Services
CA-IS	Cloud Based Accounting Information Systems
Cloud BI	Cloud Business Intelligence
AWS	Amazon Web Services
HR	Human Resources
NIST	National Institute of Standards and Technology
POPIA	Protection of Personal Information Act
NSBC	National Small Business Chamber
CRM	Customer Relationship Management
S3	Amazon Simple Storage Service
GPT	General Purpose Technology
NRI	Network Readiness Index
GII	Global Innovation Index
TIPS	Trade and Industrial Policy Strategies
R&D	Research and Development
UTATUT	Unified Theory of Acceptance and Use of Technology
TOE	Technology Organisation Environment
DOI	Diffusion of Innovation
HRM	Human Resource Management
4IR	Fourth Industrial Revolution
ERP	Enterprise Resource Planning
ISS	Information Systems Strategy

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1 Introduction

Substantial research has been carried out on the value of cloud computing (CC) and its offerings of providing all types of organisations access to Information and Communication Technology (ICT) as a resource (Abdollahzadehgan et al., 2013; Nagahawatta et al., 2021; Yeboah-Boateng & Essandoh, 2013; Zhang & Ravishankar, 2019; Gonzalez et al., 2024). This has been viewed as a significant contribution toward Small and Medium Enterprises (SMEs) (Saratchandra & Shrestha, 2022). SMEs are organisations linked to the improvement of economies globally (Al-Sharafi et al., 2023; Olawale & Garwe, 2010). In most middle-income countries, they account for a significant share of production and employment (ibid.). In South Africa (SA), SMEs have become the key instrument for job creation and poverty alleviation (Tassiopoulos, 2016; Eze & Lose, 2023; Mbuyisa & Leonard, 2017). In addition, they are the primary source of competitive advantage and economic development (Adeniran & Johnston, 2012). Though SMEs significantly impact the economy of SA, it is also unfortunate that they have the highest failure rate (Kudzaishe & Fatoki, 2012).

In SA, nearly 75% of new SMEs do not flourish and become established businesses within their fifth year (Eze & Lose, 2023). This phenomenon is caused by various challenges like unfavourable governmental policies, lack of education, lack of skills, limited finances, limited resources, inaccessibility to appropriate technology, etc. (Prinsloo et al., 2015; Roy & Patil, 2023; Setiyani et al., 2020). These challenges have been heightened by the global economic environment that SMEs find themselves in. Some influences have aided this global economic environment, but it is mostly the information age (Wolf, 2001; Adeniran & Johnston, 2012; Sanele & Lekhanya, 2022). The rapidly changing environment characterises this age due to constantly evolving ICTs (Sanele & Lekhanya, 2022). As a result, SMEs compete globally with various organisations that can take advantage of ICTs (Sanele & Lekhanya, 2022; Gonzalez et al., 2024). Thus, the significance of the adoption and use of CC by SMEs has been justified by various researchers (Kshetri, 2010; Mohlameane & Ruxwana, 2014; Johnston, Loot, & Esterhuyse, 2016; Tshiyole & Jokonya, 2016; Osembe & Padayachee, 2016; Van Dyk & Van Belle, 2019).

1.1 Cloud computing

Cloud computing is a process and a platform where organisations can share a pool of computing resources or tools offered over the Internet (Habib et al., 2012). Hayat Malik et al. (2019) and Ahmed (2020) emphasise that CC is also an on-demand delivery of computing resources over the Internet. According to the National Institute of Standards and Technology (NIST), CC has five necessary characteristics that fulfil CC's definition and purpose. These include on-demand self-service, broad network access, resource pooling, rapid elasticity, and measured service (Jangjou & Sohrabi, 2022; Mell & Grance, 2011).

These five characteristics contribute to the benefits and, therefore, the significance of CC. For example, with on-demand self-service, the cloud user can offer computing capabilities to their clients, which include servers and shared network storage. These capabilities are provisioned automatically without human intervention from the Cloud Computing Service Provider (CCSP) (Kumar et al., 2022). On the other hand, broad network access offers capabilities that can be accessed over the Internet through various devices and platforms such as desktops, laptops, mobile phones and tablets (Smuts, 2019). Resource pooling refers to computing resources from CCSPs, where virtual resources are dynamically assigned and reassigned in response to user demands (Paredes-Gualtor et al., 2018). The following characteristic is the measured services, which involve using embedded cloud technology to independently manage and optimise resources through metering capabilities (Smuts, 2019). Lastly, rapid elasticity refers to the ability of elasticity, the scaling outward and inward of computing resources depending on the user's resource demands (Kumar et al., 2022).

The CC characteristics result in benefits such as accessibility and availability of diverse computing resources (Wu & Plakhtii, 2021). This benefit is attributed to the broad network and resource pooling characteristics of CC. In the same breath, the attribute of rapid elasticity makes it seem to the consumer as if computing resources are unlimited and can be allocated at any time (Mell & Grance, 2011; Hayat Malik et al., 2019). Therefore, rapid elasticity and measured service translate to the cost reduction of Information Technology (IT) resources. This is a significant benefit of cloud computing, often the main reason for CC adoption and use. Another advantage of CC is that it provides flexibility and scalability to computing resources (Alismaili et al., 2016). Similarly, this is attributed to rapid elasticity, measured service and on-demand self-service.

Cloud computing is offered to users in three models (Gupta et al., 2013). These models consist of Software-as-a-Service (SaaS), Platform-as-a-Service (PaaS) and Infrastructure-as-a-Service (IaaS) (Noor, Sheng, Ngu, & Dustdar, 2014; Albelaihi & Khan, 2020). Software as a service consists of various applications offered to users and accessed via the Internet (Setiyani et al., 2020; Matias & Hernandez, 2021). Applications are centrally hosted and maintained by the CCSP (Gupta et al., 2013; Laverdealbarracín et al., 2023). Software as a service is ideal for users requiring a standard application (Dillon, Wu, & Chang, 2010). In this case, users do not need to install, upgrade and maintain applications they access. The CCSP is responsible for installing, upgrading, and maintaining applications hosted in their environment (Setiyani et al., 2020). Examples of SaaS include salesforce (Khayer et al., 2021; Zhang et al., 2021).

Platform as a service differs because it provides operating systems, databases, middleware, software development kits and tools like Java (Shimba, 2010; Fuggetta, Nitto, & Milano, 2014). In this case, the user can access resources needed to develop or create applications. This can be achieved without installing or downloading software (Setiyani et al., 2020; Matias &

Hernandez, 2021). Examples of PaaS include GoogleAppEngine (Khayer et al., 2021; Zhang et al., 2021).

The last service model is IaaS, in which users control and maintain their operating systems, storage, and other deployed applications (Bhatiasevi & Naglis, 2015). The main feature of the IaaS is that users access physical devices such as servers, storage systems, routers and switches for their operations (Saini & Saini, 2011). Therefore, users can utilise hardware services according to their needs (Setiyani et al., 2020; Matias & Hernandez, 2021). Examples of IaaS include Amazon Elastic Compute Cloud (EC2), Rackspace, and Amazon Simple Storage Service (S3) (Khayer et al., 2021; Zhang et al., 2021). As illustrated in Figure 1, cloud computing service providers maintain all the infrastructure and services for SaaS (Albelaihi & Khan, 2020). The user uses the application without maintenance and liability (Angeli & Masala, 2012; Misra & Mondal, 2011). Cloud users have less control (Jangjou & Sohrabi, 2022). The primary advantage of SaaS is the ability to achieve comprehensive remote collaboration with CCSPs. Another benefit is the ability for users to accelerate their service launch into the market. On the other hand, PaaS enables users to manage the application and the runtime while the CCSP manage the rest (Amini & Bozorgasl, 2023).

The primary advantage of PaaS is its ability to accelerate product development in the CCSPs platform (Albelaihi & Khan, 2020; Amini & Bozorgasl, 2023). Platform as a service provides multiple developers access to computing resources, allowing users to test their software in the cloud environment before its implementation in the market (Jangjou & Sohrabi, 2022). Lastly, the unique benefit of IaaS is that it reduces vendor lock-in. A distinctive advantage of IaaS is its capacity to mitigate vendor lock-in. This is because users use the hardware and manage their applications and systems (Jangjou & Sohrabi, 2022). The disadvantage of IaaS is that it is more expensive than SaaS and PaaS (Albelaihi & Khan, 2020).

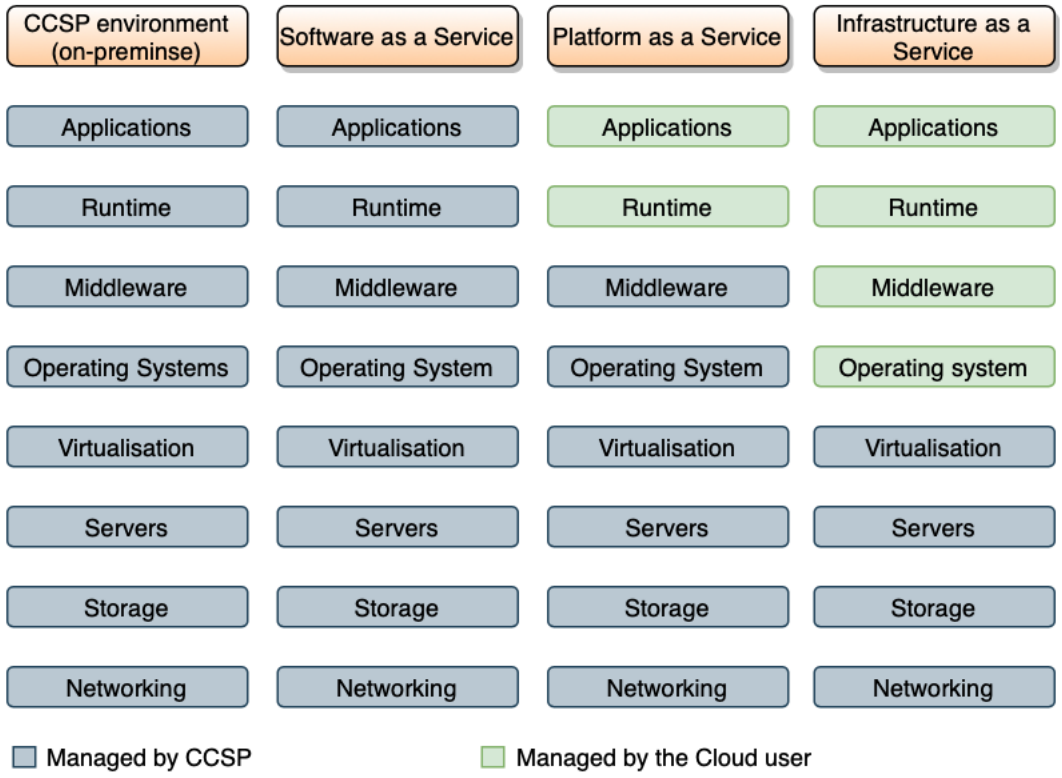

Figure 1: Cloud computing service models and delivery by Bond (2015).

1.1.1 Cloud computing deployment models

Cloud computing services are also delivered in deployment models (Habib, Hauke, Ries, & Mühlhäuser, 2012; Amini & Bozorgasl, 2023), as shown in Figure 2. Deployment models have been developed to support the user's business needs (Agapito & Cannataro, 2023). It speaks to the different ways cloud users can access CC services. Deployment models fundamentally point to the infrastructure underlying the CC service models (Laverdealbarracín et al., 2023). The deployment models consist of the private, public, community, and hybrid cloud (Mujinga, 2020; Jangjou & Sohrabi, 2022). The private cloud is a service that is designed to serve and maintain a computing environment for a private organisation (Hsu et al., 2014). A private organisation or a third party can manage and maintain its infrastructure. In this case, users have exclusive access to the CC resources (Matias & Hernandez, 2021). The private deployment model gives users increased control over the cloud infrastructure, computer resources and cloud security (Hsu et al., 2014). Therefore, the private cloud model is advantageous to users who require high levels of security, compliance and customisation (Maniatis, 2023).

In contrast to the private cloud, the public cloud allows the general public, consisting of multiple users, to share computing resources through the Internet (Matias & Hernandez, 2021). Third-party organisations such as Amazon Web Service (AWS), Google Cloud Platform, and Azure offer computing resources (Mohlameane & Ruxwana, 2014). Thus, the cloud infrastructure is

external to the user's environment. In this case, the user can access limitless processing power, storage and scalability capabilities. However, public clouds can leave users vulnerable to security risks, data breaches and cyber-attacks (Maniatis, 2023). The hybrid cloud model combines the private and public cloud (Matias & Hernandez, 2021). This leads to the advantageous combination of the benefits of the public and the private cloud models. Users can, therefore, mitigate the security risks of the public cloud and benefit from the economies of scale of the public cloud (Bhat, 2013; Mosweu et al., 2019). Lastly, the community cloud model is designed to serve multiple users of a specific community with shared interests (Hayat Malik et al., 2019). For example, government agencies and research institutions with shared interests can share CC resources (Maniatis, 2023). Community cloud models offer increased security customisation options with the advantage of economies of scale (Laverdealbarracín et al., 2023; Maniatis, 2023)

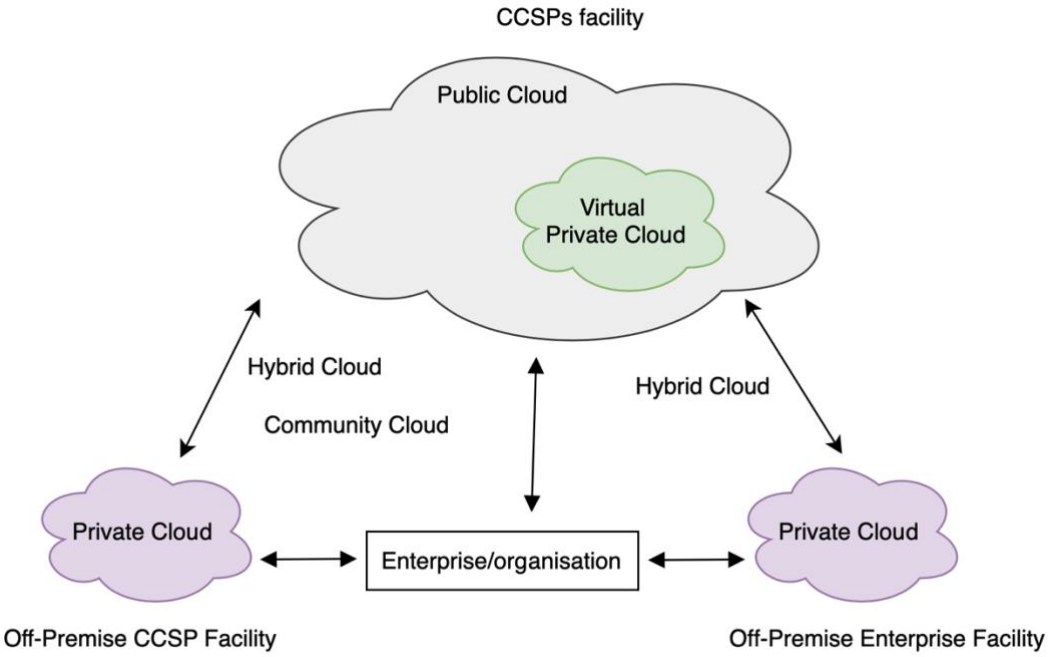

Figure 2: Cloud computing deployment models by Bond (2015)

1.2 The significance of cloud computing

The advantages CC offers are the driving force behind the significance of CC for various organisations. In the context of organisations, CC can lower operational costs, offer access to an array of computing resources, provide flexibility in organisations, enable remote work for organisations, facilitate resource scalability, ensure high resources, increase load capacity, improve organisational performance (Agapito & Cannataro, 2023; Alsafi & Fan, 2020; Vajjhala & Ramollari, 2016; Kumar et al., 2022). Cloud computing is often recognised as the fifth utility, joining the ranks of water, electricity, gas and telecommunications. In the scenario of CC, computing resources are accessible as needed, mirroring the availability of other utility

services (Kumar et al., 2022). In addition, CC is often viewed as a General-Purpose Technology (GPT).

General purpose technologies are defined as technical breakthroughs that can spur and sustain growth via their persistent use in the economy (Lawson & Samson, 2001; Cirillo et al., 2023). Like GPT, cloud computing offers a dynamic technological environment that opens up numerous information systems solutions and possibilities for business communities, in contrast to fixed and comprehensive information solutions that do not provide the same level of flexibility and exploitability (Brynjolfsson et al., 2010; Subashini & Kavitha, 2011). It also has the potential for pervasive use and can foster generalized productivity gains. It can be utilised for various tasks in diverse environments because it can generate profound economic and social consequences (Wahab et al., 2016). Like GPT characteristics, cloud computing impacts numerous businesses (Hofer & Karagiannis, 2011; Ahmed, 2020). As a result, businesses are exploring the benefits of cloud computing in various sectors, including SMEs (ibid.)

1.3 The significance of cloud computing for SMEs in SA

Information and Communication Technologies (ICTs) have become significant for all organisations, particularly SMEs. The adoption and use of ICTs like CC can drive growth for SMEs in SA by enhancing market access and improving operational efficiency (Qureshil et al., 2009; Qiang et al., 2006). Cloud computing plays a vital role in SA's social and economic sectors (Moyo & Loock, 2021). For example, the on-demand, pay-as-you-go attribute of CC can relieve SMEs of the financial burden associated with investing in computer hardware and software (Saratchandra & Shrestha, 2022; Neves, Marta, Correia, & Neto, 2011). Small and medium enterprises can access these resources without purchasing hardware equipment, software services and IT skills to maintain systems (Neves, Marta, Correia, & Neto, 2011). Another benefit is the accessible use of software packages without purchasing licenses. In addition, software upgrade responsibilities, including maintenance, become the service provider's responsibility (Dangwal & Lata, 2014). Cost, flexibility, and scalability benefits translate to reliable and constantly available resources. Therefore, SMEs can access resources anywhere and anytime with an information device. This, in turn, fosters and enables growth strategies to mitigate poverty and address challenges in middle-income countries like SA (Hiran & Henten, 2020).

Small and medium enterprises are often vulnerable in competitive markets due to limited resources, including capital and technical knowledge (Nagahawatta et al., 2021; Roy & Patil, 2023; Saratchandra & Shrestha, 2022). Most SMEs are not primarily technology-focused companies. Therefore, SMEs allocate their resources towards core business functions and allocate fewer resources to technological initiatives (Never et al., 2022). Thus, CC plays a significant role in developing business and competitive edge for many organisations, including SMEs (Al-Sharafi et al., 2023). In the post-COVID era, it has increasingly become important

for SMEs to embrace ICTs such as CC (Never et al., 2022). This is crucial for enhancing business performance and sustaining competitive advantage (Al-Sharafi et al., 2023). Hence, studying the dynamics related to CC is significant and relevant for comprehending the factors influencing its adoption and utilisation.

1.4 Small and medium enterprises and the context of South Africa

Two annual reports measure and investigate different aspects of ICT progress in various countries worldwide. They consist of the global technology report, sometimes referred to as the network readiness index (NRI) report and the global innovation index report. The World Economic Forum publishes the NRI annually to reflect the ICT status of different countries. The NRI measures and considers the capacity of countries to leverage ICTs for increased competitiveness and innovation trends of recent years. The most recent reports were published in 2016 and 2022. In both reports, SA has the highest NRI in Africa, which is unique compared to other African countries (Baller et al., 2016; Dutta et al., 2022). For instance, in SA, the business sector is the main contributor to the NRI compared to other African countries where the government is the main contributor. This aspect ties in well with the Global Innovation Index (GII) report, where SA is recorded as the most innovative economy in Sub-Sahara Africa, with Botswana being the second and Kenya the third (Dutta et al., 2022; Dutta et al., 2023). These aspects make SA unique as a middle-income country in Africa. These factors also illustrate that South African businesses have acquired some dynamic capabilities that assist them in adopting and using technologies like CC in this information age (Vuke, 2015).

In South Africa, SMEs are typically defined as businesses with 6 to 200 employees, inclusive (National Small Business Act 102, 1996). Statistics South Africa (Stats SA) is the national statistical service of SA. It is a nationally recognised organisation that provides accurate and official statistics to advance economic growth, development and democracy in SA (Makgetla, 2023). In their report, Stats SA revealed that 60% of all formal small businesses are in the five largest metros of SA. These include Johannesburg, Cape Town, eThekwini, Ekurhuleni and Tshwane. According to Trade and Industrial Policy Strategies (TIPS), these SMEs are in various industries, including engineering, IT, and creative work in the arts, marketing, education, construction, hospitality, manufacturing, and agriculture (Makgetla, 2023). This illustrates the significance and impact of SMEs on the South African economy. The growth rate of small businesses over the past 30 years was inadequate to overcome the deficit in small enterprises left by apartheid.

Small business owners in SA make up 6% of the working population. This is contrary to similar middle-income countries where small business owners make up 20% of the working population. Again, this highlights and justifies the importance of focusing on and encouraging SME growth and success for economic development in SA. In line with this sentiment, TIPS

has released a report that explains the importance of SMEs in SA for the economy. For example, TIPS estimated that small businesses directly generate a third of the value added to the SA economy. In 2020, small businesses in SA held at least a quarter of total business assets. Small companies were more labour-intensive and profitable than their larger counterparts. They generated 30% of total employment in SA. Small businesses also accounted for almost all job losses reported during the pandemic. It is therefore important for the SA government to increase and strengthen initiatives that assist SMEs affected by the COVID-19 pandemic. In general, there are contextual differences between SMEs in middle income countries compared to developed countries, Table 1 presents the differences.

Table 1: Characteristics of SMEs in middle income countries and developed countries

SMEs in middle income	SMEs in developed countries
Lack of access to finance	Better access to finance
Limited access to digital infrastructure and lack of adopting advanced technologies	Advanced technologies and digital tools
Shortage in knowledge and skills	High skilled workforce
Limited export orientation	Access to export markets
Stringent bureaucratic frameworks and policies	Supportive regulatory frameworks and policies

In evaluating the differences between the SMEs in middle and developed countries, the findings showed that the number of SMEs in developed countries is higher than those in middle income countries (Wang, 2016; Makgetla, 2023). As already stated, SMEs are known to contribute to economic development and the stability of the economy (Eze & Lose, 2023). This then contributes to developed countries' economies due to a higher number of SMEs. Unfortunately, some challenges constrain SME growth in middle income countries (Wang, 2016). They include limited access to finances, digital infrastructure, tools and skills, limited orientation to exports, stringent bureaucratic frameworks and policies (Kapurubandara & Lawson, 2006; Wang, 2016). This is not to say that developed countries do not have challenges. However, according to the literature, their challenges turn out to be sector based. For example, SMEs offering exports of goods and services tend to struggle the most. Their challenges include high transport costs, domestic vs foreign regulations, lack of knowledge about foreign markets, and language and cultural differences (Pandya, 2012). At the same time, other SMEs in different sectors may experience different challenges. This observation shows that developed countries strive towards reducing the general challenges that most SMEs face. On the other hand, most SMEs in middle income countries experience similar types of challenges. This may contribute to the failure rate of SMEs in middle income countries.

1.5 Background to the research problem

Existing scientific research of CC focusing on the SME sector is generally limited, particularly in middle-income countries. In Africa, a significant portion of scientific research centres around SA. This focus is important since it provides an opportunity to leverage the existing body of knowledge, allowing for the extraction of valuable insights. By doing this, the researcher aims to advance the understanding of the African landscape, subsequently providing a potential resource for other countries in similar situations to access and utilise this knowledge. The ultimate aim is to facilitate the adoption and use of CC in SMEs to contribute to their improvement. The existing body of knowledge indicates that numerous SMEs in SA have adopted and are using CC for multiple benefits (Van Dyk & Van Belle, 2019). Within these SMEs, there are various approaches to CC adoption and use. Some SMEs maximise CC's full potential, while others opt for a limited use of its services. While this is recognised, it is regrettable that the factors driving the evolution and advancement in the adoption of CC by SMEs in SA have not been adequately articulated within the existing literature. In other words, there is a gap in understanding the dynamic processes involved in SMEs' adoption and use of CC in SA. As a result, the objective of this research was to investigate these dynamic processes, focusing on three aspects.

The term dynamic refers to phenomena that form patterns that continuously change over time (Kalibatiene & Vasilecas, 2021). A Dynamic process refers to a process that is constantly changing over time due to internal and external factors or influencers (Luenberger, 1979). Thus, the study focuses on the dynamic processes of adopting and using CC. The argument is that the process of adoption and use is not linear. It is dynamic, it changes over time and is influenced by internal and external factors. In investigating these dynamic processes of adoption and use of CC by SMEs in SA, the study addresses three aspects. Firstly, the challenges of SMEs' adoption and use of CC are also discussed. Secondly, Organisational Learning (OL) processes that lead to the adoption and use of CC. Lastly, the organisational changes (OC) experienced by SMEs when adopting and using CC.

The objective of the first study was to describe and understand the challenges of the adoption and use of CC in SMEs. The rationale for investigating the challenges of CC in SMEs is based on two aspects. The first is the issue of context, the context of SA being a middle-income country. Secondly, SMEs differ from larger organisations in size, structure, and resources. For instance, contextual factors like structure, organisation processes and environment influence the adoption of ICTs (Del Aguila-Obra & Padilla-Meléndez, 2006; Premkumar & Roberts, 1999; Sabi et al., 2018). Middle-income countries differ from developed countries, encompassing disparities in capital resources, including knowledge, financial assets and social structures. When compared to larger organisations, SMEs have fewer resources in terms of financial capital and access to knowledge. As a result, SMEs will most likely have different challenges

compared to larger organisations. Investigating SMEs and identifying these challenges provides an entry into understanding the dynamics of SMEs' adoption and use of CC in SA. Lastly, the existing literature that centres on middle-income countries in a broader context provides limited coverage of SMEs' challenges when adopting and using CC. Therefore, there is a significant shortage of research that explicitly delved into the challenges related to SMEs' adoption and use of CC in SA.

The objective of the second study was to understand the OL processes that lead to the adoption and use of CC by SMEs. Kim (1993) supports the idea that learning in organisations is a dynamic process, not a linear process. It is self-evident that the successful adoption and use of technology requires knowledge about that technology, in this case, CC. Hence, adopting and using CC entails learning (Archibugi & Pietrobelli, 2003). Organisational learning is a learning process organisations employ to transfer knowledge from an individual to an organisational level. Unfortunately, the lack of knowledge and skills in CC is one of the challenges of adopting and using CC in SMEs. Therefore, it is rational to investigate and gain an understanding of OL processes employed by SMEs during the adoption and use of CC. At present, CC has been studied from various perspectives. The most prevalent perspectives consist of the Unified Theory of Acceptance and Use of Technology (UTATUT), the technology-organisation-environment (TOE) framework, the diffusion of innovation (DOI) theory, the socio-technical framework, the Theory of planned behaviour (TPB), technology acceptance model (TAM) (Ahmed, 2020; Dahiru et al., 2014; Hayat Malik et al., 2019; Hiran & Henten, 2020; Khayer et al., 2020; Nair et al., 2019). However, there has been a notable absence of studies investigating the adoption and use of CC from an OL perspective. Organisational learning is an essential facilitator of the adoption and use of CC. As a result, understanding OL processes adds to a more comprehensive understanding of effectively adopting and using CC in SMEs.

The objective of the third study was to understand the OCs that have emerged in the adoption and use of CC in SMEs. Scholars generally agree that achieving a successful adoption and use of IS with organisations necessitates a comprehensive evaluation and realignment of various other organisational factors and processes (Zafar, Tabish, & Jha, 2012). This introduces the significance of OC in adopting and using CC (Olusola & Oluwaseun, 2013). In general, limited research addresses the intersection of OC and the adoption and use of technologies such as CC, especially within the context of SMEs in middle-income countries (Alshardan et al., 2015). Numerous published works have the primary objective of offering models, frameworks, or guidelines to aid SMEs in adopting and using CC to enhance capabilities, efficiency and productivity (Santana, 2003). However, there is a notable absence of research that focuses on organisational changes needed to effectively implement these guidelines to successfully adopt and use CC (Alshardan et al., 2015). Scholars agree that OC

is an expected outcome of IS adoption and use (Avgerou, 2001; Francalanci & Morabito, 2008; Cragg, Caldeira, & Ward, 2011). Hence, it is important to understand the organisational changes that can transpire through the CC adoption and use process. This understanding may assist SMEs in aligning their organisational processes and factors to adopt and use CC successfully. A systematic approach to understanding the integration of the three studies is given in Chapter 6.

The predominant focus on CC and SMEs centres around diverse themes related to the adoption and use of CC. The central themes primarily focus on the benefits followed by implications, impacts and factors that influence the adoption and use of CC (Feuerlicht et al., 2011; Faasen, Seymour, & Schuler, 2013; Makena, 2013; Mohlameane & Ruxwana, 2013; Gumbi & Mnkandla, 2015; Sibanyoni, 2015; Hashela, Smolander, & Mutefu, 2016; Abubakar, 2016; Senyo, Effah, & Addae, 2016; Seifu, Dahiru, Bass, & Allison, 2017). Many publications have not emphasised the dynamic nature of the adoption and use of CC, which is characterised by a non-linear process. This dynamic process can be attributed to various factors, such as the distinct nature of SMEs compared to other types of organisations. In addition, the unique contextual considerations in middle-income countries differ from those in more developed contexts. These would then introduce questions that need to be addressed. Consequently, these conditions would pose questions that demand exploration.

1.6 Research Objectives and Questions

The objective of this study is to understand the dynamic processes of CC adoption and use by SMEs in SA. Therefore, the main research question is:

What are the dynamic processes of CC adoption and use by SMEs in South Africa?

A multi-paper approach of three empirical studies will address this question holistically and systematically. These studies will serve as a guideline to answer the main question. Each study will address each of the following three questions.

What are the challenges of the adoption and use of CC by SMEs in SA?

What are the organisational learning processes that lead to the adoption and use of CC in SMEs in SA?

What are the organisational changes that have emerged in the process of the adoption and use of CC by SMEs in SA?

The following section outlines the relationship between the respective studies.

1.7 The Nomological Net

The nomological net is a network that interlocks theoretical constructs and illustrates the relationships between the constructs and relevant links (Roest & Pieters, 1997). For this study, the nomological net, shown in Figure 3 is used as a conceptual model that clarifies the relationships between the theoretical constructs.

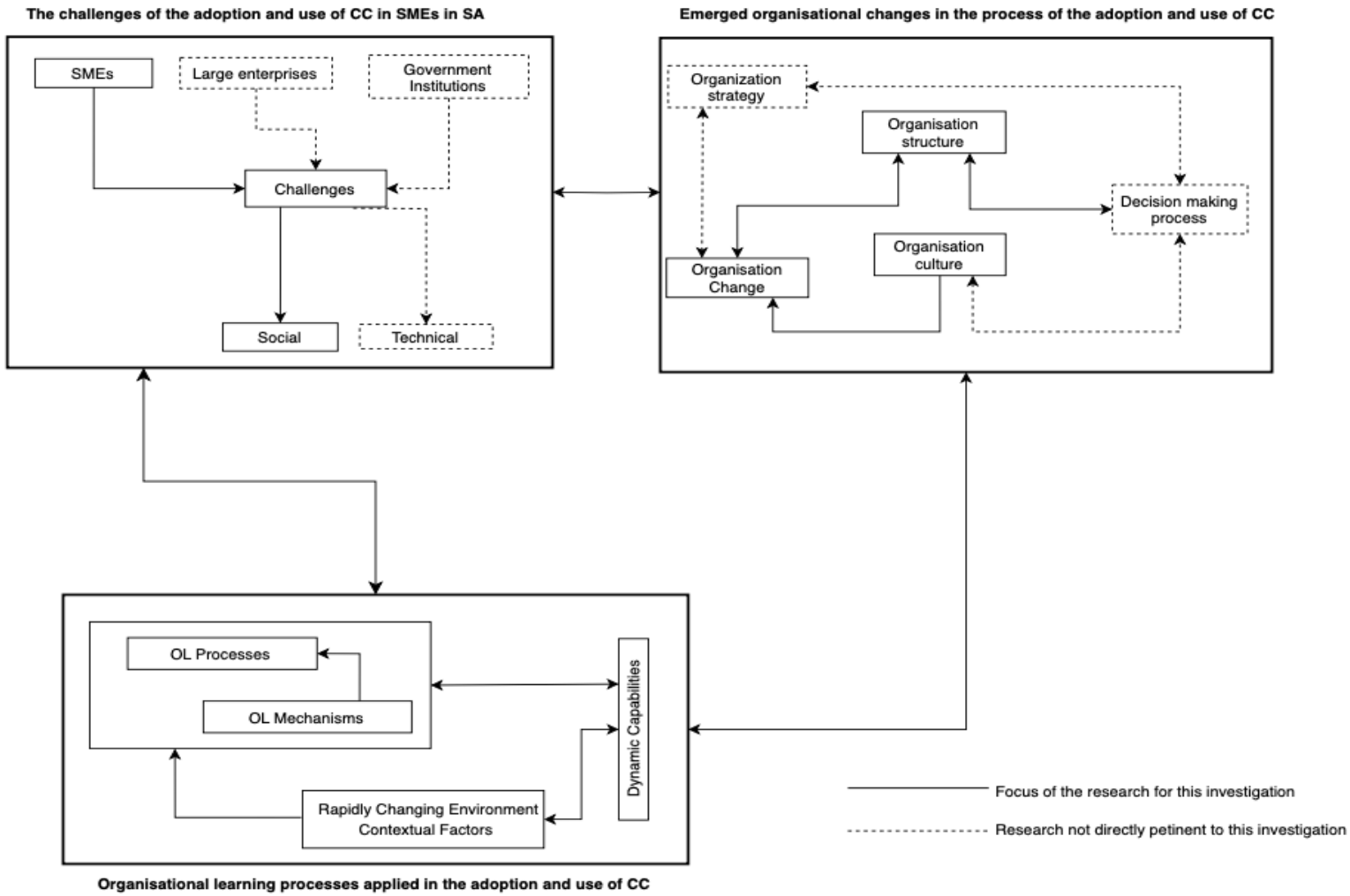

Figure 3: Nomological net

This study begins by investigating the challenges associated with the adoption and use of CC by SMEs in SA. The literature on the adoption and use of ICTs has shown that various technical challenges and barriers exist in middle-income countries that impact the adoption and use of ICTs. For example, limited ICT infrastructure negatively impacts the adoption and use of ICTs (Kabir, Islam, & Hossain, 2015). The study focused on the social aspect of challenges, mainly to lay a foundation for investigating and understanding the dynamics of the CC adoption and use of CC. Although this is the focus of the first study, it was also crucial that the researcher is socialised into the context of SMEs and the CC environment. This allowed for an alternative perspective of the challenges associated with adopting ICT, in this case, CC.

The process of the adoption and use of a technology like CC is not linear. Various aspects may bring about a dynamic aspect to the adoption and use process. However, the gateway to understanding these dynamics is through the challenges that exist within the process of adopting and using CC. One of the critical challenges in the adoption and use of CC is the lack of knowledge (Mujinga, 2020). Although the lack of knowledge poses a significant challenge to the adoption and use of CC, SMEs have nonetheless adopted and embraced it. Therefore, the aim was to explore OL by examining how SMEs acquire knowledge about CC. Thus, SMEs that have adopted and are actively using CC despite knowledge related challenges need to be investigated. As a result, OL became a key point of investigation for study 2.

The analysis of the first study revealed a relationship or link between the adoption and use of CC and the OL processes utilised by SMEs to adopt and use CC. This connection became evident due to the lack of knowledge, which was identified as one of the critical challenges to SMEs' adoption and use of CC. While conducting the second study, it became clear that OL is operationalised through OL mechanisms (Battistella et al., 2020). OL mechanisms are institutionalised structures and procedural arrangements that aid learning (Oliver, 2009; Armstrong & Foley, 2003; Battistella et al., 2020). Once OL mechanisms were understood, investigating and analysing the OL processes that facilitated the adoption and use of CC became easier. Thus, the second study is unique because it employed OL as a theoretical lens for viewing and understanding SMEs' adoption and use of CC.

During the second study, it also became apparent that OL is intricately linked to OC. This is because learning leads to changes within the organisation. This phenomenon led to the third study, investigating the OCs that emerged in adopting and using CC. This study mapped out the progression of adopting and using CC, illustrating the shifts from the pre-adoption, adoption, and post-adoption stages. This allowed the researcher to identify OCs that emerge during the CC adoption and use process. Studying the different stages made it easier to study the elements in the adoption process that caused the shift from one stage to the next. It also made it possible to study OCs that emerged in the process of adoption and use of CC. The OC in the structure and culture of SMEs was evident in the progression of the use of CC.

1.8 Methodology for the Literature Review

The body of knowledge in IS is diversified, involving interdisciplinary knowledge and content (Webster & Watson, 2002). This has made conducting literature reviews in IS challenging, resulting in a cause for concern regarding the quality, systematicity and transparency of literature reviews (Paré et al., 2016). In addressing this concern, the hermeneutics approach presented by Boell & Cecez-Kecmanovic (2014), shown in Figure 4, was adopted for the three studies. The hermeneutics approach enabled the researcher to interpret the literature iteratively; the two cycles contributed to the thoroughness of the literature review in the three studies. In addition, the approach allows the analysis of individual studies to the broader body of knowledge. The approach further emphasises on the emergent meanings, themes and patterns from the literature review.

The approach consists of 2 main cycles, the search and acquisition cycle and the analysis and interpretation cycle, shown in Figure 4.

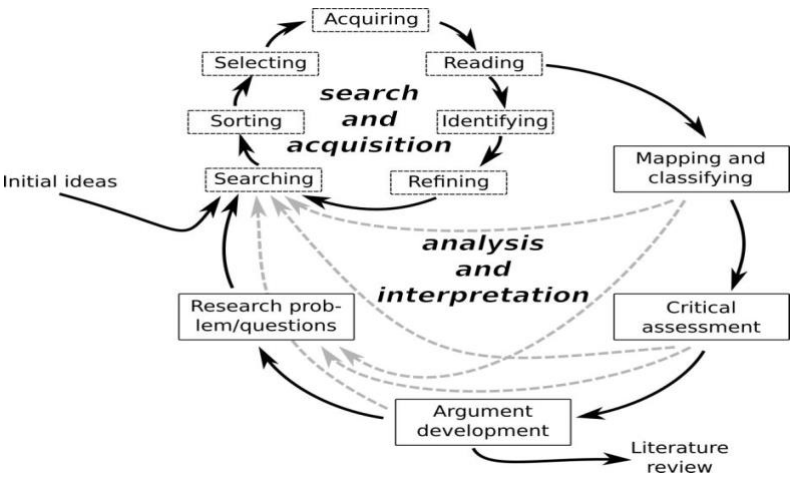

Figure 4: Hermeneutic framework *(Boell & Cecez-Kecmanovic, 2014)*

The first cycle was applied by identifying articles related to the initial key concepts (search words/keywords) from previous readings and experiences. The search words and keywords included terms that were based on knowledge areas and research questions that align with the following three studies.

The Challenges of the Adoption and Use of Cloud Computing by SMEs in SA, in this study, keywords that include the challenges, barriers and hindrances of the adoption of CC were searched. The context of middle-income countries, developing countries and countries in Africa were searched for further refinement. In addition, a general search was done on keywords that include the state of adoption, influencers, drives and dynamics of CC adoption in SMEs.

Organisational Learning Processes that Lead to the Adoption and Use of CC by SMEs in SA – In this study, search terms that were used include terms like organisational learning (OL), OL mechanisms, OL processes, OL mechanisms in IS, OL mechanisms in SMEs, OL processes in the adoption and use of CC/IT/IS, OL theory and OL frameworks.

Organisational Changes that Emerge in the Process of Adoption and Use of CC by SMEs in SA - In this study, search terms that were used included organisational change, Organisational change enacted by IS/IT/CC, OC and CC/IS/IT adoption and use, OC processes.

The search engines used were databases such as Web of Science, EBSCOhost, ProQuest, Elsevier, JSTOR and INFORMS. The listed databases provide a list of the top Management Information Systems (MIS) journals and conference proceedings that go beyond the basket of eight. Dissertations, books and reports were included for further elaboration and as supportive evidence for claims made (Rowe, 2014). Furthermore, it ensures that the body of literature being searched extends to other disciplines relevant to the study.

The search process allowed for the sorting, selection, acquisition, and reading of relevant articles. The next stage was to systematically analyse and classify concepts, contributions, methods followed and findings. This included the analysis of abstracts (and introductions if the abstract does not provide adequate information) and conclusions. This process allowed for the mapping and classification of concepts. This simplified the process of critically assessing the body of literature. As a result, the researcher could develop and frame the argument of the study.

1.9 Research Design

A research design guides how a researcher plans to conduct a study. It guides the researcher to follow a research method that applies to the relevant research. Research methods are critical as they maximize the soundness of the findings (Turner et al., 2013). They are based on underlying philosophical assumptions with ontological foundations (Cassell, 2016). Ontology is the study of the nature of being or of existence (Wahyuni, 2012). There are several categories of ontological perspectives in the field of science. They include realism, nominalism, idealism, and social constructivism (Tolk, 2013). The ontological foundation of this study is social constructivism.

Social constructivism takes a position that acknowledges the relative and contextual forms of reality. It also holds that reality cannot be limited to physical matter but can also be socially constructed (Neuman, 2006). The phenomenon of investigation in the current study is socio-technical. Thus, the social constructivist's approach is more appropriate as an ontological perspective. To this effect, an appropriate epistemological position was also selected.

Epistemology is a way of knowing and getting to know (Tolk, 2013). Various epistemological approaches align with ontological perspectives (Neuman, 2006). They include positivism, interpretivism and critical research. In line with social constructivism is interpretivism. Interpretivism is a way of understanding social constructs to interpret and understand human behaviour (Kasi, 2009). The current study investigates the dynamic processes of the adoption and use of CC by SMEs in SA. This phenomenon is characterised by behavioural science phenomena that can be adequately understood through the interpretive approach.

This study adopted a multi-method research strategy. A multi-method research strategy refers to more than one research method within a single research study (Hazra, 2014). A combination of empirical research methods is used to attain reliable outcomes (Daly, Miller, & Roper, 1999). This type of approach involves the collection of different kinds of data bearing on the same phenomenon (Jick, 1979). This is useful in improving the accuracy of findings. In other words, multiple viewpoints allow for greater accuracy. Multi-methods also provide an opportunity to holistically understand a particular phenomenon (Lee, 1991). Given that this research project encompasses three studies, each study will employ a distinct method. However, all three studies will adhere to a qualitative approach. This study aims to understand the dynamic processes of CC adoption and use by SMEs in SA. The empirical context consists of SMEs, and a field study involving SMEs as a subject of analysis was conducted. The selection of these cases followed the purposive and snowballing sampling technique (Neuman, 2006).

1.10 Structure of the Thesis

The thesis is organised into seven chapters, focusing on different aspects of the research.

Chapter 2 – Theoretical Perspective outlines the theoretical perspective adopted in the study. The chapter presents the research strategies and methods used in each study. The chapter introduces the empirical situation and discusses data collection and analysis techniques.

Chapter 3 – Study 1 presents the first paper, describing the challenges SMEs face when adopting and using CC. The study served the purpose of introducing the researcher to these dynamics and socialising the researcher to the empirical situation and context.

Chapter 4 – Study 2 presents the second paper, which explores SMEs' OL processes when adopting and using CC. This study generates the best plausible explanation of the OL process that SMEs in SA engage in when adopting and using CC.

Chapter 5 – Study 3 presents the third paper, and its purpose is to understand the understand the organisational changes that have emerged in the process of adoption of CC by SMEs in SA.

Chapter 6 – General Contribution and Integrated Elaboration consists of an integrated elaboration where the findings from the three empirical studies are integrated. A general contribution of the thesis is presented by elaborating on what was achieved from the three studies.

Chapter 7 – References provides scholarly resources and literature referenced in the study.

2 Theoretical Perspective

The current research has adopted the social constructivism perspective. Social constructivists refer to knowledge and patterns identified as socially constructed (Braun & Clarke, 2006; Golafshani, 2003). Crotty (1998, p 42) describes social constructivism as "*the view that all knowledge and therefore all meaningful reality as such, is contingent upon human practices, being constructed in and out of the interaction between human beings and their world, and development, and transmitted within an essentially social context*." The main objective of this research is to understand the dynamic processes associated with the adoption and use of CC by SMEs in SA. These dynamic processes take place in a social context that can be investigated and well understood by interrogating interaction between human beings and their world within their context. Additionally, the nature of the current study is socio-technical, where human beings in SMEs interact with CC in SA as context. Therefore, this research adopted social constructivism as the most appropriate theoretical perspective.

The social constructivist combines subjectivism and objectivism perspective, which allows objects in the world to be instrumental in generating meaning (Crotty, 1998). The objectivism perspective holds that reality exists independently of the human mind. In other words, objects have intrinsic meaning (Blaikie, 2007). On the other hand, subjectivity holds that objects do not contribute to their meaning but that the subject imposes meaning on the object (Blaikie, 2007). Separately, these views would not have been ideal in investigating the current research question. However, the social constructivist approach would be appropriate in addressing the socio-technical nature of the study. Orlikowski (2000, p. 45) further explains that "*social constructivism examines how interpretations, social interests, and disciplinary conflicts shape the production of technology through shaping its cultural meanings and social interactions among relevant social groups*."

In alignment with the constructivist perspective is the multi-method research strategy adopted for the research. Thus, section 2.1 provides details on the multi-method research strategy that was adopted for the research project. Section 2.2 explains the research methods applied in the study and outlines the significance of selecting these methods for each of the three studies. Section 2.3 provides a brief overview of the empirical situation. It discusses the selection of the unit of analysis and observation and its appropriateness in observing the given phenomenon. The chapter ends with section 2.4, which outlines the analysis process adopted in this research.

2.1 Multimethod research strategy

This research employs triangulation, where a multi-method strategy was applied to study the phenomenon under investigation (Hussein, 2018). The research methods were selected based on their appropriateness in aligning with the social constructivist perspective and investigating

the research question. Generally, qualitative research aims to facilitate in-depth inquiry rather than settling for a simplistic explanation (Golafshani, 2003). Multi-methods take it even further in fostering a deeper understanding of diverse perspectives of the research phenomenon as they investigate the same issue from diverse perspectives (Anguera et al., 2018). Compared to using a single method, a multi-method approach helps improve the accuracy of findings, as multiple viewpoints allow for improved accuracy (Hazra, 2014). Golafshani (2003) and Seale (2003) further explain that multi-methods lead to a more valid, reliable and diverse construction of realities. For example, when multiple methods with various weaknesses are combined to investigate a phenomenon, they will result in robust findings and conclusions that are more valid than when a single method is used (Ahmed & Sil, 2012). In other words, multi-methods can be selected based on their complementary nature to compensate for inherent weakness in a single method (wood et al., 1999). Another advantage of using multi-methods is that collecting different data using different methods leads to a broader coverage of the problem area (wood et al., 1999).

A disadvantage that comes with multi-method is the adequate selection of the methods that are complementary to each other and that are best suited to address the research question. Various criteria are used in selecting research methods to consider the validity. They include Internal validity, external validity (survey), ease of replication, and controlled experiment, among others. For this study, the selection was based on the potential for theory development, potential for theory confirmation and observational studies. In achieving this objective, this study applies a multi-method strategy through three research strategies and methods that interrogate the research question sequentially and separately (deMarrais & Lapan, 2004). Upon completing each study, inferences between the studies are made and explained (Anguera et al., 2018). The first study uses an inductive strategy; the second study uses the abductive strategy (Noor & Darmaningrat, 2023). The third and last study makes use of the retroductive strategy.

2.1.1 The inductive research strategy

The first study adopted the inductive research strategy. The inductive research strategy enables the construction of a theory directly from the data (Creswell, 2014). The inductive strategy contrasts with approaches where theory guides data collection (Creswell & Poth, 2018). This strategy is helpful when there is a need to explore a new phenomenon and when existing theories are insufficient in investing a phenomenon (Woiceshyn & Daellenbach, 2018). The first study sought to identify the challenges of adopting and using CC in SMEs in SA. The literature reviewed on the adoption and use of CC within organisations consists of various studies that described the challenges of the adoption and use of CC (Senyo et al., 2016). However, the challenges of the adoption and use of CC in SA were not explicitly articulated in

the body of literature, particularly in SMEs. In this case, the inductive approach helped allow an empirically derived understanding that was valuable in describing these challenges based on the context of SA (Bidan et al., 2012).

Furthermore, the inductive approach was selected according to the social constructivist approach (Sahay & Robey, 1996). The social constructivist perspective is interpretive and qualitative, entrenched in meaning, social interaction and language (Munyua et al., 2015). This complements the inductive approach because its goal is to derive understanding from the observed social interaction (Blaikie, 2007). The inductive approach proved valuable in transitioning to the second study, where the abductive research strategy was adopted.

2.1.2 The abductive research strategy

The abductive strategy was initially presented as a method for generating hypotheses in natural sciences (Blaikie, 2007). However, it has since been advocated as an appropriate method of theory construction in interpretive social sciences (Blaikie, 2007; Meyer & Lunnay, 2013). For this reason, the abductive strategy was adopted for theory development. The abductive strategy involves generating and evaluating theoretical explanations (Haig, 2008). Theoretical explanations are derived from social actors' language, meanings and accounts in their day-to-day activities (Blaikie, 2007). These attributes influence the actor's behaviour; this is central to the theoretical explanation generated through the abductive approach (ibid.).

The second study's objective was to explain OL processes that facilitate the adoption and use of CC in SMEs. Thus, the aim was to generate an OL theory founded in SMEs in SA. In achieving this, the adoption of the abductive strategy was appropriate.

To further justify the suitability of the abductive strategy, it is argued that the OL is positioned and explained from the perspective of the global north. In following the abductive strategy, the study hopes to generate an OL theory reflective of the context of SA without negating the existing OL theories (Thompson & Bowman, 1992).

An inductive approach could have been adopted for theory development. However, inductive logic assumes that data can be divorced from existing theories, limiting the achievement of a more comprehensive understanding of the phenomenon (Meyer & Lunnay, 2013). The deductive approach, on the other hand, is also limiting in theory development (Woiceshyn & Daellenbach, 2018). In deductive analysis, data is compared with a theoretical framework (Staat, 2013). This will result in excluding data that does not fall within work boundaries (Meyer & Lunnay, 2013). The abductive strategy combines the inductive and deductive processes, leading to a deeper and richer understanding of the phenomenon being studied.

2.1.3 The retroductive research strategy

The third study followed a retroductive research strategy. The retroductive strategy has been used in the natural and social sciences (Blaikie, 2007; Malhotra, 2017). It is prevalent from the perspective of critical realism (Easton, 2010). Central to critical realism is the explanation that social phenomena are held by mechanisms and structures that produce social behaviour (Belfrage & Hauf, 2017). While this research is not based on critical realism, the retroductive process that critical realists use in uncovering mechanisms and structures that underlie social behaviour can be used in the social constructivist approach (Belfrage & Hauf, 2017; Easton, 2010). Blaikie (2007) describes retroduction as a process of employing logic and creativity to construct a representation or visualization of the systems or mechanisms accountable for generating observed phenomena. Therefore, the retroductive strategy is useful for unearthing cognitive structures in a social context that has produced observable social behaviour (Blaikie, 2007; Fleetwood, 2014). The study's objective is to understand organisational changes that have emerged through the adoption and use of CC by SMEs. Investigating organisational changes involved tracing SMEs' journey in adopting and using CC. The retroduction logic encompasses a reasoning technique of moving backwards from observations to create a possible explanation (Malhotra, 2017). Retroductive reasoning facilitated the tracing of the progression by retracing steps from the final stage, which entails the current use of CC, through the intermediate stage, the adoption of CC, to the initial stage, characterised by the preadoption phase of CC. Studying change from the endpoint to the beginning is advantageous because, at that stage, the change has already occurred, simplifying the analysis process and enabling a clearer understanding of the sequence of events and underlying factors. (Kaluzeviciute & Moreton, 2023; Karahanna et al., 1999). Thus, the retroductive strategy was advantageous in that OC that has emerged in the process of adoption and use of CC could be examined. While the strategies differ between the three studies, the research methods applied were similar across all studies.

2.2 Research Methods

The research methods applied across all the studies consist of participatory observations and ethnographic interviews, as shown in Table 2. The following subsections outline the rationale behind the chosen research methods. The systematic execution of these methods is outlined in each of the studies.

Table 2: The overview of the three empirical studies and research methods

Study	Research Question	Research Objectives	Research Strategy	Research Method
Study 1	What are the challenges of the adoption and use of CC by SMEs in SA?	To identify and understand the challenges faced by SMEs in SA when adopting and using CC.	Inductive Research	Participant observation Ethnographic Interviews
Study 2	What are the organisational learning processes that lead to the adoption and use of CC by SMEs in SA?	To understand and explain the OL processes that lead to the adoption and use of CC by SMEs in SA.	Abductive Research	Participant observation Ethnographic Interviews
Study 3	What are the organisational changes that have emerged in the process of adoption and use of CC by SMEs in SA?	The objective of the study was to understand the organisational changes that have emerged in the process of the adoption and use of CC by SMEs in SA.	Retroductive Research	Participant observation Ethnographic Interviews

The research methods that were applied in this study consist of participatory observations and ethnographic interviews.

2.2.1 Participatory observation and ethnographic interviews

Participatory observation refers to a method of researcher participation in the lives of the individuals being studied while making observations (DeWalt & DeWalt, 2002). The participation of the researcher and the properties of the social context being studied offer added insights and a distinctive perspective compared to other research methods (Jorgensen, 2020). The research strategies followed in this research depend on the social context; hence, participatory observation was applied (or perhaps implemented) throughout the research. One could argue that the first study follows an inductive approach; therefore, participatory observation was unnecessary. This would be correct; however, using participatory observation in the first study became imperative for initiating the researcher's socialisation into the empirical situation. It also added value in facilitating the process of the abductive strategy, whose point of departure is to discover how social actors view and understand their context and environment (Chamberlain, 2006). The participatory observation allowed for the socialisation of the researcher to the actors' language, meanings and accounts of their day-to-day activities. The first step would be to report on the key concepts (language, meaning, interpretations) that characterise the phenomenon studied (Blaikie, 2007).

The main emphasis in participatory observation is cultural practices that play an essential role in learning (DeWalt & DeWalt, 2002). In this case, existing OL theories are based on Western culture, which differs from the South African culture (Kasi, Keil, Mathiassen, & Pedersen,

2008). Therefore, observing the cultural practices of individuals and collective learning allowed the researcher to instantly ask questions as they observed these practices. In addition, Avery and Kassam (2011) confirm that learning processes are observable in day-to-day activities. They can be observed in pockets and puzzles. This includes environments where processes are not explicitly formulated. Similarly, participatory observation created a good foundation for investigating organisational changes that emerged in the process of adoption of CC by SMEs in the third study. Participatory observation alone is inadequate for comprehensively investigating the phenomenon under study (Gobo, 2008). Therefore, ethnographic interviews were used as an added data collection technique. Ethnographic interviews are founded on the weaknesses of standard interviews, which overlook shared meaning and contextual understanding that allow respondents to understand the meaning of questions and answers (Johnston, Weaver, Smith, & Swallow, 1995). Ethnographic interviews permit an understanding of how people perceive, understand and seek to change their context or reality.

Ethnography, by right, implies that the researcher will socialise themselves with the culture and norms of the empirical situation, in this case, SMEs in SA (Carpiano, 2009). Ethnography is recognised as a research strategy for understanding society documenting its traditions and beliefs in society (McGranahan, 2018). The strategy provides an avenue for exploring and examining the cultures and societies that are an important part of human experiences. This is meant to provide insight into cultural and social behaviours and uncover the underlying cognitive processes that drive these behaviours (Hockey & Forsey Martin, 2020). Ethnography is implemented through the collection of data by the researcher, involving direct engagement and interaction with participants to gain insights into their perspectives and experiences (Forberg & Schilt, 2023). In other words, the researcher must be the observer embedded in the data.

This interaction takes various forms, including shared experiences and interviews. While the study does not take an ethnographic approach, it incorporates a data collection technique commonly employed in ethnography. The technique being used is ethnographic interviews. These interviews go beyond mere observation and description of a phenomenon; they involve an approach where the researcher immerses themselves within the social structures under study. This immersion enables the researcher to gain a profound understanding and conduct conversational interviews with participants, engaging with them as an insider. Thus, participatory observation and ethnographic interviews were helpful across the three studies.

2.3 The Empirical situation (field work and data collection)

The study's main objective is to understand the dynamic processes of the adoption and use of CC by SMEs in SA. Thus, the empirical context consists of SMEs and environments in which they interact. Therefore, the purposive sampling technique was applied to select a workable sample size of SMEs. The purposive technique refers to a process of identifying possible cases

that fit a specific criterion that must be used to select the cases that are of interest to the study (Neuman, 2006). The criteria used in selecting the sample consisted of SMEs that had been using CC for more than six months and were dispersed within the spectrum of CC service offerings (SaaS, PaaS, and IaaS). This is because the interest of the study is focused on the adoption and use of CC in SMEs. To acquire rich data and experience from SMEs regarding both the adoption and use of CC, SMEs would need to have at least worked with CC services for a reasonable period.

The geographical scope of the SMEs is located in SA and includes the provinces of the Western Cape, Kwazulu-Natal (KZN), and Gauteng. According to the National Small Business Chamber (NSBC) of South Africa, 40% of SMEs are in Gauteng, 30% in the Western Cape and 10% in KZN (NSBC, 2016). Therefore, 80% of SMEs in SA are in these three provinces. From this premise, the researcher focused on these three provinces in SA. The details of the SMEs are outlined in Table 7, Table 10 and Table 16. The tables detail the location of each SME, the cloud services adopted and used by each SME, the scope of operation by each SME and the industry of operation for each SME. The information on the SMEs in these tables depicts the diversity in the selection of SMEs. This was beneficial in obtaining a heterogeneous sample. A heterogeneous sample increases generalisability and validity. This further complements the multimethod strategy, particularly in increasing validity.

The onboarding process of SMEs is given in Figure 5, which presents the events or activities the researcher underwent. Three main approaches were used to onboard the respondents. The first aspect was connecting with CCSPs; the justification was to interact with the CCSPs because they would be the best people to know the SMEs that fit the study's criteria. At times, the researcher was referred to SME respondents. Still, at times, CCSPs would not be comfortable with sharing information or reaching out to SME respondents to facilitate the interview session. Secondly, the researcher attended events where they met SME employees and owners. The researcher could schedule and secure interview sessions through interaction with SME employees and employers. The last aspect was to physically go to business parks and request to schedule interviews conveniently. The research managed to get SME respondents. The researcher would request further referrals to other possible SME respondents in all these approaches. Through the referrals, the researcher would get more SME respondents to interview. Thus, the snowballing technique was also applied over and above the purposive technique. The snowballing technique refers to a situation where existing respondents can assist in recruiting future respondents (Neuman, 2006).

The sample size for the first study consisted of 12 SMEs, the researcher was guided by an interview guide that focused on the challenges of SMEs. the sample size for the second and third study consisted of 23 SMEs. The second and third study respondents were identical, the difference is that the interview guide was divided into 2 sections, focusing first on

organisational learning and secondly on organisational change. Please refer to Appendix 7 for the interview guide of the 3 studies.

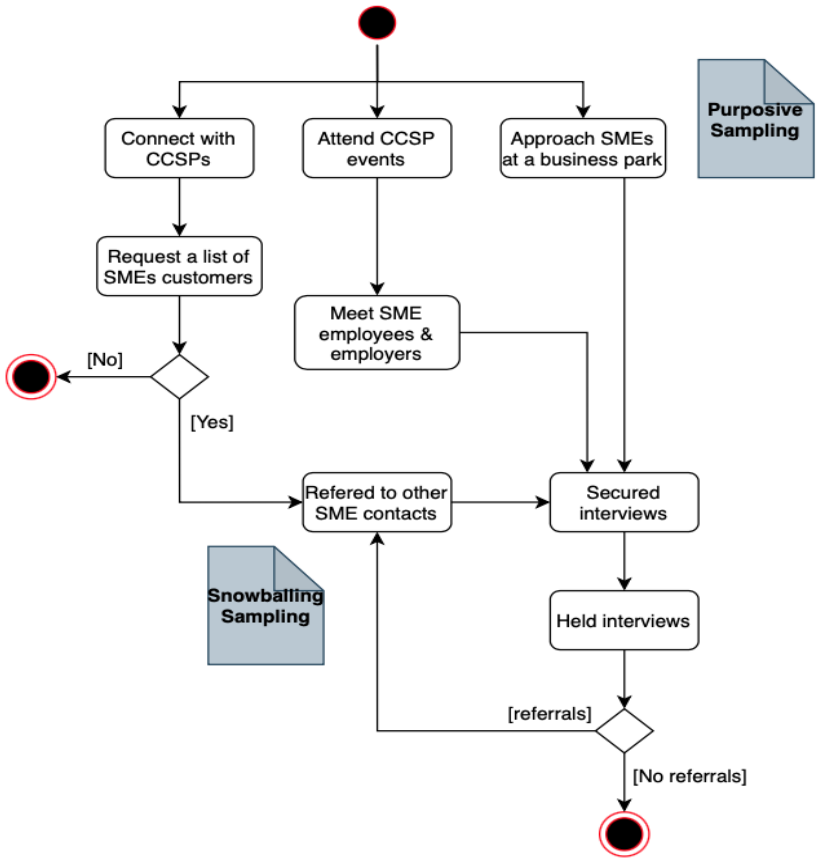

Figure 5: The process of onboarding SME respondents

In fulfilling participatory observation obligations, the researcher attended meetings, seminars, workshops and engaged in informal conversations with SME employees as shown in Table 3. A detailed outline of the participatory observations is provided in Table 17 in Appendix 1.

Table 3: Summary of participatory observation

Date	Time	Description	Participation/Observation
January – June 2018 (continuous meetings)		Cape Town (Informal meetings)	Discussions and follow ups on the contextual issues, the challenges and the drivers of the adoption and use of CC by SMEs in SA. These discussions were taking place in the same period where three client SMEs were being interviewed and/or observed in the context of understanding the challenges and OL processes.
18 – April-2018	12:00-12:45	UCT Techfest (Event) Cape Town	Participated as an audience and later networked/engaged with the guest speaker.
15-May-2018	14:00-16:00	Johannesburg	Discussion on CC provision and use with one of the company's ICT engineers and manager in the enterprise support services. The discussion focused on the role of the CCSP in the ecosystem on CC sector in SA.

Date	Time	Description	Participation/Observation
5-June-2018	14:00-15:30	Cape Town (Informal meetings)	Group discussion on CC provision and use with the enterprise support services manager and 3 ICT engineers. The discussion focused on the role of the CCSP in the ecosystem on CC sector in SA.
12-July-2018	8:00-17:00	AWS summit (Event) Cape Town	Communicated with SME representative, CCSPs and various stakeholders. Attended sessions with SME representatives on topic such as security services. I interacted with various personnel from the global CCSP, representatives of third party CCSPs, SME representatives/owners.
1-31July-2018	Continuous	AWS Cloud foundations course	Participated in online AWS cloud computing foundation course (the theory and the practical component)
19 March-2019	15:00-17:00	AWS education sector (Event) Johannesburg	Participated a panel discussion and through the presentation/sharing of the findings of the first study. Networking with SMEs owners/representatives in the education sector, particularly in the private sector.
11-July-2019	8:00-17:00	AWS summit (Event) Cape Town	Communicated with SME representative, CCSPs and various stakeholders. Attended sessions with SME representatives on topic such as security services.

Cloud Computing Service Providers (CCSPs) organised and hosted these events for diverse organisations. The events were helpful in that there were SME employees and owners who were present. Some events were hosted by organisations that assist entrepreneurs by providing networking opportunities and information regarding funding and ICTs. The events allowed for formal engagements like participation in panel discussions and interviews. In addition, the researcher was able to attend meetings with CCSPs. This allowed for a greater understanding of the external environment in which SMEs exist. The events, interactions and observations were carried out in 24 months. In this period, the researcher conducted ethnographic interviews, where a sample consisted of SMEs that had been using CC for more than two years and used diverse CC service offerings (SaaS, PaaS, and IaaS). The details of the unit of analysis and observation are discussed in each of the three studies.

2.3.1 Data analysis

The study adopted qualitative data analysis methods to unearth themes, characteristics, and meanings from data (Gibson & Brown, 2009). This can be achieved using various data analysis methods, depending on research objectives and questions. Thematic data analysis was adopted for the first and second studies. Thematic analysis guides the researcher in discovering patterns of meaning in a data set. Its main objective is to derive meaning from the data in line with a constructionist perspective where meaning and experience are socially produced and reproduced (Braun & Clarke, 2006). The thematic analysis identifies common

themes within data and theorises about social behaviour (Guest, MacQueen, & Namey, 2012). Thematic analysis conducted within a constructionist framework seeks to theorise the sociocultural contexts and structural conditions that enable the individual accounts provided (Guest et al., 2012). In the first study, thematic analysis enabled the identification of the challenges of the adoption and use of CC by SMEs from data systematically. In addition, open coding was used primarily due to the inductive logic adopted for the study. This resulted in the description of the challenges of the adoption and use of CC by SMEs in SA.

2.4 Summary of the second chapter

This chapter introduced the theoretical approach selected to investigate the three studies. The research adopted constructivism as its ontological perspective and interpretivism as its epistemological approach. It elaborated on the research strategies and methods for the three studies. The first study followed an inductive strategy, the second study employed an abductive strategy, and the third study applied a retroductive strategy. Consistency in research methods was maintained across all three studies, with participatory observation and ethnographic interviews serving as primary data collection techniques. Moreover, SMEs were presented as the unit of analysis. The chapter outlined the data analysis method applied consistently across the three studies. The preceding chapter and this one have laid a foundation for the forthcoming discussion on each study, beginning with the first study that investigates the challenges of adopting and using cloud computing.

3 Study 1: The Challenges of the Adoption and Use of Cloud Computing by SMEs in South Africa

Abstract

SMEs are vital contributors to economic development in middle-income countries like South Africa. These SMEs adopt and use various Information and Communication Technologies (like cloud computing. In basic terms, CC is a platform where organisations can access ICT resources online. Generally, research on CC and SMEs is concentrated on developed countries, with limited studies on middle-income countries like South Africa. Thus, there is limited insight and understanding of SMEs' challenges in adopting and using CC in South Africa. This research aims to understand and describe the challenges of the adoption and use of CC by SMEs in SA. In achieving this objective, the study adopted the inductive logic of reasoning and an interpretative and qualitative approach. Participatory observation and ethnographic interviews were used for data collection, and the thematic data analysis method was applied to analyse the data. Findings revealed that the main challenges include inferior CC provision, cost, lack of knowledge and skill, and lack of support. This study can contribute towards insights for SMEs and CCSPs. In addition, it informs government initiatives and policies that can capacitate local CCSPs to offer CC services that are less expensive yet adequate for SME consumption.

Keywords: Cloud Computing, SMEs, Adoption and Use

3.1 Introduction

Organisations adopt and use IS mainly to enhance business efficiency and performance (Vasiljeva, Shaikhulina, & Kreslins, 2017; Chege & Wang, 2020). This is achieved by integrating IS with various organisational functions (Chen, Mocker, Preston, Teubner, & Chen, 2010; Slim et al., 2021). For example, Slim et al. (2021) recognise the advantage of aligning IT with business objectives to enhance operational efficiency, foster innovation and gain a competitive advantage. In their article, Chen et al. (2021) conducted a systematic literature review to identify critical conceptions of IS strategy. They include using IS to support business strategy and the primary plan for the IS function within an organisation. These perspectives underscore the significance of IS within the organisational context.

While this applies to most organisations, SMEs face barriers to adopting and using IS, such as cost and lack of skilled labour (Mokwena & Hlebela, 2018). These barriers were seen as limitations in the adoption and use (Yeboah-Boateng & Essandoh, 2014) of IS by SMEs until the introduction of CC (Kshetri, 2010). Cloud Computing offers a solution where ICT tools can be accessed and used at minimal cost (Oduh et al., 2018). This means that CC allows SMEs

to access IS resources previously accessed by larger organisations with adequate capital and resources (Tarhini et al., 2017). Thus, SMEs are enabled and capacitated to compete globally as large organisations (Prasanna et al., 2016). The advantages and the significance of the adoption and use of CC by SMEs have been justified by various researchers (Kshetri, 2010; Mohlameane, 2012; Mohlameane & Ruxwana, 2013; Johnston et al., 2016; Tshiyole & Jokonya, 2016; Osembe & Padayachee, 2016; Khayer, Jahan, Hossain, & Hossain, 2021; Narwane et al., 2020). However, the limited studies that have focused on the adoption and use of CC in SA revealed that the rate of adoption of CC by SMEs is slower than that of other countries (Faasen et al., 2013; Vuke, 2015; Gumbi & Mnkandla, 2015; Mokwena & Hlebela, 2018; Sithole & Ruhode, 2021; Mudzamba et al., 2022). Some of these studies refer to the challenges of adopting and using CC without explicitly investigating these challenges. Therefore, not only is there a lack of clarity in understanding the dynamics of the adoption and use of CC by SMEs in SA, but there is a deficiency in articulating the challenges experienced by SMEs when adopting and using CC. Among the possible dynamics are the challenges SMEs in SA face when adopting and using CC (Sithole & Ruhode, 2021). Therefore, this study aims to understand and describe the challenges SMEs in SA face when adopting and using CC.

The benefits and the challenges associated with the adoption and use of CC in SMEs influence the levels of CC adoption and use (Feuerlicht et al., 2011; Makena, 2013; Twala, 2016; Seifu et al., 2017; Mohlameane & Ruxwana, 2020). The benefits CC offers SMEs have been clearly articulated (Kumar, Samalia, & Verma, 2017; Senyo et al., 2016), mainly because they are consistent and universal. Conversely, the challenges are most likely not universal; they depend on an organisation's context and size (Mohlameane & Ruxwana, 2020). The size of an organisation has implications; it influences the level of adoption and use of ICTs like CC. This view is coherent with much research that says contextual factors in organisations and the environment affect the adoption of ICTs (Premkumar & Roberts, 1999; Del Aguila-Obra & Padilla-Meléndez, 2006; Sabi, Uzoka, Langmia, & Njeh, 2016). Therefore, SMEs will most likely have different challenges than larger organisations. Investigating and identifying these challenges provides an entry into understanding the dynamics of SMEs' adoption and use of CC in SA. Therefore, this study aims to describe the challenges that affect SMEs in SA when adopting and using CC. Describing the challenges SMEs face will lead to understanding the challenges within these SMEs. The study will also add value in socialising the researcher to the environment and context of the empirical situation.

3.2 The adoption and use of CC and SMEs

The research has been carried out on adopting and using CC in various contexts within several middle-income countries, Table 4, Table 5 and Table 6, outline the investigation issues in these

settings. The literature on the adoption and use of CC is discussed and divided into themes and subthemes. The current literature in SA is presented in Table 4, which expounds on this study. The context of other African countries is outlined in Table 5, and a broader context of the literature on middle-income countries is presented in Table 6.

Table 4: Literature review on cloud computing in the context of SMEs in South Africa

Author	Context	Subject of inquiry
Kshetri, 2010	China, India, Vietnam, SA	The state and opportunities afforded by cloud computing
Faasen, Seymour, & Schuler, 2013	SA	The intention of adopting CC and Enterprise Resource Planning (SaaS)
Mohlameane & Ruxwana, 2013	Gauteng province	The challenges of the adoption and use of traditional ICT solutions in comparison to CC
Mvelase, Sibiya, Dlodlo, Oladosu, & Adigun, 2013	SA	The proposal of a virtual enterprise architecture against the AWS virtual computer.
Mohlameane & Ruxwana, 2014	Gauteng province	The awareness of CC.
Twum-Darko & Sibanyoni, 2014	Gauteng, Mpumalanga provinces	The readiness of SMEs to adopt CC as an ICT innovation for meeting strategic objectives.
Tshiyole & Jokonya, 2016	Gauteng province	The evaluation of the benefits of CC.
Kumalo & Poll, 2016	SA	The arguments related to alleviating and mitigating the risk of business failure through CC.
Osembe & Padayachee, 2016	Gauteng province	The perceptions of the benefits and challenges of the adoption and use.
Mokwena & Hlebela, 2018	Gauteng province	The factors that hinder the adoption of CC with a focus on SaaS.
Ayong & Naidoo, 2019	SA	The critical factors influencing the adoption of CC: A conceptual model was developed.
Dyubele et al., 2020	Eastern Cape province	The challenges facing rural SMEs in the implementation of the adoption of CC.
Moyo & Loock, 2021	Limpopo province	The security evaluation practices among SMEs when adopting cloud business intelligence.
Never et al., 2022	SA	The study investigated and proposed a framework for CC adoption.
Mudzamba et al., 2022	SA	The study investigated and proposed a framework for cloud adoption. The development of guidelines for CC adoption to assist SMEs in navigating CC adoption.

Table 5: Literature review on cloud computing in the context of SMEs in Africa

Author	Context	Subject of inquiry
Korongo et al., 2013	Kenya	The use of CC as a business management tool to enhance productivity and efficiency.
Makena, 2013	Kenya	The study investigates the factors that affect CC.
Abubakar, 2016	Sub-Sahara Africa	The factors that can influence, encourage, and inhibit CC adoption.
Hayat Malik et al., 2019	Nigeria and Asia	The margin that sustains the level of CC adoption.
Khanda & Doss, 2018	Botswana	The effectiveness, challenges, and successes of CC.
Mwavali, 2021	Kenya	The level of CC adoption.
Makelana et al., 2022	Sub-Sahara Africa	The use of SaaS to improve dynamic capabilities.
Adane, 2023	Ghana	The effect of the adoption factors on a business decision to use CC.

Table 6: Literature review on cloud computing in the context of SMEs in middle-income countries

Author	Context	Subject of inquiry
Yeboah-Boateng & Essandoh, 2013	Developing economies	The awareness and familiarity SMEs have with CC
Yamin, 2013	Saudi Arabia	The spread, concerns and challenges of CC adoption and an enabling environment
Basahel et al., 2016	Saudi Arabia	The business model of CC and the factors affecting its adoption.
Sayginer & Ercan, 2020	Turkey, Izmir	The intentions for decision-making regarding the adoption and use of CC.
Mujinga, 2020	Middle-income countries	The inhibitors or challenges of the adoption of CC.
Alaqidi, 2022	Middle-income countries	The impact of cloud technology on the performance of information management.
Abdullah et al., 2020	Kurdistan in Iraq	The introduction and implementation of an HR model to address challenges in HRM.
Alsafi & Fan, 2020	Saudi Arabia	The perceived barriers that affect the adoption and use of cloud services.
Albelaihi & Khan, 2020	Saudi Arabia	The benefits and hindrances of CC adoption.
Kaplancalı & Akyol, 2021	Middle-income countries	The performance evaluation regarding the usage of CC in business activities is assessed.
Khayer et al., 2021	Middle-income countries	The determinants of CC adoption in measuring the effects of CC adoption.
Zhang et al., 2021	China	The intercedence combined to contributes to high rates of CC adoption. CC adoption.

Author	Context	Subject of inquiry
Kumar et al., 2022	India	The impact of business, economic and environmental performance leads to the challenges of CC adoption.
Lutfi, 2022	Jordan (Western Asia)	The adoption of cloud-based accounting information systems.
Alqahtani et al., 2023	Saudi Arabia	The influencing factors that have an impact on CC adoption.
Al-Sharafi et al., 2023	Malaysia	The factors that impact the integration of CC in SMEs and the effects on environment, financial and social performance.

While reviewing the literature, it was observed that CC adoption was studied separately from CC use. There may be an assumption that once CC is adopted, then the issue of use is inherent. Thus, the concepts of adoption and use are intricately linked together. This study views adoption as accepting the technology into the organisation or SME. Cloud computing use is considered the exploitation of CC, which occurs after the adoption process. Themes emerged from the literature review process, as indicated by the tables above. The themes consist of the benefits of CC for SMEs; awareness, levels, and state of adoption and use of CC; the general factors and drivers influencing CC adoption and use; business performance due to the adoption and use of CC; and barriers and hindrances to the adoption and use of CC.

3.2.1 The benefits of CC for SMEs

Cloud computing has become a critical IT strategy for competitive advantage for many organisations (Prasanna et al., 2016). As a result, there has been a steady increase in the adoption and use of CC in the past few years. CC provides various benefits for different sectors, including the SME sector (Qureshi, 2011; Kaur & Aggarwal, 2018). Literature shows that various SMEs in SA have adopted and are using CC for multiple reasons (Gumbi & Mnkandla, 2015; Vuke, 2015; Tshiyole & Jokonya, 2016; Khayer et al., 2021). For example, ICT resources are accessible via the Internet (broad network access). SMEs can access data and perform business operations anywhere (Karunakaran & Kalyanasaravanan, 2018). Therefore, there is no need for a physical location that can cost SMEs rental and storage rates. Additionally, SMEs are not responsible for maintaining hardware and software (Botta et al., 2016; Carroll et al., 2011). They are not obliged to acquire software licenses, update software packages, and upgrade hardware tools; this liability lies with CCSPs. The maintenance of these tools requires skilled personnel (Yeboah-Boateng & Essandoh, 2014). CCSPs employ qualified personnel to administer and maintain computing resources (Rath et al., 2012). This means that SMEs do not need to carry the expense of paying highly skilled personnel (Zabalza, Rio-belver, Cilleruelo, Garechana, & Gavilanes, 2012; Khayer et al., 2021). Most of the outlined innovations of CC translate to affordability. In most cases, literature has highlighted affordability as the main driver for SMEs' adoption and use of CC (Kwame, Addae, & Boateng, 2018; Mokwena & Hlebela, 2018). Nonetheless, CC was once a brand-new technology that was introduced to SMEs. During the initial phases of its adoption and use, researchers focused on understanding the phenomenon of awareness.

3.2.2 General factors and drivers influencing CC adoption and use

Several studies were geared towards understanding the factors that influence CC adoption and use, particularly in the context of Africa (Inclusive of SA). Simultaneously, a few studies were in this category or theme in the context of other middle-income countries. For example, Adane (2023) investigated factors that affect a decision to adopt and use CC in Ghana. Abubakar (2016) and Ahmed (2020) examined factors that can influence, encourage and inhibit CC adoption in the context of Africa. Some studies were conducted in Kenya, where the level of CC adoption was investigated, as well as the factors that affect adoption (Makena, 2013). Similar studies were conducted in Saudi Arabia, where the factors affecting CC adoption were investigated, and the business model used by SMEs for CC adoption and use was also studied (Basahel et al., 2016). Alqahtani et al. (2023) examined four influencing factors (Technology, organisation, environment and social) that impact CC adoption. Another study based in Malaysia accessed the factors that affect the integration of CC within SMEs and the effects on environment, financial and social performance (Al-Sharafi et al., 2023).

Most publications investigated CC as a whole package without zooming into specific services or deployment models. However, a few publications focused on specific service models and applications within CC. For instance, as an application in the SaaS category, Lutfi (2022) examined the drivers influencing the adoption and use of Cloud Based Accounting Information Systems (CA-IS) in Western Asia. Some publications pointed to a concern with CC adoption or lack of adoption by SMEs. As a result, models and frameworks were developed in an attempt to aid CC adoption in SMEs across middle-income countries. For example, Adane (2023) developed a model that considered factors affecting CC adoption and SMEs' decision-making. Makelana et al. (2022) developed and proposed a model that aids SMEs in using SaaS to improve dynamic capabilities in SMEs in Sub-Sahara Africa. Another model was developed to predict the CC decision-making intentions of SMEs in Izmir, Turkey (Sayginer & Ercan, 2020). This model targeted CCSPs in that understanding SME intentions for CC adoption could aid CCSPs in improving CC provisioning for SMEs. Studies that targeted CCSPs as their empirical situation and phenomenon of interest were rarely found in the literature. A theme closely related to the current study is barriers and hindrances to the adoption and use of CC.

In the context of SA, Never et al. (2022) sought to understand prior researched factors influencing IaaS adoption. The factors included accessibility as a driver for IaaS adoption, whilst offshore data residency and security were inhibitors. On the other hand, Moyo and Loock (2021) focused their study on security evaluation factors and practices when adopting cloud business intelligence (Cloud BI). The study found a high level of cybersecurity awareness among decision-makers in SMEs. It also found that decision-makers preferred guidelines and checklists over cybersecurity policies and frameworks. Lastly, the factors included financial risk, data, security, and cloud provider reliability when evaluating cloud BI applications. The study further developed a framework for assessing cloud BI applications.

Twum-Darko & Sibanyoni (2014) developed a framework that guides SMEs in assessing their readiness to adopt CC for efficiency and competitive advantage. The main factors that indicated readiness for adoption were cited as the attitude of the SME, ICT infrastructure, corporate governance and favourable government policies. A study that focused on the benefits of CC was conducted by Tshiyole and Jokonya (2016), who set out to evaluate the benefits of CC for SMEs. It used the Information Systems Success Model to investigate the success and benefits of CC, where information quality and systems quality were associated with its success and benefits.

Ayong and Naidoo (2019) investigated the critical factors that influence the adoption of CC by SMEs in SA. The authors developed a conceptual model that incorporates the critical factors influencing the adoption of CC. These factors included transactional costs, complexity, trialability, security, privacy, and trust in CC services. Lastly, Mudzamba et al. (2022) developed and proposed a key recommendations adoption framework that SMEs in South

Africa can use as a guideline for adopting CC. The study found that SMEs struggle to adopt cloud services and rarely engage in preparatory activities for CC adoption.

Studies exploring the adoption and utilisation of CC identify diverse factors influencing this phenomenon. These factors include context-specific elements and deductions drawn from adopted theoretical frameworks. There were variances across studies that were noted, with factors such as organisational size, technological complexity, offshore data location, agility, and financial risk standing out (Twum-Darko & Sibanyoni, 2014; Sayginer & Ercan, 2020; Al-Sharafi et al., 2023). However, several common themes emerged, including the significance of cloud infrastructure, security, organisational competitiveness, trust, top management support, and cost reduction (Makena, 2013; Sayginer & Ercan, 2020; Moyo and Loock, 2021; Adane, 2023; Alqahtani et al., 2023). Additionally, these studies highlighted the barriers hindering CC adoption and use, highlighting the necessity for a comprehensive understanding of these challenges.

The next theme that was not as prevalent in the literature is the business performance due to the adoption and use of CC.

3.2.3 Business performance due to the adoption and use of CC

Alaqidi (2022) executed a literature review that focused on middle-income countries in general and examined the impact of CC on the effectiveness and performance of Information Systems in SMEs. Similarly, Korongo et al. (2013) studied SMEs in a district in Kenya to understand the use of CC as a business management tool to enhance productivity and efficiency. Another study was conducted on Turkish SMEs. It assessed the performance evaluation of SMEs in using CC in business activities (Kaplancalı & Akyol, 2021). Khayer et al. (2021) evaluated the determinants of CC adoption and measured the effect of CC adoption on performance through enhancing SME agility. In addition to the above studies, Kumar et al. (2022) studied the impact of business, economic and environmental performance that pushes SMEs for CC adoption.

The studies examined in the context of business performance revealed consistent findings and outcomes. The studies indicate that the primary impact of CC on business performance lies in bridging the digital gap prevalent in middle-income nations. Cloud computing characteristics like scalability, enhanced availability, increased resources, and reduced expenses were significant. Despite the advantages CC offers SMEs in middle-income countries, the theme of barriers and hindrances to CC adoption and use has been identified.

3.2.4 Barriers and hindrances to the adoption and use of CC

Middle-income countries were presented with barriers and hindrances to the adoption and use of CC. (Albelaihi & Khan, 2020; Mujinga, 2020). These themes were not as prevalent in the

literature but warranted some attention, considering that the study investigates the challenges of CC adoption and use in SMEs. Hindrances and inhibitors could be understood as challenges affecting the adoption and use of CC. A study conducted in Botswana investigated the effectiveness, challenges and successes of CC for SMEs (Khanda & Doss, 2018). The findings that were presented in the study consisted of power outages and power cuts. These findings differed from most of the challenges found in the literature. These include computing resource availability, trained staff readiness, and organisational trust.

Albelaihi and Khan (2020) and Mujinga (2020) conducted studies to understand the inhibitors and hindrances of CC adoption and use. While Albelaihi and Khan's (2020) conducted an empirical study based on Saudi Arabia, Mujinga (2020) conducted a literature review study on middle-income countries. Both studies pointed to security, privacy, lack of knowledge and expertise as the main inhibitors of CC adoption. In the context of SA, Osembe and Padayachee (2016) investigated the perceived benefits and challenges of CC adoption amongst SMEs in the IT industry. The findings were similar to Mohlameane & Ruxwana's (2014) study, which also considered the benefits and challenges of CC adoption. They revealed that security, privacy, availability, trust and transparency were the main perceived challenges of adopting CC. Another study focused on the barriers to CC adoption within SMEs in SA by Mokwena & Hlebela (2018). The authors investigated the factors that hinder the adoption of CC by SMEs in SA, and the focus was on SaaS. The study found that the higher the cost and complexity of the SaaS, the less likely the potential adoption of CC by SMEs is.

Another study was carried out by Kumalo and Poll (2016), which identified general challenges and risks experienced by SMEs in SA. The authors argued that CC service models can mitigate the risks of SME business failure. Findings revealed that SaaS could address SME challenges, like lack of funds. Where the high cost of technical know-how of implementing cost management systems such as financial or inventory control systems can be mitigated by relevant CC applications. In the SaaS model category, "off-the-shelf" cloud applications can perform financial or inventory control. These operations are available at a minimal cost without requiring technical know-how. The focal point of the two previous studies was the adoption of a CC service model (SaaS) and its adoption by SMEs in SA. These studies left out other CC service models, such as the PaaS and the IaaS. This could have omitted some of the barriers several SMEs may have experienced in CC adoption.

Dyubele et al. (2020) assessed the challenges facing rural SMEs in the implementation of the adoption of CC. The findings revealed that security, compatibility, perceived usefulness, and perceived ease of use were among the main challenges rural SMEs face in SA. These studies' overarching challenges include security, privacy, lack of expertise, knowledge, and trust.

3.2.5 The summary of the literature reviewed

Figure 6 provides a visual summary of the literature review associated with CC adoption and use by SMEs. The main themes found in the review consist of the benefits of CC for SMEs, the general factors and drivers of CC adoption and use, the barriers and hindrances of CC adoption and use and business performance due to CC adoption and use.

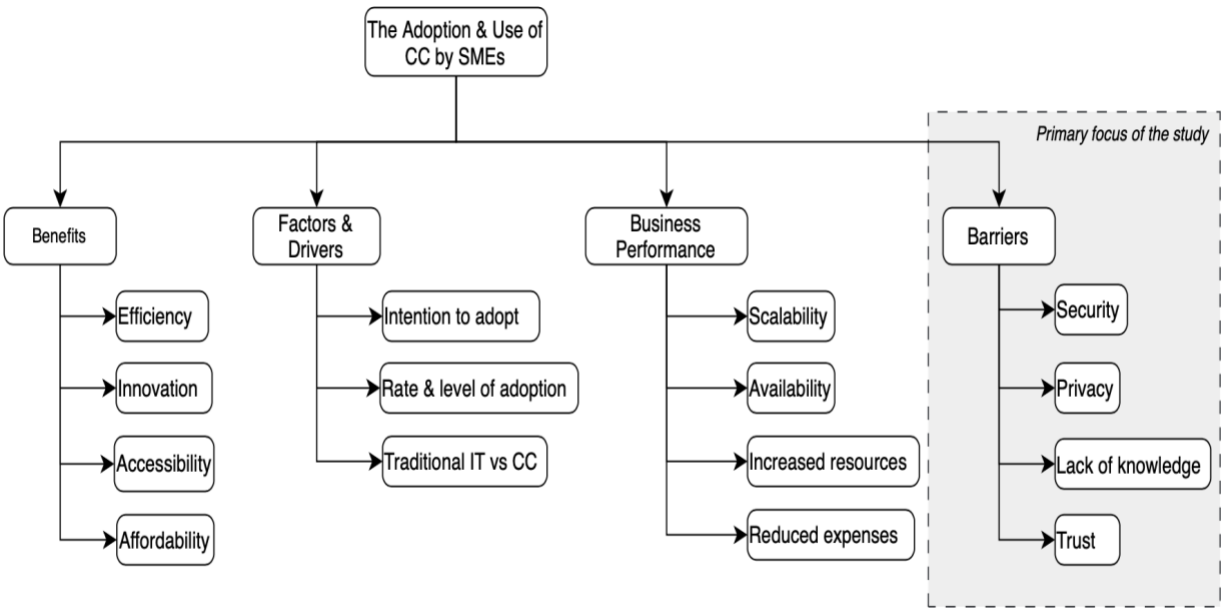

Figure 6: Themes based on the literature reviewed on the adoption and use of CC by SMEs

While these studies explore various themes, they also shed light on the challenges surrounding the adoption and use of CC. The theme of barriers and hindrances to CC adoption and usage among SMEs encompasses most of these findings. While this is the case, it is equally important to note that these studies have not explicitly investigated the challenges of SMEs' adoption and use of CC in SA. Therefore, they may not provide a holistic understanding of the challenges of CC adoption and use by SMEs in SA. On the other hand, some studies set out to investigate the challenges of CC, specifically in the SA context. However, some of the studies are narrowly focused. For example, studies focusing on specific CC services, such as the SaaS, exclude other CC services.

Another example is a study that focused on a cluster of SMEs in rural areas in SA and excluded SMEs in other regions in SA. The current literature provides a starting point for understanding the types of challenges that SMEs in SA may face when adopting CC. However, it may be

beneficial to explicitly investigate the challenges of adopting and using CC in SMEs in SA, as this would provide a holistic view of these challenges. As detailed in the following section, investigating these challenges necessitates systematic methods and techniques.

3.3 Methodology

The objective of this study was to investigate the challenges of the adoption and use of CC by SMEs in SA. In order to achieve this objective, inductive reasoning was adopted as a research strategy. Qualitative methods were applied to the study as it has been shown that the current literature provides a starting point for understanding the types of challenges that SMEs in SA may face when adopting CC. However, these challenges are often not the primary attention but are addressed in later investigation stages. As a result, there may be a narrow view of the challenges of the adoption and use of CC by SMEs in middle-income countries like SA. Therefore, qualitative research methods were employed to thoroughly and holistically examine these challenges.

The empirical context of the study consists of SMEs in SA. The selection of these cases followed the purposive sampling technique (Neuman, 2006). The sample was selected from the SME population, where the unit of analysis was made up of 12 SMEs. The unit of observation consisted of 12 participants; one participant was interviewed in each SME. The SME respondents or interviewees consisted of Chief Information Officers (CIOs), Chief Executive Officers (CIOs), executives and Information Officers (IOs) and SME owners. In total, there were 12 respondents. Table 7 provides detailed information on the sample. By engaging in participatory observations (summary of participatory observations shown in Table 3, the researcher immersed themselves in the social dynamics, culture, and norms of the empirical environment. In chapter 2, section 2.2.1, a detailed description of ethnographic interviews is provided.

Table 7: Profile of SMEs for Study 1

SME Size	R	No. of Emp**	Period of CC use	Location	CCSP	Level of cloud use	Scope of operation	Industry
Small	R1	40	7 years	CT	Global	SaaS	Western Cape	Private Security
	R2	5	2.5 years	CT	Global	SaaS	Africa	Finance
	R3	8	4 years	CT	Global	SaaS/PaaS/ IaaS	Global	Finance
	R4	7	1.5 years	JHB	Global	SaaS	Global	Finance
	R5	8	8 years	JHB	Global	SaaS	Africa	Finance
	R6	40	9 months	CT	Global	PaaS	Western Cape	Education
	R7	10	4 years	JHB	Global	IaaS	SA	Tourism
	R8	24	1 year	CT	Global	IaaS	SA	Marketing
	R9	6	3 years	DBN	Local	SaaS	Africa	Beauty/fitness
Medium	R10	200	2 years	JHB	Local	SaaS	SA	Telecoms'
	R11	150	4 years	CT	Local	IaaS	SA	Retail
	R12	200	5 years	CT	Local	IaaS	SA	Advertising

* Respondent
** Employees

The criteria used in selecting the sample consisted of SMEs that had been using CC for more than six months and were dispersed within the spectrum of CC service offerings (SaaS, PaaS, and IaaS). This is because the interest of the study is focused on the adoption and use of CC in SMEs. To acquire rich data and experience from SMEs regarding the adoption and use of CC, SMEs would need to have at least worked with CC services for a reasonable period. The geographical scope of the SMEs is located in SA from the provinces of the Western Cape, Kwazulu-Natal (KZN) and Gauteng. According to the National Small Business Chamber (NSBC) of South Africa, 40% of SMEs are in Gauteng, 30% in the Western Cape and 10% in KZN (NSBC, 2016). Therefore, 80% of SMEs in SA are in these three provinces. From this premise, the researcher focused on these three provinces in SA.

This resulted in four SME representatives being interviewed from Gauteng, one representative from KZN and seven representatives from the Western Cape. Whilst the SMEs may have specific locations, their scope of operation is broad. For example, two SMEs operate globally; three SMEs operate in parts of Africa, five SMEs operate in SA, and one SME in the Western Cape. The SMEs are in various industries; four are in the finance industry; the rest are in telecommunications, private security, tourism, education, retail, marketing, advertising, and the beauty and fitness industry. The vendors that provide CC services to the SMEs consist of global corporate CCSPs like Amazon Web Services (AWS) and local CCSPs. The provision

of the industries in which SMEs operate, the cloud services used by SMEs, and the scope of operation provide insight into the context of the SMEs.

In line with the adopted inductive research strategy, this study employed thematic analysis to analyse qualitative data, consisting of six phases (Guest et al., 2012). The first phase consists of familiarising oneself with the data, the researcher recorded interviews with the respondents' permission. Thereafter, the researcher transcribed the data into Microsoft Word. The researcher took notes while simultaneously transcribing the interview data. This process served as a method used by the researcher to familiarise themselves with the data. The transcribed data was uploaded onto Atlas ti. as a software data analysis tool. This made the second phase possible, which consisted of systematically generating initial codes across the entire data set of 12 interviews. This iterative process made linking data or quotations to the relevant codes possible. In the third phase, codes were organised and collated into potential themes (appendix 4). The fourth phase was comprised of another iterative process that involved reviewing themes and codes to ensure that generated codes were linked to relevant themes. In the fifth phase, the themes were then defined and refined based on the generated codes and the organisation of the codes. Lastly, the final analysis presented in the findings and discussion section was achieved by selecting relevant quotations from the data set and connecting these quotations to the research question and literature.

3.4 Findings and Discussion

The findings presented in this study result from a thematic data analysis process that was adopted. This process began with the transcribing of recorded interviews. Open coding was applied to identify codes from data corresponding to the challenges associated with the adoption and use of CC. The codes were grouped together and continuously refined to form categories. The categories were grouped into sub-themes, which led to identifying the challenges of SMEs' adoption and use of CC in SA. Themes, sub-themes and corresponding data are presented in Table 8. The themes of, inferior CC services, knowledge and skills, cost, user support, compliance and regulations, trust and other challenges were not as prevalent in the data.

Table 8: The challenges of the adoption and use of CC by SMEs in SA

Themes	Sub-Themes	Examples of Quotation from Data
Inferior CCSPs	Limited Resources	*'…global CCSPs…have computers in different cities, in different countries that they run your computing on, so the redundancy and the level of expertise that you would expect from a global CCSP versus a local player is very different…*' (R-7)
	Lack of Trust in Local CCSP	'*…I think a lot of small CCSPs have a bit of a cower attitude… Yah, it's not a big deal….oh, you have a virus on your server, oh okay will just…will do something'* (R-7) *'…The same setup that we get from the current [global] CCSP in comparison to previous (local) CCSP, has doubled the price. At least it's a stable thing'* (R-12)
Knowledge and skills	Lack of Knowledge in SMEs	'*I think there is a perception that the cloud is the web … so they just go oh well, if I am on the web then I am in the cloud* '(R-7) *'…before I came to this company, in my previous company, we never knew about cloud computing. Everything was like locally hosted'* (R-12)
	Lack of Skills within SMEs	'*…I have to get a third party to do it [attend to faults] and I have experience with my [CCSP] product and they are not, that I know of…*' (R-9) *'…They were the first engineers to be trained on this but they can't do anything because they don't have a proper [CC] experience…'* (R3)
Cost / affordability	Contractual Obligations/setup	'*…if you increase your resources, you will sign for another year, based on your increase…'* (R-11) '*…listen, in the agreement it said, we can limit your performance without notifying you…*' (R-1)
	Cost of Skill and User Support	'*…its not easy to pick up the phone and chat to someone at [CCSP] unless you are paying a huge amount of premium for support*' (R-6).
	Cost of Quality Service	'*…The same setup that we get from the current [global] CCSP in comparison to previous (local) CCSP, has doubled the price. At least it's a stable thing*' (R-12)
User support	Lack of user support	*'… CCSP does not have engineers to offer service to you. You'll have to build your own environment and you will have to manage it yourself'* (R-3)
	Poor user support	'*… I had an issue where the daily backups were failing and it took them over a week to fix the problem and the communication is just terrible, the support system is horrible'* (R-9)
Compliance and regulation	Regulation in the Finance Industry	'*…in some financial institutions … there are certain laws that are in place, when it comes to auditing and some of them [SMEs] don't really have a choice but to host the equipment themselves*' (R-1)
	General Regulation	*'…we must make sure that we are hosting in a country that has similar restrictions on personal information'* (R-11)

Themes	Sub-Themes	Examples of Quotation from Data
Trust	Leaked Information	'… a *lot of people worry about cloud … what can I say, Information being leaked…'.* (R-3)
	Lost Power and Control	'… *can't drive to anywhere to fetch the data…you have to export back over the Internet, that kind of thing, so it's more a mentality thing than anything else'* (R-11)
Other Challenges	Data hosted overseas	'…*We don't like the idea that all the servers in the cloud is actually not residing in SA, because those documents…are some private emails…so until [global CCSP] has only dedicated data center in SA…then we are not going to move …*' (R-3)
	Documentation Challenges	'…*there is a lot of documentation so it's a bit hard to navigate which documentation you should be using for which scenario… that's why you end up turning to Google...maybe they [global CCSPs] could improve on that just the user-friendliness of their documentation'* (R-2)
	Migration Issues	*'…we are talking about thousands and thousands of documentation so…the process took quite long… the transfer itself took about 2 or 3 days and that left our clients not being able to do anything…'* (R-2)
	Disconnected line/Internet	'*…internet business had gone off then I'd just connect with the 3G, I switch the connection over and everybody has Internet again…'* (R-1).
	Change	'…*the business does not adapt to change well'* (R-10) *The respondent further said that "...people do not want to change, the second pain is people don't know how to change*' (R10)
	Control	'… *don't have access to the cloud panel only they [CCSP] do…they can only change things via change control.*' (R-3) '…*every time you want to change something, you have to phone somebody or email somebody*' (R-11)

3.4.1 Inferior CC services

Practitioners and the academic community in ICT generally agree that CC is a technology that promises the desired ICT resources and benefits in comparison to in-house ICT resources (Mohlameane & Ruxwana, 2013). In the South African context, findings showed that this narrative was plausible depending on the CCSP that SMEs use. The data showed that SAs CC service providers consist of local and global CCSPs. This was also evident during participatory observations where the CC market in SA comprised global and local CCSPs and third-party organisations. Third-party organisations are basically "the middleman" between global CCSPs and users. In both participatory observations and respondents' views, local CCSP's services lacked reliability and availability. The reliability and availability of CC services play an integral part in CC offerings (Khan, 2014; Kwame et al., 2018).

According to NIST, CC has five imperative characteristics: on-demand self-service, broad network access, resource pooling, rapid elasticity and measured service (Mell & Glance, 2011). Based on the SME respondents, local CCSPs do not always have all the listed characteristics in their cloud offerings. Some of their services lack the rapid elasticity aspect; others lack the on-demand self-service. In other words, they do not fulfil the characteristics that CC should, by the definition of NIST. Therefore, SMEs that use local CCSPs tend to experience quite a number of challenges, such as a lack of reliability and availability of the CC service. This may result from limited infrastructure and skilled professionals that could support CC in middle-income countries (Kwame et al., 2018). Thus, the lack of such resources in local CCSPs may have resulted in SMEs acquiring a sub-standard cloud service. SMEs are often pushed to use local CCSPs as they are less expensive than global CCSPs. However, their experience with outages, server faults, or inability to access services pay-as-you-go has led to a lack of trust in local CCSPs.

Upon reflection, the description of inferior cloud service provision may indicate that CCSPs offer frugal CC innovations to SMEs in SA. In other words, SMEs in SA use frugal CC innovations. Frugal technologies are affordable technologies that enhance functionality, are easy to use and have been innovated under resource scarcity (Howell, van Beers, & Dorn, 2018). The goal of frugal innovations is to reduce technological complexity and maximize value for money (Leliveld & Knorringa, 2018). Frugal innovations are developed for low-income market contexts and are seen to differ from innovations in developed economies (Hossain et al., 2016). Therefore, one can deduce that local CCSPs have developed and offer frugal CC innovations and that global CCSPs offer CC services set up by developed economies. As Kwame et al. (2018) have suggested, middle-income countries have limited skilled professionals. Thus, the next theme is the lack of knowledge and skills in SMEs.

3.4.2 Lack of knowledge and skills in SMEs.

The theme of the lack of knowledge and skills was not prevalent in the literature that was reviewed. A literature review study conducted by Mujinga (2020) referred to the lack of knowledge as one of the challenges faced by SMEs in middle-income countries. The study does not explore the relationship between the lack of knowledge and, mainly, the lack of skills in adopting and using CC. It can be argued that knowledge is required to adopt and use CC. However, the same cannot be said where skills are concerned. Most publications have outlined the relinquishing of the maintenance of hardware and software tools as a benefit of CC for SMEs (Rath et al., 2012; Zabalza et al., 2012).

Literature has painted a picture that SMEs do not need CC skills when they adopt CC. However, findings revealed that both skills and knowledge continue to play a significant role in adopting and using CC. Understanding CC offerings and services, particularly from global CCSP, requires adequate digital literacy and basic knowledge of information technology. In SA, 50% of the population does not have digital literacy (Krönke, 2020). Therefore, proficiency in using CC can challenge SMEs as knowledge and skills are still required. In addition, continuous use of CC requires SMEs to understand the CC services better. While they will not manage the hardware and software resources, they must still manage their business operations in the cloud. For example, SMEs may decide to use a database in the cloud. They would need to be able to access the database and make changes whenever required. If their needs change, they may also need to change the type of database they are using. Most significantly, adopting and using any technology requires learning (Archibugi & Pietrobelli, 2003).

Learning outcomes consist of knowledge acquired (Kane & Alavi, 2007). Once knowledge is acquired, an environment where skills can be developed can be created. Therefore, SMEs usually journey into this process of learning. The next theme, typically perceived as the primary motivator for adopting and using CC, is cost minimization.

3.4.3 Cost minimisation of CC

Numerous publications across various contexts have consistently highlighted that cost is the predominant factor driving the adoption and use of CC in SMEs (Dangwal & Lata, 2014; Sabi et al., 2016; Sithole & Ruhode, 2021). However, the analysis and findings showed that it's not as simple; costs vary depending on the CCSP. For example, global CCSPs were found to be costly, while local CCSPs were inexpensive. Global CCSPs offer a service aligned with all the five necessary characteristics of CC as defined by the National Institute of Standards and Technology (NIST) (Mell & Grance, 2011). These characteristics include on-demand self-service, broad network access, resource pooling, rapid elasticity and measured service. The global CCSPs' provision is aligned with the given characteristics, but the local CCSPs offer an

inferior service. In that the cloud service provision does not have all the listed attributes of CC listed by NIST. For instance, some local CCSPs may include rapid elasticity, broad network access and on-demand self-service in their cloud provision. Another local CCSP may have broad network access resource pooling but cannot provide a measured service. In other words, a local CCSP may have two or three of the characteristics but not all of them.

SMEs that use global CCSP have pointed out that CC services are not as inexpensive as they are made out to be. For example, there are added costs to the primary cloud offering. Most SME respondents have said that they often cannot afford the cost associated with user support from global CCSPs, which is usually acquired at an additional cost. On the other hand, local CCSPs are less expensive, probably due to their inferior CC service. Most SME respondents have also said that local CCSPs often do not offer the measured service, pay-as-you-go, or on-demand self-service. The advantage of the pay-as-you-go service is that SMEs would only pay for the services they have used. The lack of the pay-as-you-go service takes away from the significant benefit of CC. This is because the measured service characteristic translates to cheaper access to computing resources.

The on-demand self-service means that SMEs can unilaterally provision computing resources whenever required without the service provider. The inability of local CCSPs to unilaterally provision computing resources when needed results in the obligation to sign contracts with SMEs. In other words, they must sign a contract with time and financial obligations every time they want to scale up. When they want to scale down, they cannot because they are tied to a contract. As a result, access to an adequate complete CC service is still difficult for SMEs because it is costly. Some SME respondents pointed out that it's not about cost but rather the value CC offers to their businesses. Therefore, they do not purchase CC services because they are inexpensive, but they provide value for their customers. It's more about customer satisfaction than saving costs. They further explained that initially, the driver was cost (cheaper). However, they would experience challenges with local CCSPs. This would force SMEs to stop focusing on paying for computing resources at a more affordable price but to offer value for customers. This value translates to the critical benefits of CC such as efficiency, reliability and availability. In other words, SMEs would rather pay more for CC because it ensures business continuity. Another theme closely associated with cost is user support.

3.4.4 Lack of user support

Most studies rarely point out the lack of support as a challenge for SMEs. However, the lack of user support was cited as one of the challenges SMEs face when adopting and using CC. Some SMEs experienced poor support systems from CCSPs, and other SME respondents did not have access to user support. As the previous section mentions, global CCSPs offer support at added costs. This pushes SMEs to manage their CC environment and, therefore, find ways

to address issues that would have been addressed through user support from CCSPs. SME respondents who use local CCSPs have cited unpleasant experiences with the CCSPs' support systems. Respondents mostly cited poor communication and lengthy periods of server downtime.

The lack of or poor user support systems places SMEs in a challenging position where they lose out on efficiency and possibly live without user support. User support from CCSPs for SMEs plays a significant role in SMEs' adoption and use of CC. In their study that focused on SA, Kumalo and Poll (2016) established that SaaS is a solution for addressing the lack of technical know-how for relevant computing management. This is because SaaS is similar to an "off-the-shelf" product that SMEs can use efficiently. In this study, 58% of the SMEs have adopted and utilised SaaS.

Nevertheless, the lack of support was cited as one of the significant challenges of the adoption and use of CC in SMEs in SA. Wamuyu (2017) proposes a solution to address the issue of CCSPs customising their contracts and services to align with specific support requirements of micro and small enterprises. This could assist SMEs even in matters of compliance and regulations, which was cited as a challenge. Such customization could also prove beneficial for SMEs in addressing challenges related to compliance and regulations.

3.4.5 Compliance and regulation

In most countries, including SA, regulations are implemented to protect data. For example, the Protection of Personal Information Act (POPIA) Electronic Communication and Transaction Act (Mujinga, 2013). Findings showed that there was great awareness and concern about the POPIA. The POPIA requires that South African organisations ensure the confidentiality, privacy and safety of personal information (Kandeh et al., 2018). Organisations that mismanage collecting, storing, processing and sharing personal information can be held accountable (Mohlameane & Ruxwana, 2020). Ideally, SMEs in SA should ensure that CCSP platforms comply with relevant regulations before adopting CC (Von Solms & Willett, 2017). Data analysis and participatory observation activities have shown that global CCSPs take it upon themselves to monitor and comply with different contextual laws of diverse countries, such as the PoPIA for SA (Mujinga, 2013). Therefore, global CCSPs ensure global compliance with various industry regulations (Ramgovind et al., 2010).

This is even more so in the financial industry, as regulations constantly change (Borgman et al., 2013). The regulation issue is significant for SMEs, as its scope of operation extends to numerous countries. Therefore, this makes CC adoption and use for such SMEs more expensive than using local CCSPs. Local CCSPs understand the importance of compliance with industry regulations (Mujinga, 2013). Most of the local CCSPs are focused on the POPIA due to the context of SA. Compliance was not seen as a significant challenge in the adoption

and use of CC literature that was reviewed and data. Some of the respondents explained that when they embarked on the process of adopting CC, compliance was not a priority, especially for those who did not have personal information stored in the cloud. However, when they adopt CC, they are slowly introduced to compliance and governance matters that unfold in the process of adoption and use. Moyo and Loock (2021) observed that SME decision-makers often preferred guidelines and checklists over policies. Following from the theme of compliance and regulations is the lack of trust by SMEs towards CC services.

3.4.6 Lack of trust

In a sense, compliance with regulations such as POPIA is meant to address confidentiality, privacy and safety of personal information. However, compliance does not automatically ensure that there won't be security bridges or data leaks. Therefore, the lack of trust posed a challenge to the adoption and use of CC. Some respondents referred to the inability to drive to a specific location to access their data because the CCSP owns the computing infrastructure. Some respondents referred to big corporate CCSPs who lost users' data despite compliance and capacity in terms of resources. The lack of trust in the adoption and use of CC is consistent with the literature reviewed. In their study, they sought to understand the intentions of SMEs adopting CC in SA. Faasen et al. (2013) found that SMEs were reluctant to adopt and use CC due to the lack of vendor trust or CCSP trust. Similarly, Mohlameane and Ruxwana (2014) explained that trust and transparency were perceived as challenges to CC adoption and use. Therefore, trust is a dynamic mechanism through which other adoption factors can influence the decision for SMEs to adopt CC (Ayong & Naidoo, 2019). This aligns with Twum-Darko and Sibanyoni's (2014) view, where trust is a key mediating factor influencing SMEs in adopting and using CC. Other challenges were less cited in the data; these challenges may become of significance as the adoption and use of CC matures in SA. They consist of data hosted outside of SA, documentation for user support purposes, migration, connectivity, change and control of CC of services.

3.4.7 Non-major challenges

Respondents mentioned other challenges that were not as consistent throughout the data. From participatory observations, as shown in Table 17, SMEs that grow in size and their return on investment (ROI) eventually migrate from local CCSPs to global CCSPs. This is one of the ways they address the challenges faced when using local CCSPs. Though this is an obvious solution, it also introduces different challenges. For example, data centres outside of SA may introduce legal concerns due to various jurisdictions (Prasad et al., 2012). Another challenge was that of documentation. Previously, user support was an issue because it's an added cost to CC services, particularly in global CCSPs, which makes CC expensive. Therefore, these

CCSPs have produced and uploaded documents meant to serve as guidelines for addressing faults that users may encounter when using their cloud services. As a result, some SMEs have come to rely on these documents whenever faced with technical challenges.

Nonetheless, a response pointed out that these documents are not easily accessible on relevant platforms and are not user-friendly. Mokwena & Hlebela's (2018) studied the factors affecting SaaS adoption by SMEs in SA. The findings recorded complexity (the degree to which an innovation is perceived as challenging to understand and use) negatively impacting the adoption and use of CC. The challenges of migration, Internet access, and inability to control CC service were also mentioned in the data. However, these challenges were not mentioned in the literature on adopting and using CC in the context of middle-income countries. A study conducted in Botswana by Khanda and Doss (2018) found that Internet access and computing resource availability, among other challenges, hindered the adoption and use of CC.

3.5 The conclusion of the first study

In the context of middle-income countries, as referenced in the literature reviewed for this study. The current body of knowledge refers to the challenges SMEs face when adopting and using CC. These challenges include access to the Internet, awareness, availability and reliability, security and privacy, readiness for adoption, power cuts and outages. These challenges are often not the primary attention in the current literature but are addressed in the latest publications (Osembe & Padayachee, 2016; Kumalo & Poll, 2016; Khanda & Doss, 2018; Khan, 2020; Mujinga, 2020). In addition, some studies focus on specific services like SaaS (Kumalo and Poll, 2016; Mokwena & Hlebela, 2018; Never et al., 2022). However, they also don't distribute attention evenly to the full spectrum of services offered by CC. Therefore, there may be a limited or narrow view of the challenges of adopting and using CC by SMEs in middle-income countries like SA. In other words, a comprehensive of these challenges has not been done through a holistic study.

Consequently, participatory observation and ethnographic interview techniques were used as research methods. These methods were valuable as they enabled the researcher to immerse themselves fully in the empirical situation. Resulting in the insider's (SMEs) view of understanding the challenges of adopting CC. As a result, most of the challenges described in this study complement the existing challenges documented in the literature in two distinctive ways. Firstly, new challenges are introduced to the existing ones that are already known. Secondly, on a broader scale, the study corroborates the existing challenges described in the literature, except for one challenge (cost/affordability) that arguably contradicts the current literature.

The main additional challenge to the current literature is the provision of inferior CC services by local CCSPs. The current body of knowledge has not identified the provision of inferior CC services. The study revealed that inferior CC services impact the user experience of several SMEs in SA when adopting and using CC. Recognising the provision of inferior CC services

as a challenge and understanding its repercussions can assist CCSP in improving its cloud service. Furthermore, government initiatives for facilitating digitization in SMEs can specifically target local CCSPs.

Additionally, challenges that were not as prevalent in the data but outlined in the findings data hosted in other countries, documentation, migration and inability to have control of cloud services. These challenges might come to the forefront as the adoption and use of CC advances beyond the current stage.

An interesting phenomenon was affordability, where affordability is often understood to be a driver for the adoption and use of CC (Oduh et al., 2018; Khayer et al., 2021). The findings of this study show that the cost of CC depends on the CCSP and the services used by SMEs. In other words, CC can be affordable for SMEs; however, it is often costly, particularly when SMEs want a reliable service (Mokwena & Hlebela, 2018). This study also confirmed some of the challenges outlined in the current literature, encompassing compliance, regulation, security, and lack of knowledge and skills. Figure 7 depicts these challenges and further underscores the two challenges that present differing aspects compared to the prevailing literature.

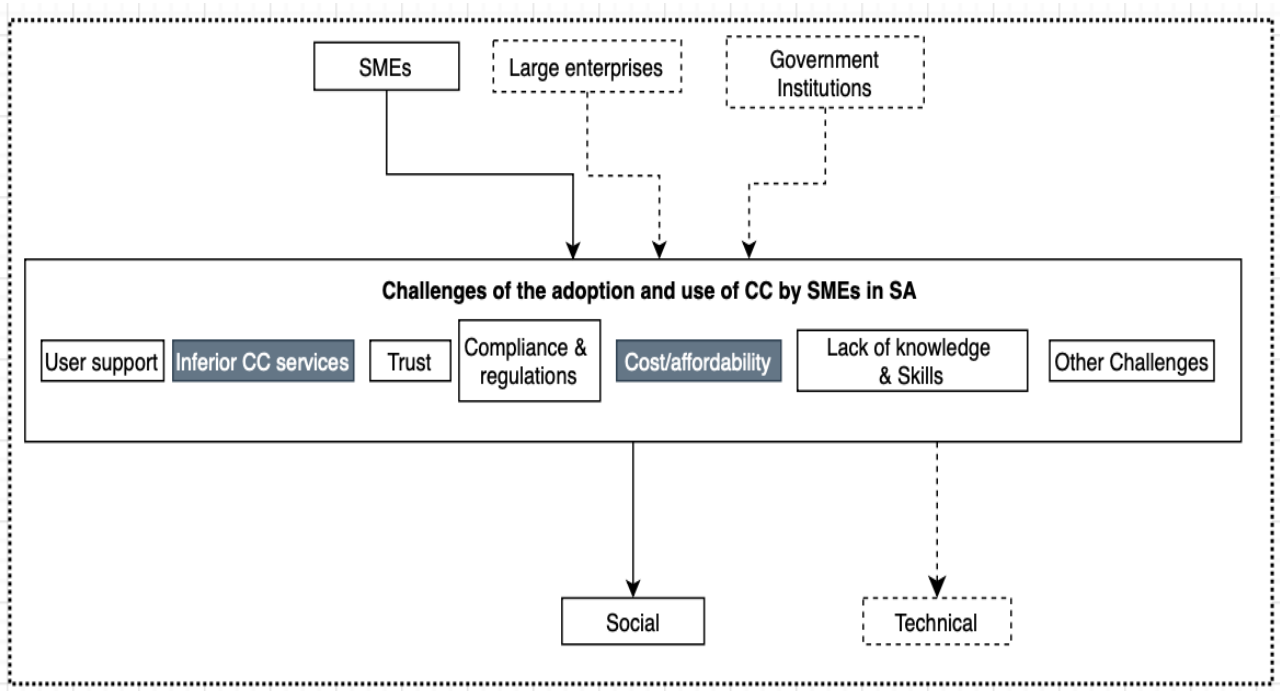

Figure 7: The challenges of the adoption and use of CC by SMEs in SA.

In conclusion, the objective was to understand and describe the challenges of the adoption and use of CC in SA. The inductive research strategy was applied to achieve the objective, and participatory observations and ethnographic interviews were adopted as research methods. Thematic analysis was used as a data analysis method. The empirical situation was made up of SMEs in SA. Their environment and context were taken into consideration; this

resulted in a descriptive and holistic view of the challenges faced by SMEs in SA when adopting and using CC. Through thematic analysis, findings revealed themes that include inferior CCSPs, lack of knowledge and skills, cost, lack of user support, compliance and regulation issues and lack of trust.

This study can contribute to practical insights into informed solutions by SMEs and CC practitioners. In addition, the study can inform government initiatives or policies that can capacitate local CCSPs to offer CC services that are less expensive yet adequate for SME consumption. Future studies can focus on the inter-organisational relationships between CCSPs and SMEs. The challenge of inferior CCSPs points out possible frugal CC innovations by local CCSPs. Thus, future studies can focus on the role played by local CCSPs in SMEs and the digital economy.

4 Study 2: Organisational Learning Processes that Lead to the Adoption and Use of CC by SMEs in SA

Abstract

Literature has shown that SMEs find themselves in the information age characterised by a rapidly changing environment. In this environment, knowledge becomes a critical resource and basis for competition. The adoption and use of technology require knowledge about that technology, in this case, CC. Thus, the process of adoption and use of CC involves learning. Organisational learning is a learning process utilised by organisations where knowledge is distributed from an individual to the organisational level. Much has been covered in the literature on the adoption and use of CC and SMEs. However, this study employs a different theoretical lens in viewing SMEs' adoption of cloud computing in South Africa from an OL perspective. The objective of this study was to describe OL mechanisms that are applied by SMEs in SA when adopting and using CC and to generate the best plausible theoretical explanation of OL in the context of SMEs in SA. The study followed an abductive strategy. Participatory observations and ethnographic interviews were used as data collection techniques. Thematic analysis was used for data analysis. The findings showed that SMEs use OL mechanisms, which include investigative and enquiring activities, training, and alliances for exploitation and exploitation processes. SMEs have a challenge of exploration and exploitation occurring simultaneously due to limited resources. Therefore, SMEs must be deliberate in addressing the tension between exploration and exploitation processes.

Keywords: Organisational Learning, SMEs, Adoption and Use, Cloud Computing

4.1 Introduction

Cloud computing is often seen as a solution to address limited ICT resources in SMEs in middle-income countries. Therefore, research has been undertaken to understand CC adoption and use in SMEs (Mohlameane & Ruxwana, 2014; Osembe & Padayachee, 2016; Mokwena & Hlebela, 2018; Ayong & Naidoo, 2019). The adoption and use of CC has focused on various themes such as awareness and the state of CC adoption and use, business performance as a result of CC adoption and use, drivers and influencers of CC adoption and use, and barriers to CC adoption and use. Additionally, the adoption and use of CC have been studied from various theoretical perspectives. These theoretical perspectives include the unified theory of acceptance and use of technology (UTATUT), the technology-organisation-environment (TOE) framework, diffusion of innovation (DOI) theory, socio-technical framework, Theory of planned behaviour (TPB), technology acceptance model (TAM) (Ahmed, 2020; Dahiru et al., 2014; Hayat Malik et al., 2019; Hiran & Henten, 2020; Khayer et al., 2020;

Nair et al., 2019). Thus, the adoption and use of CC have been studied from several perspectives but the OL perspective. The objective of the first study was to understand the challenges of the adoption and use of CC in SMEs. The lack of knowledge about CC was one of the main findings associated with the challenges of adopting and using CC. In this case, learning about CC becomes a significant factor in addressing the lack of knowledge. Therefore, OL becomes a vital facilitator of the adoption and use of technology in various organisations, including SMEs.

SMEs today operate in an era defined by globalisation and rapidly evolving technologies, commonly called the information age (Adeniran & Johnston, 2012; Qian & Oe, 2024; Setiyani et al., 2020). Globalisation is quickly evolving with improvements of existing ICTs and developments of new ICTs (Chege & Wang, 2020; Fushimi, 2022). Knowledge has become a critical resource and a basis for competitive advantage (Sanhokwe et al., 2023; Tetteh & Burn, 2001). Knowledge is a resource related to the notion that the adoption and use of ICTs require learning about that particular ICT (Archibugi & Pietrobelli, 2003), in this case, cloud computing. This study shifts its focus from individuals to SMEs, thus examining OL and how it relates to the adoption and use of CC.

Organisational learning is a learning process in an organisation where individuals facilitate and engage in learning activities to increase knowledge and understanding (Fiol & Lyles, 1985; Giacomini et al., 2022; Patterson et al., 2024). This process consists of interpreting, acquiring, distributing, retaining, memorizing and generating new knowledge in the context of an organisation (Crossan et al., 1999; Joel et al., 2023; Sanhokwe et al., 2023; Troshani, 2020).

The significance of OL lies in the fact that it can aid a strategic fit and innovation in dynamic environments (Joel et al., 2023; Llorens-montes & Martínez-lópez, 2016; Sanhokwe et al., 2023). It enables organisations to sense and respond to changes and new business opportunities (Lyytinen & Rose, 2006; Upadhayay et al., 2024). More significantly, OL facilitates the adoption and use of IS in organisations, enabling organisations to develop dynamic capabilities and competitive advantage (Schönherr et al., 2023).

Organisational learning is operationalised through OL mechanisms. OL mechanisms are institutionalised structures and procedural arrangements that aid learning (Oliver, 2009; Wicher & Frankus, 2023). They may include Research and Development (R&D), training of employees, social learning through electronic media, job rotation, partnering, and traditional classroom learning (Encinas Bartos et al., 2024; Llorens-montes & Martínez-lópez, 2016; Schönherr et al., 2023).

It is essential to highlight that most OL research in Information Systems is concentrated in the global north. This raises the question of how OL research applies to SA SMEs. Particularly when considering that culture, structure, environment, and strategy are contextual factors that influence OL (Fiol & Lyles, 1985; Wicher & Frankus, 2023). All these contextual factors have

an impact on the context of SA. These contextual factors further raise the question of the applicability of the existing OL theoretical explanations in various contexts. In other words, can these theoretical explanations be transferable to the context of SMEs in SA? Therefore, this study addressed the research question: what are the OL processes that will lead to the adoption and use of CC in SMEs in SA? The objective of the current study was to generate a theoretical explanation that would provide the best plausible explanation of the OL processes in SMEs in SA when adopting and using CC.

The subsequent subsection delves into the essential concepts of OL as addressed in the literature. Concepts such as contextual factors that affect OL and organisational learning levels are explored. The literature proceeds to present OL within information systems (IS). This is where literature focuses on IS as a facilitator of OL, and OL as a process that facilitates the adoption and use of IS and OL theories and frameworks. Then, the methodology is addressed where abduction was adopted as a research strategy. In this case, OL mechanisms were first investigated as the first step in developing the OL theoretical explanation. The OL mechanisms provided a foundation for further investigation, development, and understanding of the underlying theoretical explanation of OL in SMEs when adopting and using CC. This explanation is then presented in the theoretical elaboration section.

The study would contribute to an OL theoretical explanation that considers the South African and SME context. Furthermore, generating OL theory from empirical analysis can contribute to existing OL theoretical frameworks.

4.2 Organisational learning

The literature defines and discusses organisational learning (Argote & Hora, 2017; Birasnav et al., 2019; Patterson et al., 2024; Upadhayay et al., 2024). However, the term's definition varies depending on the field of study (Crossan et al., 1999; Imran et al., 2016). For example, Fiol and Lyles (1985), Hurley and Hult (1998) and Upadhayay et al. (2024) took a product innovation perspective of OL. Day (1994), Fernández-Mesa and Alegre (2015), and Lek et al. (2022) focused on the entrepreneurial perspective. Pine, Bart, and Boyntn (1993) were concerned with the product and service perspective. In addition, Birasnav et al. (2019) and Ibiam and Harrop (2023) studied OL from an operational, engineering and performance perspective. The consensus from the different studies is that OL is a set of processes for interpreting, acquiring, distributing, retaining, or memorising knowledge and generating knowledge in the context of an organisation (Chiponde et al., 2022; Sanhokwe et al., 2023; Troshani, 2020).

This study views organisations as entities where employees coordinate their actions to achieve specific goals (Cunliffe, 2008). Therefore, OL occurs in the context in which employees or individuals learn from each other (Dahl & Irgens, 2022; Wang & Ahmed, 2007). In the first

place, OL is a process of learning where learning commences with interpretation. Bontis and Hulland (2002) describe interpreting as sharing what was once limited to the individual's mind with a group of individuals. Interpreting starts with intuition, the most basic learning level (Crossan et al., 1999). Intuition is often a subconscious process where individuals get insight and understanding (Crossan & Berdrow, 2003; Wicher & Frankus, 2023). There isn't one description or definition in the literature on what constitutes intuition (Behling & Eckel, 1991; Crossan et al., 1999). However, one coherent aspect is connecting patterns from existing concepts or observations to new ideas (Behling & Eckel, 1991; Wicher & Frankus, 2023). Interpreting occurs when sharing what was once limited in the individual's mind to a group (Bontis & Hulland, 2002; Schönherr et al., 2023).

The next process is the acquisition of knowledge. Knowledge is acquired for adequate understanding (Lek et al., 2022; Llorens-montes & Martínez-lópez, 2016). This is followed by knowledge distribution, where knowledge from diverse sources is shared or distributed for common understanding (Chiponde et al., 2022; Huber, 1990; Lek et al., 2022). Once common understanding and consensus in utilising that knowledge is achieved, retaining or memorising it would be the next objective. Retaining or memorising knowledge refers to storing knowledge in an organisation for future applications (Huber, 1991; Sanhokwe et al., 2023; Wicher & Frankus, 2023). The last process is knowledge generation; it constitutes continuous learning by creating new knowledge (Lek et al., 2022; Real et al., 2006). These processes are a means by which OL is achieved.

4.2.1 Organisational learning mechanisms

Organisational learning is operationalised through OL mechanisms (Battistella et al., 2020). OL mechanisms are Institutionalised structures and procedural arrangements that aid learning (Armstrong & Foley, 2003; Battistella et al., 2020; Oliver, 2009; Wicher & Frankus, 2023). They help organisations acquire and generate new knowledge for continuous improvement (Ibiam & Harrop, 2023; Kululanga et al., 1999; Lek et al., 2022). These OL mechanisms manifest and display themselves in various ways (Bell & Figueiredo, 2012; Encinas Bartos et al., 2024; Wicher & Frankus, 2023). OL can be observed and studied as a phenomenon (Oliver, 2009). As a result, Armstrong and Foley (2003) and Domínguez-Escrig et al. (2023) explain that a learning organisation is unlikely to emerge if these mechanisms do not exist. Generally, learning mechanisms are distributed between external and internal OL mechanisms. External learning assists the organisation in exploring learning activities, while internal learning focuses on helping the organisation exploit learning activities (Bell & Figueiredo, 2012).

These mechanisms include human resources recruitment, Research and Development (R&D), training of employees, social media learning, access to open-learning centres, e-learning systems, job rotation; involvement in multi-disciplinary teams, traditional classroom learning

(Encinas Bartos et al., 2024; Imran et al., 2016; Joel et al., 2023; Llorens-montes & Martínez-lópez, 2016); mentoring, alliancing, partnering, license agreements, acquisitions, mergers, seminars (Battistella et al., 2020; Domínguez-Escrig et al., 2023); performance measurement (Oliver, 2009) and audit revisions (Carroll & Edmondson, 2002). The emphasis on the importance of OL mechanisms is that they establish capabilities and know-how in organisations (Belle, 2016; Giacomini et al., 2022). These mechanisms secure productivity, competitive advantage, and the ability to sense, interpret, and respond to changes in the internal and external environment (Qian & Oe, 2024; Upadhayay et al., 2024). Though this has been established in the literature, it is also important to note that organisations' learning capacity is dependent and influenced by four contextual factors (Birasnav et al., 2019; Fiol & Lyles, 1985).

4.2.2 Contextual factors influencing OL

The contextual factors influencing OL are environment, culture, structure, and strategy (Fiol & Lyles, 1985; Wicher & Frankus, 2023). Culture refers to shared beliefs, norms, and established behavioural patterns employees share (Dodgson, 1993).

The culture of the organisation influences the organisation's actions. An organisation's learning capacity is affected by its culture (Birasnav et al., 2019; Ibiam & Harrop, 2023). For example, an organisation with tolerance for mistakes is central to a positive learning culture (Huber, 1991). This is also evident in project-based organisations where learning from past failures is part of OL (Chiponde et al., 2022). Likewise, an organisation that embraces collaborative learning would have a positive learning culture (Dahl & Irgens, 2022). Another contextual factor is the organisation's existing strategy.

Strategy refers to organisational goals and objectives and, ultimately, the extent to which the strategy can be implemented (Fiol & Lyles, 1985). Organisational learning can be helpful in strategy formulation and implementation (Giacomini et al., 2022; Imran et al., 2016). For example, organisations implementing OL would integrate learned lessons or feedback into improving and developing their organisational strategy (Alerasoul et al., 2022). However, an existing strategy may constrain learning, as resources are often time allocated and aligned to fit the organisation's strategy (Bapuji & Crossan, 2004; Giacomini et al., 2022). Another contextual factor pertains to the structure of the organisation. In Gidden's (1984) view, structure refers to rules and resources used by agents (employees) to interact. The interaction is essentially the ability of employees to exercise power by reforming or transforming the existing structure. The structure is implicated in the reproduction of systems. Thus, a formal, mechanistic, hierarchical structure turns to reinforce past behaviours, actions, and practices (Fushimi, 2022; Martínez-León & Martínez-García, 2011). This structure constrains learning as organisations resist adaptability, which is vital for learning (Fushimi, 2022; Nicolin & Meznar, 1995). Contrarily, an informal, flexible, decentralised structure encourages flexibility (Fushimi,

2022; Martínez-León & Martínez-García, 2011). It allows room for changes in behaviour, actions, and practices, making learning manageable (Ibiam & Harrop, 2023; Qian & Oe, 2024).

4.2.3 Levels of learning in organisations

At times, behavioural learning is referred to as single-loop learning. This refers to the changes or adjustments of behaviour and actions taken when there is a variance between intentions and actual outcomes or activities (Patterson et al., 2024; Sanhokwe et al., 2023). Behavioural or single-loop learning is also seen as a lower-level approach focused on addressing the symptoms of the problem without targeting the root cause (Wicher & Frankus, 2023). Conversely, when changes or adjustments are made to target the root cause of a problem, this would be called cognitive or double-loop learning (Jashapara, 2003; Wicher & Frankus, 2023). In this case, learning results in changes in policies, norms and objectives. Cognitive learning is observed when assumptions and principles that constitute governing variables are examined or challenged (Ibiam & Harrop, 2023). An organisation can make behavioural and cognitive changes (Wong et al., 2008). This type of learning is called triple-loop learning (Anders, 2004; Sanhokwe et al., 2023). At this level, organisations can commit to continuous learning to improve productivity (Sanhokwe et al., 2023; Wong et al., 2008). In the information age, organisations must be skilled at deploying applicable information systems. Consequently, OL remains crucial in the implementation and utilisation of IS. Similarly, within the context of the information age, organisations have had to learn to be capable of applying relevant IS. Therefore, OL continues to play a significant role in the adoption and use of IS (Bhatt & Grover, 2005; Tippins & Sohi, 2003).

4.3 Organisational learning and IS

OL is a topic that has been researched since the early '90s. Most publications in this era are focused on understanding OL as a concept. As a result, OL has been studied from diverse perspectives and disciplines (Bhatt & Grover, 2005; Birasnav et al., 2019; Domínguez-Escrig et al., 2023; Fernández-Mesa & Alegre, 2015; Robey et al., 2000). The result was the formation of the OL concepts and the foundation of OL theory. The early stages of research in OL and IS are mainly distributed in the late '90s and early 2000s (Al-Tameem, 2004; Hunter, 2003; Robey et al., 2000). In this era, there is a focus on the importance of OL for adopting and using IS to aid positive organisational outcomes (Robey et al., 2000). Furthermore, in the early and mid-2000s, the phenomenon of virtual environments coupled with new ways of sharing information resulted in additional contributions to OL theory (Berranger et al., 2001; Goel et al., 2012; Raymond & Blili, 2000). Therefore, some publications are dedicated to extending OL theory by considering the effects of the information age on organisations. When analysing literature in OL and IS, it is evident that the research is distributed into three categories.

Namely, IS as a facilitator of OL, OL as a process that facilitates the adoption and use of IS, and OL theories and frameworks.

4.3.1 Information Systems as a facilitator of OL

The first section views IS as a facilitator of OL. In these publications, IS is understood to be an enabler for OL or re-enforces OL. This is significant because OL is seen as a dynamic capability or creating dynamic capabilities in organisations (Ghasemzadeh et al., 2022). Therefore, IS is adopted to enable OL.

The research that is focused on IS as an enabler of OL is attentive to the characteristics, the effects and the role of IS in aiding OL (Kane & Alavi, 2007; Lopez-Nicolas & Soto-Acosta, 2010; Qi & Chau, 2016; Schönherr et al., 2023). These publications are primarily concerned with investigating IS tools that enable OL. For example, the internet promotes OL in terms of speed, breadth of a learning cycle, and it allows independence and visibility of information production and use (Yang et al., 2001). Generally, IS often changes the hierarchal organisational structures, making them flat. This removes the dependency on senior employees and encourages knowledge sharing (Yang et al., 2001). Another example is virtual environments; they offer a communication and information dissemination platform that supports OL (Goel et al., 2012). Two-way (between the service provider and customer) information exchange in virtual customer environments creates exploratory innovations. On the other hand, one-way information exchange facilitates utilisation plans only (Roberts & Dinger, 2018).

Other roles of IS in facilitating OL include interaction and communication to enable collaboration and information sharing among employees (Choe, 2004). Information Systems tools can improve knowledge management and organisational memory (Céspedes-Lorente et al., 2019). Furthermore, IS tools like Team Management Systems facilitate knowledge transfer as an aspect of OL (Wang, Huang, Davison, & Yang, 2018). In addition, the role of IS in knowledge partners facilitates knowledge assimilation, and knowledge networks facilitate knowledge co-creation (Dong & Yang, 2015). Furthermore, the literature presents models that prescribe how organisations can adequately adopt, and use IS to enable OL.

Most models and frameworks in this category, use OL theory as a theoretical lens or foundation. Some authors use OL theory as the only basis for developing these models. Other authors make use of a combination of OL theory and other theories. In this case, the main objective was to prescribe frameworks and models that can facilitate the adoption and use of IS to enable OL in organisations. For example, Iyengar et al. (2015) and Keung & Kwok (2012) developed and presented a model focusing on group support systems as an IS tool to aid OL. Other examples include a model to facilitate onshore and offshore IT outsourcing business processes (Whitaker et al., 2010). A model that facilitates the adoption of electronic medical

records in hospitals and a model that facilitates the adoption of business-to-business e-commerce were presented (Goo et al., 2015). While the prevailing literature generally advocates that IS plays a supportive or enabling role in OL, certain early studies in the field contested this narrative (Gill, 1995).

The concern was the deterministic view that IS is undoubtedly an enabler of OL. The contention was that applying IS could enhance OL. Nevertheless, achieving OL might not be guaranteed. Robey and Boudreau (1999) studied a case that analysed two organisations. In each case, computers and communications were used to automate tasks. These tasks served as environmental scanning and operational functioning tools. When the external environment was rapidly changing, both organisations failed to prosper. They could not engage the OL activities of scanning and processing information within the organisation. This emphasises that although IS were implemented to improve OL, the desired OL outcomes were not realised in either of the organisations. Hence, IS can facilitate OL, but success is not assured. On the other hand, OL can facilitate IS adoption and use in organisations.

4.3.2 Organisational learning as a process that facilitates the adoption and use of IS

The second category of literature views OL as a critical process for achieving positive organisational outcomes (Robey et al., 2000). Organisational learning is also seen as a significant factor in technology assimilation to aid innovation in organisations (Lek et al., 2022; Upadhayay et al., 2024). This includes the successful adoption and use of IS (Lek et al., 2022; Robey et al., 2000). According to Zappa and Robins (2015), OL facilitates an environment where organisations can explore, produce, circulate and exploit knowledge to transform it into innovation. Thus, OL develops dynamic capabilities that allow organisations to sustain themselves in rapidly changing environments.

Dynamic capabilities (DC) are the organisation's ability to integrate, build and reconfigure internal and external competencies to address rapidly changing environments (Teece et al., 1997; Zhang et al., 2023). Teece et al. (1997) developed the theory of DC, which provides a framework as an extension of the Resource Based View (RBV) theory. The RBV theory describes the conditions under which organisations may achieve a sustained competitive advantage based on their resources and capabilities (Chatterjee et al., 2023; Sawers et al., 2008).

The fundamental assumption of the RBV is that resources and capabilities are heterogeneously spread in competing organisations and persist over time (Chatterjee et al., 2023; Wang & Ahmed, 2007). That is, as long as these resources and capabilities are valuable, rare, costly to imitate and non-substitutable, a competitive advantage will be achieved in an organisation. Barreto (2009) and Teece et al. (1997) recognised the relevance of the RBV theory. However, it did not answer how and why other organisations build a competitive

advantage in rapidly changing business environments (Chatterjee et al., 2023; Zhang et al., 2023). For this reason, the DC framework was developed to help understand the causes and processes of wealth creation for organisations, particularly in environments of rapid technological change (Karman & Savanevičienė, 2021).

The primary assumption of the DC theory is that the competitiveness of organisations lies in its organisational and managerial processes and is shaped by their asset position and paths available to it (Montreuil et al., 2020; Teece et al., 1997; Zhang et al., 2023). Organisational and managerial processes are the organisation's current routines, patterns, practices and learning mechanisms (Ferreira et al., 2021; Montreuil et al., 2020). Accordingly, all organisations have day-to-day processes or routines. However, these processes are specific to routines that enhance the competitive advantage of an organisation rather than processes designed for purely operational purposes. (Wang & Ahmed, 2007; Zhang et al., 2023). Organisational and managerial processes are followed by an organisation's strategic posture determined by its specific assets (Teece et al., 1997). These organisational assets include technological, complementary, financial, reputational, structural, institutional, market assets and organisational boundaries (Buzzao & Rizzi, 2023; Naseer et al., 2023). They determine the competitive advantage of the organisation at a particular point in time in the related market (López & Vivas, 2005).

In addition to the significance of the organisation's assets position in attaining competitive advantage, there is also the historical path of the organisation (Easterby-Smith & Prieto, 2008; Zhang et al., 2023). The historical path of the organisation refers to the path that the organisation has travelled from its inception to its current position (Ghasemzadeh et al., 2022; López & Vivas, 2005). Thus, the organisation's growth is the function of its current position and trajectory in moving forward (Teece et al., 1997). Its current position is shaped by the journey travelled (Sher & Lee, 2004). The path the organisation takes today, whether acquiring assets, investments and processes, will impact its future (Teece et al., 1997).

The importance of DC in an organisation for competitive advantage has been established and studied extensively. However, Zollo and Winter (2002, p. 340) probed, "*What are the mechanisms involved in the creation and evolution of DC*?". The answer to this question links the creation and evolution of DC with OL (Zahra et al., 2006). Karman and Savanevičienė (2021) explained that OL is essential in realising DC in organisations. In Easterby-Smith and Prieto's (2008) terms, OL processes enable the configuration and re-configuration of the organisation's operational resources and routines. Therefore, OL processes set a foundation for creating DC in organisations (Pulsiri & Vatananan-Thesenvitz, 2021; Upadhayay et al., 2024). Additionally, this addresses the reasons and objectives of implementing OL to enable the adoption and use of IS in organisations.

In this category of literature, where OL is viewed as a critical process for achieving positive organisational outcomes (Robey et al., 2000), there were coherent views that OL is necessary for facilitating adequate adoption and use of IS to achieve positive organisational outcomes (Grewal et al., 2001; Wijnhoven, 2021). For example, OL can be used strategically by guiding IT-enabled communication for superior customer value in marketing (Rogé et al., 2011). According to Bhatt and Grover (2005), OL is an essential antecedent of IT capability building in organisations. Thus, OL plays a significant role in mediating IT competency and organisational performance (Tippins & Sohi, 2003). OL can be used to understand and improve the implementation of the Enterprise Resource Planning (ERP) system in organisations and address contextual issues affecting users from the vendor's point of view (Liang & Xue, 2004). In another publication, OL is applied to understanding cybersecurity incidents and challenges organisations face (Patterson et al., 2024). In another case, OL and DC theories were used to investigate the effects of digital and green servitisation on IT innovation performances (Upadhayay et al., 2024). Another study examined single, double, and triple-loop learning to understand how organisations effectively adopt intelligence amplification (Wijnhoven, 2021). The research was undertaken to grasp the significance of OL processes in modelling the emerging work culture, emphasizing the crucial competencies essential for fostering innovation within organisations (Ivaldi et al., 2022). In a different study, the focus was on examining the contribution of AI systems to OL processes to understand how the correlation between the two can enhance core capabilities and yield improved strategic benefits for organisations (Jarrahi et al., 2023).

In as much as there are models developed for the facilitation of IS to aid OL in organisations, there are also models developed for the facilitation of OL as a strategic approach for enabling the adequate adoption and use of technology. For example, a model was developed that showed that OL's intensity positively affects the quality of the IS infrastructure and IS business experience. (Bhatt & Grover, 2005). Sherif et al. (2006) presented a model to explain peer-to-peer conflicts that are likely to arise with the introduction of disruptive technologies. The model aims to provide managerial interventions for resolving conflicts in such situations. The argument proposed that OL can potentially reduce conflicts by fostering effective coordination and learning structures. These structures empower employees to adapt work norms and practices in alignment with new work processes.

The last example is the Business Intelligence (BI) value creation model, which proposes possible paths by which BI assets and BI capabilities can create business value (Fink et al., 2017). OL was a critical lens for the development of the model. This is because there is a conceptual fit between operational BI capabilities with the exploitation of OL and strategic BI capabilities with the exploration of OL. The objective of the current study was to understand OL processes associated with the adoption and use of CC by SMEs in SA. Conscious

implementation of OL for adopting and utilising CC by SMEs can cultivate dynamic capabilities in adopting and using IS, such as CC. In addition, this may enhance SMEs' ability to improve their competitiveness in the information age. Furthermore, this underscores adapting some theories and frameworks to accommodate modernisation or the information age.

4.3.3 OL theories and frameworks

The last category of literature in IS and OL focuses on OL theory and its concepts. The literature consists of the initial stages of OL theory and progresses to adapting OL theory to address modernized organisations (Raymond & Blili, 2000; Berranger, Jones, & Tucker, 2001). Modern organisations include virtual organisations, network enterprises, and other organisational forms enabled by IS (ibid.). Various learning theories have been advanced over the years. However, the literature does not show that the same efforts have been made to advance OL theories. An aspect to consider is that in parallel with OL is the concept of a Learning Organisation (LO). These concepts sound similar and, in some cases, both concepts are used synonymously. For this research, it may be essential to distinguish the two concepts. As previously described and defined, OL infers a process. It is a sequence of actions or activities that an organisation undertakes to learn (Fiol & Lyles, 1985; Huber, 1991; Presenter & Joseph, 1996). On the other hand, LO implies a structure characterised by distinctive organisational elements conducive to learning (Presenter & Joseph, 1996).

A LO pays minimum attention to actions that result in learning. It focuses on structural dimensions that characterise an organisation as a learning organisation. Watkins and Marsick (1999) developed a framework for learning organisations. The framework consists of 3 levels of interrelated learning: individual, team, and organisational. As such, OL is part of the framework rather than being synonymous with a LO in this framework. Thus, this study draws a similar distinction by focusing on OL theory instead of LO theory. This study explores OL processes SMEs employ during the adoption and use of CC.

Organisational learning theory evolved from its early stages and origins (Shrivastava, 1983). One view is that OL is based on sharing an individual's assumptions to engage in a group in an organisational context (Argyris and Schön,1978). OL is a process where knowledge about action-outcome relationships and the effects of the environment are developed. The next perspective is from a production point of view, where OL is seen through an institutionalised experience. In this case, repeated tasks and activities produce learning (Abernathy & Wayne, 1974; Yelle, 1979). OL has grown from these theoretical foundations, and since then, there have been various theoretical explanations, mostly frameworks, as shown in Table 9.

Crossan et al. (1999), a good framework defines the theoretical assumptions built on. It also defines its territory. In other words, a framework must define its phenomenon of interest. This

is also evident in Table 9, where the authors outline the assumptions, the context, or the perspective from which these frameworks are built.

Shrivastava (1983) developed a typology of organisational learning systems based on previous research in OL. The author describes six types of OL systems, one-man institution, mythological learning, information-seeking culture, participative learning, formal management learning and bureaucratic learning systems. Huber (1991) explains OL in terms of information processing theory. In this theory, information processes are from a social and occasionally mechanical interpersonal context. Huber (1991) views OL as information processing in an organisation's context. The framework draws on the four constructs of information processing: knowledge acquisition, information distribution, information interpretation, and organisational memory. Huber (1991) explains that OL follows a similar progression of these processes. Huber's four constructs have been widely accepted among organisational learning theories and frameworks proposed in recent years. Namely, knowledge acquisition, information distribution, information interpretation and organisational memory.

Another framework was developed by March (1991), and two adaptation models were used to develop a theoretical explanation outlining the tension between exploration and exploitation in OL. Exploration refers to the organisation's activities involving searching, discovering and experimenting with new knowledge (He & Wong, 2004; March, 1991; Roth & Corsi, 2023). Exploitation refers to the organisation's activities that involve utilising and refining existing knowledge (Menor et al., 2002; Roth & Corsi, 2023). Nonaka and Takeuchi (1995) suggested four basic patterns for creating knowledge in organisations: Tacit to tacit knowledge, explicit to explicit, tacit to explicit and explicit to tacit knowledge. Tacit to tacit infers shared knowledge between individuals and an individual's socialisation into a "craft." Explicit to explicit knowledge infers a combination of explicit knowledge that results in new knowledge, though it does not extend an organisation's knowledge base. Tacit to explicit knowledge infers that tacit knowledge is articulated well enough to be applied and integrated with explicit knowledge to create a new knowledge base in an organisation. Explicit tacit knowledge infers the sharing of new knowledge (explicit) to employees in the organisation, where employees begin to internalize the knowledge to broaden their tacit knowledge.

Table 9: OL frameworks from literature

Author	Assumption	Theory/ Framework	Theoretical underpinnings	Objective	Context
(Shrivastava, 1983)	There are six types of OL systems; One-man institution, mythological learning systems, information-seeking culture, Participative learning, formal management learning systems, bureaucratic learning systems.	Typology of OL systems	OL Literature review (OL systems in organisations).	Develop and propose the concept of organisational learning systems.	Organisations
(Huber, 1991)	Defines OL in terms of Knowledge acquisition, information distribution, information interpretation and organisational memory.	Theoretical explanation/ OL framework	Information Processing (IP) theory and OL literature review.	Develop a framework by evaluating OL literature using the IP theory as a lens.	Entity as an organisation
(March, 1991)	There are relations between the exploration of new possibilities and the exploitation of old certainties in OL (The theory of exploration & exploitation).	Theoretical explanation/ OL framework	OL, adaptive processes literature review and theories of organisational action (Rational models of choice and theory of rational search).	Model the development and use of knowledge by studying the tension/balance between exploration and exploitation processes.	Organisations
(Nonaka & Takeuchi, 1995)	There are 4 basic patterns for creating knowledge, from Tacit to tacit, explicit to explicit, tacit to explicit and explicit to tacit.	Model	Knowledge management literature review and observations from the technology innovative organisations in Japan.	To explain the process and pattern that can assist organisations to move from tacit to explicit knowledge.	Technology organisations in Japan. (Product Innovation)
(Lukas et al., 1996)	OL manifests itself in the form of different sub-processes of learning. They consist of learning by adaptation, learning by assumption sharing, learning by developing a knowledge base.	Theoretical explanation/ OL framework	Adopted and followed the conceptualization of OL developed by Shrivastava (1983) and observations of a series of case studies.	Develop OL framework for/in marketing channels.	Marketing (Marketing channels)
(Crossan et al., 1999)	4I framework – OL follows a process of intuition, interpretation, integration and Institutionalisation	Theoretical explanation/ OL framework	OL and strategic management/ renewal literature review	Develop a framework for the process of OL.	Strategic renewal of an enterprise
(Raymond & Blili, 2000)	Forms of collective learning follow a process of shared objectives, actions (change) and results (increase competitiveness).	Model	OL theory and observations from sub-contracting organisations belonging to a network.	Identify levels of OL and develop an OL model for network learning.	e-commerce (SMEs), organisations belong to a network.

Author	Assumption	Theory/ Framework	Theoretical underpinnings	Objective	Context
(Berranger et al., 2001)	Virtual OL consists of 4 processes, knowledge allocation functions, social network updating functions, knowledge maintenance functions and collaborative knowledge retrieval functions.	VOL model	Observed Cyber community/virtual organisations (The integration between alliance organisations/ inter-organisation)	Assemble insights about learning in a VO by developing a conceptual model for virtual organisational learning.	Cyber community/virtual organisations (SMEs).

Lukas et al. (1996) presented an OL framework based on marketing channels. Marketing channels are distribution channels from the manufacturer to the customer (Kozlenkova et al., 2015). Lukas et al. (1996) explained that OL manifests itself through different subprocesses of learning. They consist of learning by adaptation, learning by assumption sharing, learning by developing a knowledge base.

Crossan et al. (1999) developed a 4L framework that defines the sequential process of OL, consisting of Intuition, Interpretation, Integration and Institutionalisation. These processes occur in 3 levels of the organisation, which speak to the structure of the organisation. These structures are at individual, group, and organisational levels, where learning also happens at cognitive and action levels. Recently, Raymond & Blili (2000) illustrated forms of collective learning based on organisations (SMEs) belonging to a network regarding shared objectives, actions, and results. One of the main objectives of an organisation is to be competitive consistently. Thus, the capacity to perceive environmental threats is seen as a key shared objective. The concept of actions refers to the reaction that enables organisational transformation. Leading to increased competitive advantage in the network and the outcome of learning within the network. Berranger et al. (2001) identify four fundamental concepts of virtual organisational learning. Namely, knowledge allocation function, social network adaptation function, knowledge maintenance function and collaborative knowledge retrieval function. In addition to the mentioned theories, the present study aims to explain an OL theory used in South African SMEs during the adoption and use of CC.

4.3.4 The summary of the literature reviewed

In summary, the literature consists of two main themes, OL and OL in IS. Figure 8 outlines these concepts and others from the literature review process.

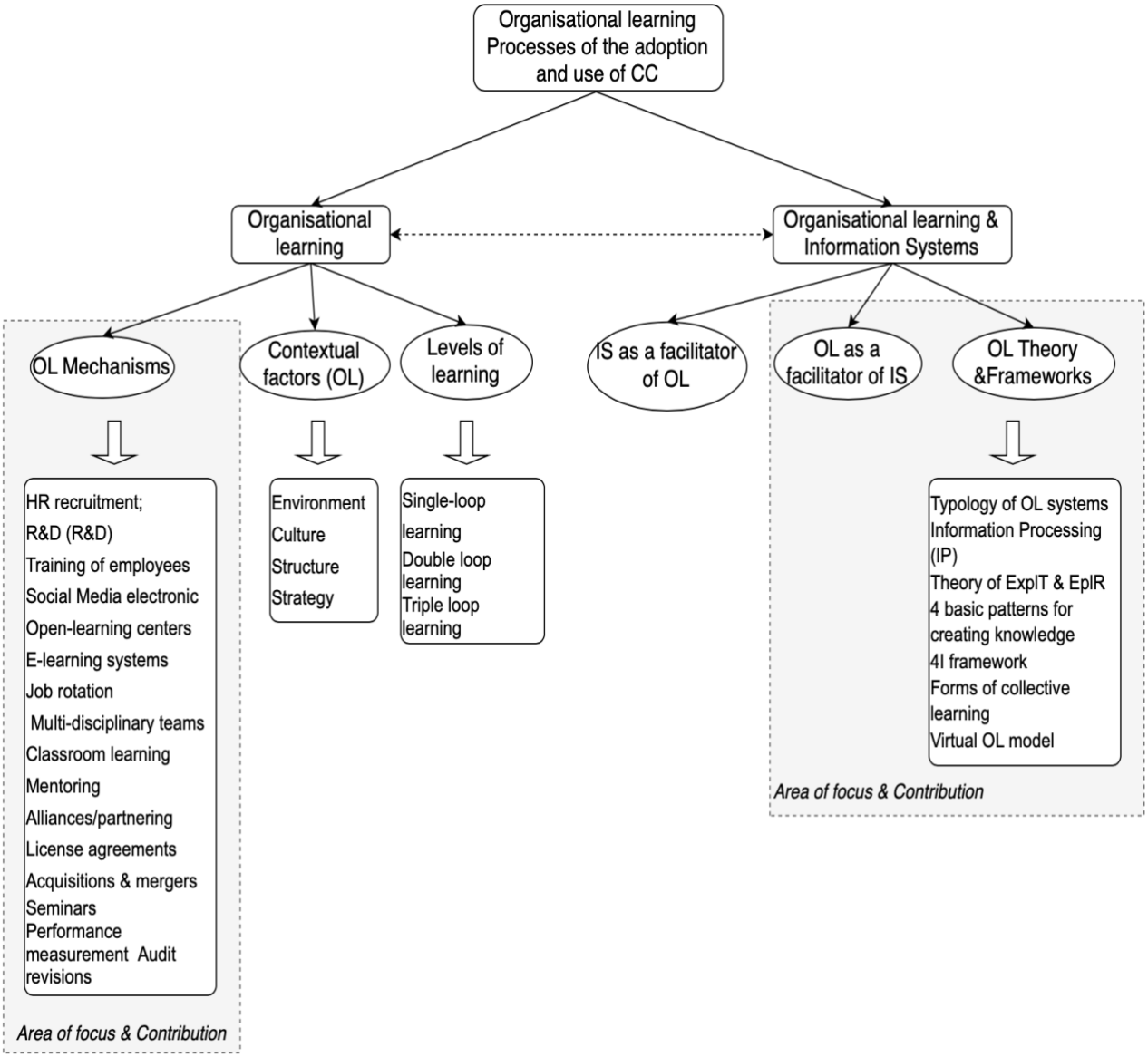

Figure 8: Themes based on the literature reviewed on OL and IS

Thus, the study will contribute to the literature that focuses on the OL mechanism used by SMEs. The study will further contribute knowledge in the area of OL as a facilitator of IS and OL theory by developing an OL theoretical explanation that facilitates the adoption and use of CC in SMEs.

4.4 Methodology

The objective of this study was to understand and explain the OL processes that facilitate the adoption and use of CC. The study followed an abductive strategy drawn from Blaikie's (2007) perspective. The abductive strategy starts with the reporting of a social actor's accounts, which consists of the following layers: The *everyday concepts and meanings* provide the bases for *social action/interaction* where *social actors can give accounts* from which *social scientific description can be made* from which *social theories can be generated* or which can be

understood in terms of *existing social theories or perspective* (Blaikie, 2007). Thus, the participatory observation approach that has been adopted has enabled the understanding and reporting of everyday concepts, meaning, and interaction of social actors' accounts. Participatory observations and ethnographic interviews were used to collect data to get the social actors' accounts.

The process of applying the given methods is shown in Figure 9.

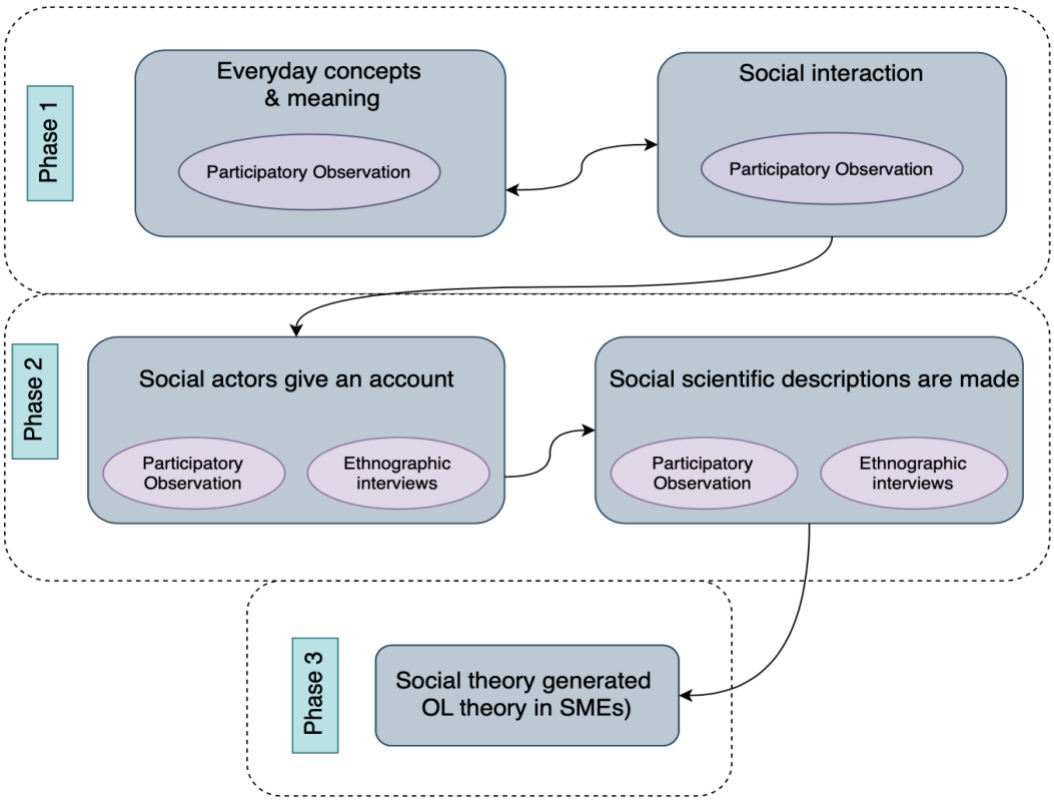

Figure 9: The abductive strategy process

The first phase focused on social interaction, which helped in understanding the context and everyday concepts and meanings. The everyday concepts and meanings shared among the individuals working in SMEs were recorded. In this phase, participator observation was useful for observing the context and social interactions. The second phase allowed a process where social actors could give their account of their experiences through ethnographic interviews. In this phase, scientific descriptions were made through taking notes, recording and transcribing interviews. The last phase focused on generating the OL theory that facilitates SMEs' adoption and use of CC in SA.

The unit of analysis consisted of 23 SMEs in SA that have adopted and are using CC. The unit of observation consisted of 23 participants, as shown in Table 10.

Table 10:Profile of SMEs for Study 2

Respondents	SME Size	Location	CCSP	CC service	Scope of operation	Industry
Respondent 1	Medium	JHB	Local moving to Global	IaaS moving to S/PaaS	South Africa	Telecommunications
Respondent 2	Small	CT	Global	SaaS	Global	Digital Marketing
Respondent 3		CT	Global	SaaS	South Africa	Travel & Tourism
Respondent 4		CT	Global	PaaS	South Africa	Information Technology
Respondent 5		CT	Global	SaaS/IaaS	South Africa	Animation
Respondent 6		CT	Global	SaaS	CT	Hospitality
Respondent 7		JHB	Global	SaaS/PaaS/IaaS	Global	Information Technology
Respondent 8		CT	Global	PaaS/SaaS	Global	Education
Respondent 9	Medium	JHB	Global	SaaS	South Africa	Education
Respondent 10	Small	CT	Local	SaaS	Global	Private Security
Respondent 11		JHB	Global	SaaS	JHB	Information Technology
Respondent 12	Small	CT	Global	SaaS	Western Cape	Private Security
Respondent 13	Small	CT	Global	SaaS	Africa	Finance
Respondent 14	Medium	JHB	Local	SaaS	South Africa	Telecommunications
Respondent 15	Small	CT	Global	SaaS/PaaS/IaaS	Global	Finance
Respondent 16	Medium	CT	Local	IaaS	South Africa	Retail (online shopping)
Respondent 17	Small	JHB	Global	SaaS	Global	Finance
Respondent 18	Small	JHB	Global	SaaS	Africa	Finance
Respondent 19	Small	CT	Global	PaaS	Western Cape	Education
Respondent 20	Small	CT	Global	IaaS	Africa	Beauty and fitness
Respondent 21	Medium	CT	Local	IaaS	South Africa	Advertising
Respondent 22	Small	JHB	Global	IaaS	South Africa	Tourism
Respondent 23	Small	DBN	Local	SaaS	South Africa	Marketing

The focus was on SMEs based in the cities that make up the key economic hubs in SA. The cities are Durban (KwaZulu Natal), Johannesburg (Gauteng) and Cape Town (Western Cape) (National Small Business Chamber, 2016). The focus was on cities, as most SMEs in SA are found in Durban, Johannesburg, and Cape Town. Participants consisted of SME owners, executive managers, chief executive officers and chief information officers. The criteria used in selecting the sample consisted of SMEs that had been using CC for more than six months and were dispersed within the spectrum of CC service offerings (SaaS, PaaS, and IaaS). This is because the interest of the study is focused on the adoption and use of CC in SMEs. To acquire rich data and experience from SMEs regarding the adoption and use of CC, SMEs would need to have at least worked with CC services for a reasonable period. The provision of the industries in which SMEs operate, the cloud services used by SMEs, and the scope of operation provide insight into the context of the SMEs.

The data analysis process began with a reflection on participatory observations made using interpretive analysis and the reflections are reported in Table 17. The participatory observations aligned well with the abductive strategy adopted from Blaikie's (2007) perspective. This meant that everyday concepts and meanings, social action/interaction, and social actors' accounts of social scientific descriptions were observed and reported.

Additionally, data analysis followed an inductive approach, using thematic data analysis to generate themes to describe the OL mechanisms SMEs in SA apply when adopting and using CC**.** The objective of this phase was to describe OL mechanisms that SMEs in SA apply when adopting and using CC. thus, open coding was applied to identify codes from data that corresponded with OL mechanisms used by SMEs in SA when adopting and using CC. The codes were grouped together and refined to form categories. The categories were grouped into sub-themes, which led to identifying the OL mechanisms. It's important to note that OL is operationalised through OL mechanisms (Battistella et al., 2020). Therefore, to understand the OL theory that is at play in these SMEs, one must examine OL mechanisms. These mechanisms were then compared to existing OL theories in the literature (outlined in Table 9). Among them, two theories; the theory of Exploration and Exploitation (ExplR and ExplT) (discussed in section 4.5.5) and the 4I framework (discussed in section 4.5.6). were selected. While other theories contained some relevant OL concepts, these two were the most compatible with the data, making them the most suitable choices. Tavory and Timmermans (2014) explain that familiarity with a broad range of theories is valuable for the abductive strategy. A novel theoretical explanation can occur in abduction with other theories in the background. This is not to say that abduction depends on existing theories but that existing theories can position the researcher to verify, falsify or modify existing theories (Blaikie, 2007). This reasoning led to the last phase, where a deductive approach was applied. In this phase, the OL theory of exploration and exploitation; and the 4L framework were used to analyse the data further. In this case, theoretical coding was employed, where concepts from the two OL theories were incorporated into the data through coding. Additionally, all the relationships between the concepts were analysed using the causal loop technique to understand the relationships further. This resulted in a theoretical explanation focused on OL processes found in SMEs in SA when adopting and using CC.

4.5 Findings

This section presents the findings from participatory observations, OL mechanisms, and the Theoretical explanation of OL applied by SMEs when using CC. Participatory observations resulted in a deeper understanding of the context and the environment of the SMEs that use CC in SA. This was significant for the first phase of the abduction process, as shown in Figure 9. In this phase, everyday concepts and meanings were identified and reported, and the social

interaction of these SMEs influenced by the SME's context and environment was observed and outlined.

The report of concepts and meaning used in everyday language is provided in Table 11. A report that describes and summarises contextual themes based on the researcher's interpretation of the observations is provided and depicted in Figure 10.

4.5.1 Concepts and meaning from everyday language

The concepts and the relevant meaning that transpired during participatory observations are given in Table 11. They mostly consist of technical jargon and some social terms used by actors in everyday language.

Table 11: Everyday concepts and meaning

Everyday concepts in relation to cloud computing	
Everyday concepts (IT related)	**Everyday concepts (IT related)**
Access to resources	Access to resources
Application	App
Costly	Expense
Connectivity	Connectivity
Console	Console
Control	Control
Disaster recovery	Recovery
Downtime	Offline
Environment	Environment
Host/ing	Host/ing
In-house system	Hosting our systems in our servers.
Infrastructure	Infrastructure
Instance	Virtual server/spinning an instant
Internet connection	Connectivity
Tech savvy	IT savvy
Managed service	Automation
Migrate	Migrate
Infrastructure	Physical equipment.
Platform	They would be specific (AWS/Azure etc.)
Real-time	Real-time
Reliability	CC is reliable and always available
Third parties	Resellers
Servers	Servers
Service	Service
Sharing recourses	Sharing
Skills	Skills
Bandwidth	Speed of the internet
Support	Support
Everyday concepts (Business related)	**Everyday concepts (Business related)**
Convenient/nce	Easy
Efficient	Effective/Efficient
For business continuity	Stable
Value for customers	Important or liked by customers
Industry	Tech space

4.5.2 Contextual themes

The insider's perspective from participatory observations allowed a deeper understanding and perspective of the context and environment of the SMEs that use cloud computing in SA. This is significant because social action and interaction of these SMEs are either affected or caused by the context and environment. This further affects the learning processes associated with the adoption and use of CC by these SMEs. The context and environment that SMEs find themselves in, have implications on SMEs, and are summarised in Figure 10.

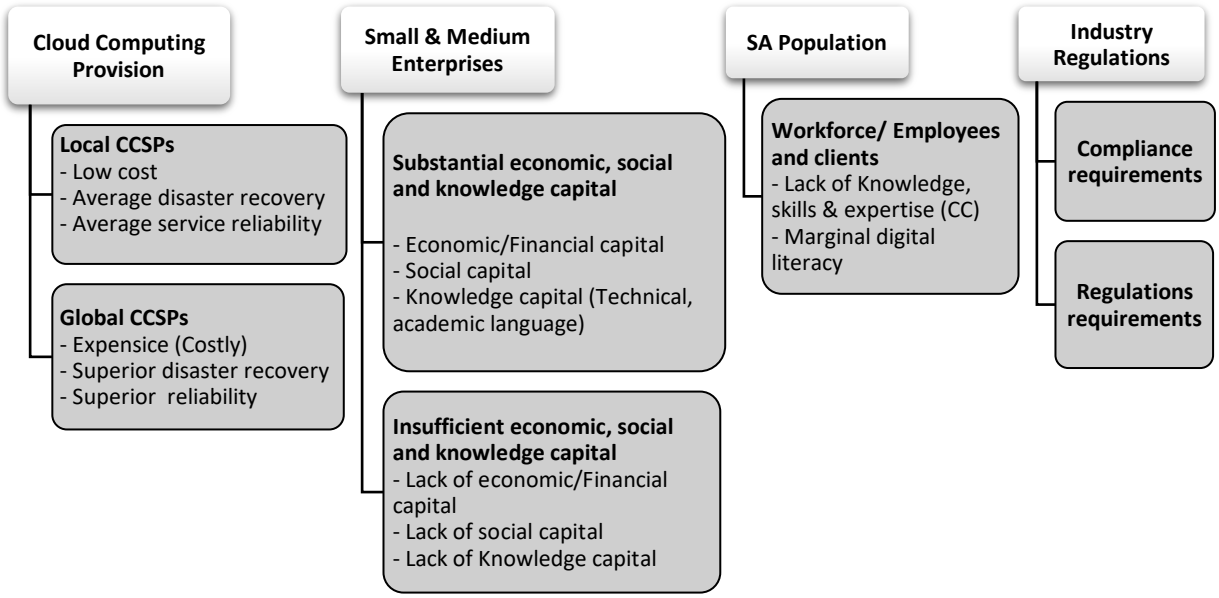

Figure 10: Contextual themes and environment

Observations showed that CCSPs are made out of global and local CCSPs. The global CCSPs have ample resources and expertise to ensure CC provision to the global market. On the other hand, the local CCSPs have limited resources compared to the global CCSPs. One can liken local CCSPs to frugal innovations often found in middle-income countries (Zeschky & Winterhalter, 2014). This means that the CC technology offered by local CCSPs meets the minimum requirements of a fully-fledged CC technology. The definition and five fundamental characteristics of CC technology were established by the National Institute of Standards and Technology (described in section 1.1) (Mell & Grance, 2011). For example, the local CCSP's cloud service would only have a few of those characteristics. This translates to a division in the type of services that SMEs can access. For example, local CCSPs offer their services at a cheaper rate with minimum offerings. On the other hand, global CCSPs provide their services at an expensive rate with a number of offerings. The observations and informal conversations show that SMEs that use local CCSPs would have less reliable and available access to CC services. SMEs that use global CCSPs would have improved reliable and available services.

This discovery led to the need to understand the context and type of SME using the global or the local CCSP. According to the SA National Business Act, SMEs are formally classified according to size (Number of employees) and annual turnover (Republic of South Africa, 1996). In addition to this classification, it also became apparent that the SMEs could be classified in terms of their economic, social and knowledge capital (SEK). These concepts described are similar to Bourdieu's concepts of the theory of capital, which includes economic capital, social capital, which includes knowledge capital (Bourdieu, 1986). Economic capital simply refers to the financial capacity of SMEs. Social capital provides knowledge capital that refers to a network of relationships with key stakeholders in the CC industry and beyond. In this social network, knowledge capital is shared by a wider collective.

Various stakeholders would meet at events organised by global CCSPs to discuss and share knowledge related to CC. In these events it was rare to meet SMEs with less economic, social and knowledge capital. This means a group of SMEs were left out in the platforms where there was evident knowledge creation and sharing. The language usage provided another noticeable indicator, representatives from SMEs with greater capital employed technical concepts related to CC. It demonstrated an extensive vocabulary integrated into their daily communication, as shown in Table 11. On the other hand, SMEs with limited capital did not possess a vast vocabulary; instead, they often referred to the name of a specific cloud service interchangeably with the broader concept of CC.

Another contextual influence is that of industries in which SMEs operate. Various regulations govern industries. Therefore, SMEs need to comply with industry standards and regulations. These standards and regulations affect the adoption and use of CC by all organisations, including SMEs. For example, SMEs with access to personal information about individuals must adhere to the POPI Act in SA. This means that SMEs who adopt CC need to ensure that the CCSPs comply with this act. In this case, some SMEs would be oblivious to the CC adoption and use regulations. However, in their learning process, they come to a point where they consider their operation in the cloud and sometimes have to migrate to other CCSPs.

Another aspect is that of the population. Some SMEs find themselves having to educate and train clients and employees in using cloud services. One cannot assume that the clients are digitally literate and can easily adapt to using CC services. Although South Africa has a 50% literacy rate, one of the highest rates in Africa, it is still a challenge as it means that 50% of the population is not digitally literate. Therefore, some SMEs find that employees and clients have low digital literacy, which introduces a barrier to understanding CC.

4.5.3 A synthesis of the observations

Firstly, it was observed that the extensive use of technical jargon in everyday language may be a potential barrier to learning about CC. As individuals develop cognitive maps of the realms

they navigate, interpreting language plays a vital role (Crossan et al., 1999). Therefore, when an unfamiliar phrase is used to communicate a message to an audience or an individual, it makes it difficult for people to comprehend the message. This may affect the ability to recognise the value of new information (Cohen & Levinthal, 1990). For example, language may be a barrier for some SMEs in recognising CC's value in their context. This, in turn, may affect SMEs' adoption and possibly use of CC. One of the contextual factors that came from participatory observations and that exist in SA is the inadequate levels of digital literacy in SA. Where only 50% of South Africans have digital literacy. This ties in well with Cohen and Levinthal's (1990) view that prior knowledge must be diverse and associated with new information that allows assimilation. Thus, assimilation permits creatively utilising new knowledge (Tsai, 2001). Therefore, using technical jargon in everyday language may exclude some SMEs that do not have prior knowledge associated with CC.

Secondly, when SMEs have adequate social, economic, cultural and knowledge capital, their OL processes become strategic and effective. SMEs that have educated employees and embrace a learning culture, particularly at an individual level (self-learning), turn to OL activities that add value to business productivity and efficiency. It was also observed that these SMEs easily adopted and used CC with confidence to improve their competitive edge and customer satisfaction. On the other hand, SMEs who did not enjoy social, cultural and economic capital struggled to get employees on board because the learning culture was not embraced at an individual level. This causes these SMEs to struggle to initiate learning opportunities and create a learning culture.

Lastly, when SMEs use global CCSPs, they become entrenched in an established learning agenda and culture provided by global CCSPs. Global CCSPs established that the adoption and use of IS are driven and influenced by knowledge. Knowledge can only come about through the process of learning. One of the strategies used by global CCSPs is to provide learning opportunities and platforms for organisations, including SMEs. Therefore, SMEs with access to such global CCSPs know about CC services. Thus, SMEs draw from the learning activities and learning culture associated with global CCSPs.

An explanation of the context of SMEs was valuable in providing some of the factors that influence OL in SMEs. However, understanding OL mechanisms used by SMEs is foundational for generating an OL theory applied by SMEs when adopting and using CC.

4.5.4 OL Mechanisms

The OL mechanisms SMEs apply when adopting and using CC are outlined in Table 12. They consist of training, investigative and enquiring activities, collective learning, experimenting, alliances, CCSPs learning initiatives, experience, documentation and learning through mistakes. The findings revealed that SMEs engage in OL through various OL mechanisms, with training being the most used OL mechanism.

Table 12: OL mechanisms

Themes of OL mechanisms	Subcategories of OL mechanism	Quotations
Training	Traditional training (47)	"*Once the training is done, you can contact them, you can pay your monthly subscription to have the system up and running, and the integration*." R6 "*…most of the services come with like basic training, so that helped a bit*." R13
	YouTube Videos & online tutorials and Webinars (8)	"*I just go to Udemy and I just take a look at the webinars on Udemy and I go through the training*" R1 "*You can train yourself online, there are courses that you can do, you link in through the system into my agency page…."* R3
	Training for clients (10)	"*…community perspective being first-time users of technology and computers…you have to take it a step at a time. You give them the basic digital skills and then once they have the confidence…they can engage with online platforms.* R9 "*We do we have an onboarding process for new clients. So, it is a formal process where we teach them*" R2
	Refresher courses (4)	"*Then they have refresher courses every couple of years that we send people on regarding that on any updates*" R3
	Certification (3)	"*But there is a person who is already certified on AWS cloud certification.*" R1
Investigative and enquiring activities	Research (magazines/journals, blogs, online reviews, search platforms) (41)	"*I did research online to see which is the most reliable provider…*" R1 "*We virtualized our own hardware to run on VMware, so I basically did lots of the research myself… that was my own learning doing research online…I just use Google*." R10 "*Somebody might go on another website and read reviews, and say other people say that this is junk.*" R10 "*Google reviews on it so…Often like there is a guarantee, there is tons of companies out there that are like comparison on things and that's probably how I would educate myself*." R2 "*He made it through by reading the documents, blog posts online…so people will be like this is how we deployed our XYZ on AWS in the US. And reading those is like so insightful…*" R8 "*I went to those websites, tried, you know like demos and whatnot…*" R17
	Online demonstrations (2)	"*In the show and tell, I showed them in real time how these features work. So, we have not committed to that, I was basically running on a free trial version for a month.*" R10 "*I went to those websites, tried, you know like demos and whatnot…*" R17
	Social media (adverts) (3)	"*I found it (cloud services) through Facebook…*" R11
Collective learning	Sharing ideas, show and tell, Employees training each other, Informal social sharing (42)	"*Each IT person is for their specific region, but we share ideas with each other…*" R1 "*…I will research sticky and I have to do a show and tell. So…there will be a one-hour session, we will sit in the boardroom with a big screen and I have to do a show and tell…*" R10 "*…they certainly learn from each other… when you put them in a room and they're talking about our ecosystem*." R4 "*…somebody may find an easier way to learn, you know or to explain something about cloud platforms can give you the opportunity to share that*." R9

Themes of OL mechanisms	Subcategories of OL mechanism	Quotations
Experimenting	Trial run (29)	"…*we tried sticky sessions, that was supposed to be the solution, but it did not work.*" R13 "…*I will never be able to sign up with a provider and not be able to do a trail or run it at least...*" R10 "*People don't just want to pay for something from day one and they don't know what they are going to get*." R10 "*Most products operated today have a trial at least or even for one week if they have a trial for me to at least run…*" R10 "*And at this point I sort of started a bit more experimentation with, you know, looked at some of the things from AWS, I played around with Google Cloud*." R8
Alliances	Partnership (Inherited IS service provider partnerships) (22)	"…*the journey, I would say, started with Google. They were very kind to us. They gave us a whole bunch of money on things like 20 or $25,000 for the year and they said these are our tools… we started there*." R4 "*My IT specialist guy who connected me to a CCSP… he explained their product, their software and then that was exactly what I wanted*." R23 "…*I can give you a bit of context because we work so much with Google, we are actually Google certified partners*" R2 "…*And as we went along, we've then got partners for cloud services*." R9 "…*the search engine is Google, so we are very entrenched in the whole Google, so trust the brand like everyone else does and it also would have just been…a big part of it…*" R2 "…*It would have made our lives more difficult to use an eternal source than just to use Google given that everything is part of…google is baked into everything in the business, so yah*." R2
	Consulting firms (6)	"*We did it in consultation…consultant for certain advice. Basically, that was my own learning*…" R10 "*You also get a consultant…*" R2
	Helpdesk, support centres, call logs (8)	"…*24-hour support text box that you can open up for web chat with someone*…" R14 "…*24-hour helpline that you can phone when you have a problem*…" R 6 "*They do have customer support, I don't think you can call them, I think it would have to be like a chat online or be it email. And I have had to ask them about things, and they have been helpful*." R5
CCSP's learning initiatives	Emails, webchats & updates from CCSPs (13)	"…*we have a lot to do with Google and we have a team that attends a lot of their conferences*." R2 "…*they do send a lot of updates and when they've changed things or fixed bugs, they keep you much updated*." R2
	Conferences, seminar events (6)	"…*they are always sending us emails about new videos, conferences and to keep you up to date with the advances and new features… Microsoft and AWS give conferences…*" R13
	Learning about CC services initiated by CCSPs (6)	"*I think that would have happened organically in the beginning. We started using it and then we would run out of space, so then it just tells you that, oh, it costs as extra.*" R2 *"I think you'll find that a lot of the start-ups in this space are very spoiled these days because they have Google knocking on their door AWS knocking on their door…*" R4

Themes of OL mechanisms	Subcategories of OL mechanism	Quotations
Experience	Previous Skill and knowledge (22)	"…*somebody might raise his hand and say I have experience with this from my previous company.*" R10 "…*I have worked with cloud-based ecologies before, I kind of knew that you sign an NDA (Non-disclosure agreement) with the service provider*." R14. "…*We have all been exposed to the Google cloud platform*." R16
Documentation (procedures and processes)	Documentation from CCSPs and within the organisation (14)	"…*and you are always learning new things and the nice thing is that their (CCSPs) documentation is really easy to follow and it's quite easy to find."* R13 "…*I think Google has got some pretty good documentation on getting self-started… they have a lot of documentation, guides and tutorials*" R19 "… *we have systems of how we use Google Drive so in certain folders for things and in certain places.*" R2

Training is an OL mechanism that most SMEs have used in the adoption and use of CC. Most SMEs create opportunities for their employees to attend formal training. Training methods include training offered by CCSPs, certification organisations or third parties and refresher (repeat) courses. The information age provides training opportunities such as webinars, YouTube videos, and online tutorials. This gives SMEs the option to use training as an OL mechanism. Training is traditionally applied to develop employee competence in various fields (Joel et al., 2023). IS organisations turn to send employees for training when an IS has already been adopted (Cha et al., 2016; Lee et al., 2018; Robey et al., 2002; Domínguez-Escrig et al., 2023). It was interesting to note that a few SMEs offer their employees training before adoption.

One of the respondents explained that "*you don't want to get trained when you adopt something. You would rather get trained maybe a few months or a few years before as you would know how to support the system and then you can take over it*. *Because when you get trained when you are already using the system, then you won't be fully qualified to do it, but if you do it before, then it will be easy for you*" (R1). This was done to understand the strategy fit of CC services for sustainability and organisational goals. OL literature indicates that training is a common OL mechanism used in organisations (Encinas Bartos et al., 2024 & Joel et al., 2023). However, in the literature, training is not positioned as an OL mechanism organisations use to test CC's suitability for sustainability and organisational goals.

The OL mechanism of investigative and enquiring activities is applied by SMEs in the adoption and use of CC (Imran et al., 2016; Llorens-montes & Martínez-lópez, 2016). This OL mechanism refers to deliberately seeking information through online searches, reading, journal magazines, blogs, online reviews, online demonstrations and social media.

Another OL mechanism is collective learning, where employees learn from each other by sharing and demonstrating ideas, learning as a collective even outside the organisation through meetups and social activities. This pointed to the employees' learning culture in most SMEs and the lack of a learning culture in some cases. This OL mechanism is identified as the one that leads to high levels of knowledge acquisition and skills development (Keung & Kwok, 2012).

Experimenting with CC tools and services has shown to be another way of overcoming the lack of knowledge about CC. Well-known CCSPs have opened their cloud platform for testing and experimenting purposes. The platforms are open at no cost to both individuals and organisations for a given period. This provided SMEs with opportunities to experiment with CC services before adoption and for refining CC competencies during the use (after adoption) of CC. OL literature highlights the significance of experimentation as an OL mechanism (Joel et al., 2023). Sheng and Chien (2016) assert that experimentation inspires radical innovation in emerging domains. Experimentation can potentially increase the chances of innovation and will, as such, contribute to the overall goal of OL (Robey et al., 2000; Syed et al.,2024). The fact that experimentation for CC services is made available by CCSPs, often at no cost, may indicate that CCSPs are trying to drive the learning culture in the context of CC adoption and

use. This is corroborated by using CCSP learning initiatives that are accessible and available to SMEs. These consist of meticulously organised events for learning processes, from technical lectures to sharing lessons and experiences about business and operational matters. Thus, SMEs would include attendance at such events as a learning strategy.

Alliances refer to joint ventures or relationships that SMEs have with each other and other organisations that have been essential for learning. Examples include consultants for SMEs, partnerships, and Internet service providers (ISPs) who became CCSPs to SMEs. In these relationships, SMEs can leverage knowledge as an intangible resource (Ngwenyama & Nørbjerg, 2010; Al-Tabbaa & Zahoor, 2024). Various organisations have also used alliances and networks to enhance learning (Robey et al., 2002; Dong & Yang, 2015; Al-Tabbaa & Zahoor, 2024). This OL mechanism is another way of overcoming knowledge barriers that are well recognised in OL literature (Feller et al., 2013; Villalonga & Mcgahan, 2005). This aligns with the findings, where partnerships with IS service providers become a path for learning about CC and, therefore, adopting and using it.

Experience is another OL mechanism that SMEs considered and applied in adopting and using CC. It is also an OL mechanism described and seen as the prime source of productivity (Boh et al., 2007). Bhatt and Grover (2005) elaborate that IS business experience allows organisations to integrate IT strategy into business strategy. Tippins and Sohi (2003) explained that organisations can acquire information through the experience of others. As important as experience is, it is not as prevalent in the data. This may indicate the lack of knowledge and skills of CC. It was also noted that recent literature focusing on human resources and experience is quite limited in the context of SMEs. Most of the research in this area focuses on tools that improve human resource management in SMEs (Coetzer et al., 2023; Biea et al., 2024).

Another OL mechanism that was not prevalent in the data is that of documented procedures. Few SMEs had documented procedures as an OL mechanism. The few SMEs that invested in formalising processes of using CC services ensured that new employees could quickly learn and follow instructions. In OL theory, documented procedures are memory mechanisms (Tippins & Sohi, 2003). They serve as a warehouse of information in organisations where they encourage the continuity of CC operations or optimal use. OL mechanisms that have been described are generally applied by SMEs when adopting and using CC. However, further insights were made in integrating the OL mechanisms with participatory observations, as outlined in Figure 11.

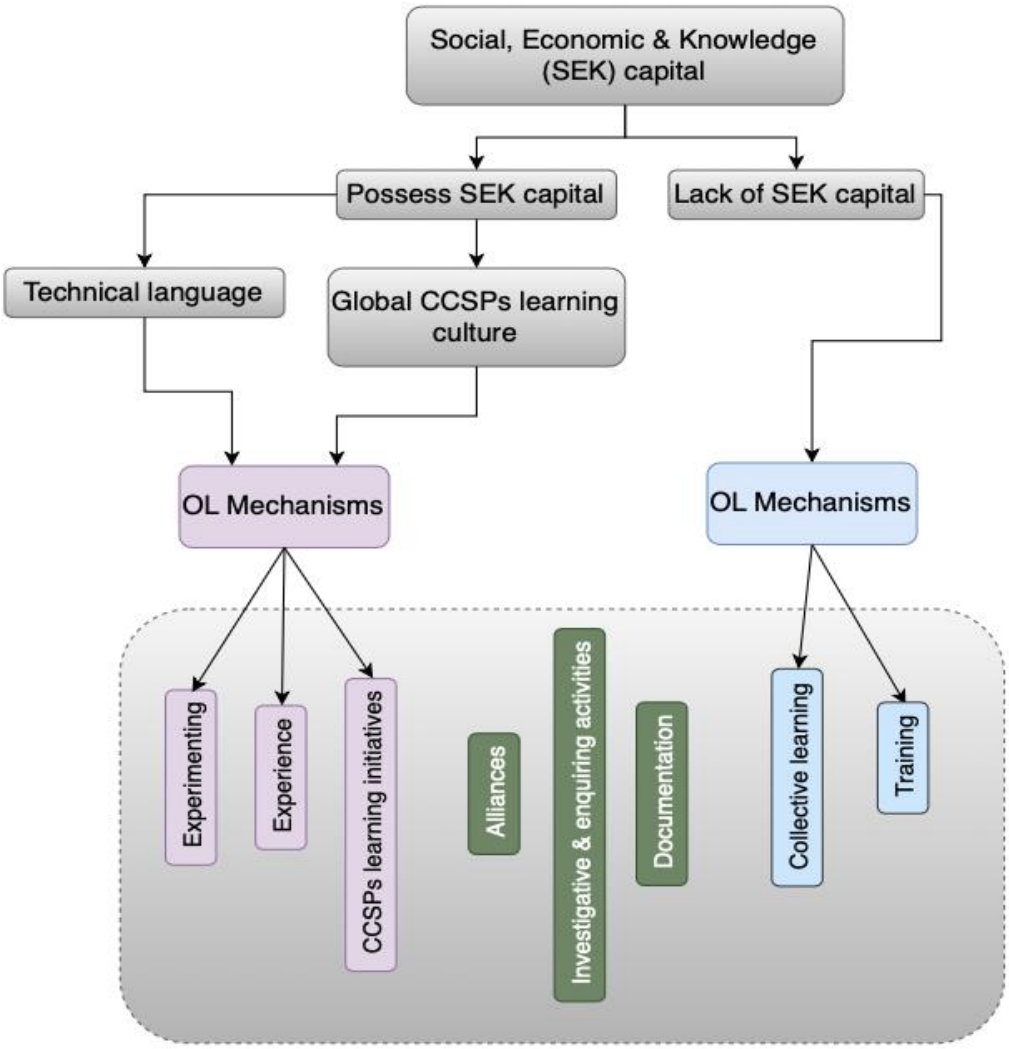

Figure 11: OL mechanisms and social, economic and knowledge capital in SMEs

SMEs with social, economic, and knowledge capital use more experimenting, experience, and CCSP initiatives. SMEs that lack social, economic and knowledge capital lean towards training, and collective learning as OL mechanisms. SMEs with social, economic and knowledge capital also have employees who can draw from past experiences. They also benefit from collective capital, mostly knowledge capital that comes with CCSPs' learning initiatives. These learning initiatives have added significantly to the learning culture around CC's use in various industries. However, SMEs with little social, economic, and knowledge capital do not benefit from such initiatives as they are not within these collaborative networks, which results in some collective capital. This phenomenon excludes SMEs with less social, economic and knowledge capital. This may further cause a digital divide in this context.

Identifying and describing the OL mechanism have offered valuable insights that can add value to SMEs and CCSP practitioners. Most importantly, the OL mechanisms provided a vital basis for further analysis of data to unearth the underlying OL theoretical explanation that SMEs

apply when adopting and using CC. The third phase is introduced at this point, as shown in Figure 9. In this phase, the social theory was generated, precisely the OL theoretical explanation, that could be understood in terms of existing theories (Blaikie, 2007; Okoli, 2023). The existing theories identified and consistent with the assumptions and concepts found in the data consisted of the theory of ExpIR and ExpIT and the 4I framework. The theories that were sampled are presented in Table 9.

4.5.5 The theory of ExpIR and ExpIT

The theory of ExpIR and ExpIT

OL is one of the key elements that have the potential to foster organisational performance and strengthen competitive advantage in an organisation (March, 1991). The visual description of the theory is provided in Figure 12.

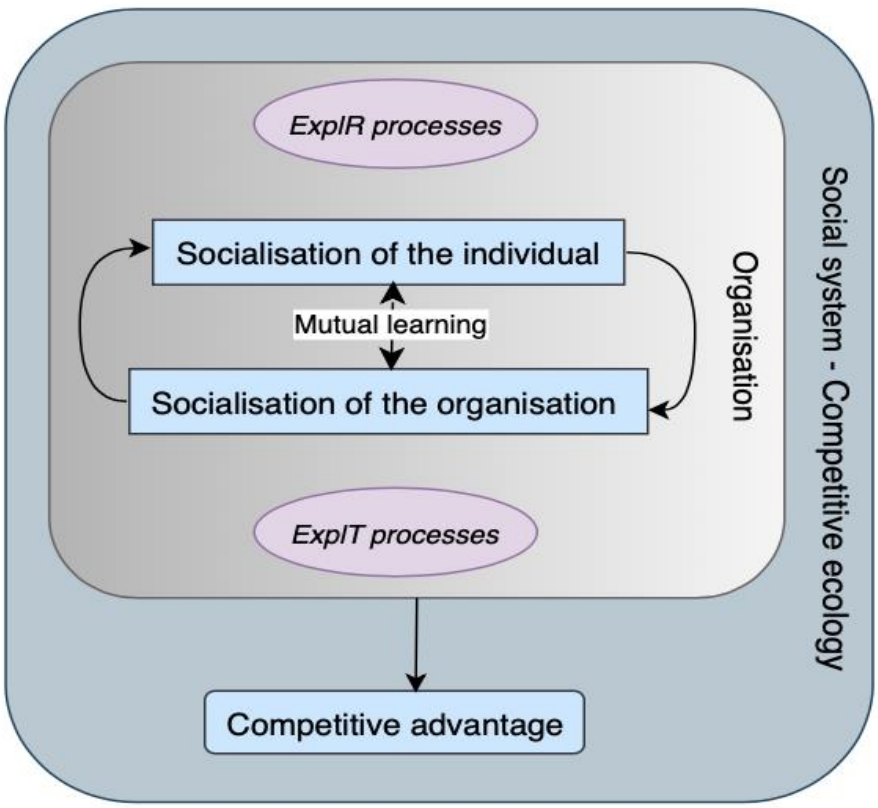

Figure 12: The theory of ExpIR and ExpIT by March (1991)

The theory of ExpIR and ExpIT considers the trade-offs between the two processes (ExpIR and ExpIT) by considering their contexts of distributed costs, benefits and ecological interaction. The study will focus on the ExpIR and ExpIT processes, the trade-offs and the social context of OL. This is justified by the fact that in the data collected, there were clear observations of the ExpIR and ExpIT processes, interaction between employees (mutual learning) within SMEs and between SMEs as organisations (social system/ecological

interaction). Distributed costs were not at the heart of the study, as the focus was on understating SMEs' OL processes in adopting and using cloud computing. The next sub-sections will address the main concepts of the Exploration (ExplR) and Exploitation (ExplT) theory in OL.

ExplR and ExplT processes

Exploration refers to the organisation's activities that involve searching, discovering, and experimenting with new knowledge (He & Wong, 2004; March, 1991; Roth & Corsi, 2023). Organisations explore by pursuing new knowledge and skills through developing and experimenting with alternatives (Goo et al., 2015; Lee et al., 2018). This is a dynamic process of creating new knowledge for later transfer and use. Alternatively, ExplT refers to the organisation's activities involving utilising and refining existing knowledge (Menor et al., 2002; Stei et al., 2024). It focuses on the existing knowledge and skills. It is characterised by implementation, utilisation (use), and refining and improving existing knowledge (Rothaermel & Deeds, 2004).

Table 13: Exploration and exploitation processes

Themes	Sub-themes	Definition
Exploration	Discovery Exploration Search Play Innovation Experimentation	Activities are characterised by search, discovery, experimentation, risk-taking, play, flexibility, and innovation of new knowledge (He & Wong, 2004; March,1991).
Exploitation	Efficiency Implementation Refinement	Activities are characterised by refinement, implementation, execution, efficiency, production and selection of existing knowledge (He & Wong, 2004; March,1991).

Exploration and exploitation require different structures, processes, strategies, mechanisms, capabilities and cultures to pursue (March, 1991). Both of these processes are vital for OL, however they are contrasting by definition. For example, ExplR activities thrive in organic structures, loosely coupled systems, path-breaking, improvisation, autonomy, chaos, dynamic markets and technologies (Lavie & Rosenkopf, 2016). On the other hand, ExplT thrives in mechanistic structures, tightly coupled systems, path dependence, routinisation, control, bureaucracy, and stable markets and technologies (March,1991). In addition, March (1991) argued that the relationship between exploration and exploitation is incompatible as they compete for the same organisational resources (Goo et al., 2015). This contrast and incompatibility is also seen in the outcomes of ExplR and ExplT.

Ambidexterity between exploration and exploitation

Exploration may result in new knowledge and innovation. It may have a negative impact on the organisation's performance, specifically in the short term (He & Wong, 2004; & Stei et al., 2024). This is because the returns from ExplR are uncertain, remote in time and distant from implementation and use. However, the slow process can improve the quality of organisational knowledge and capabilities in the long run, positively impacting the returns (March, 1991). In contrast, ExplT improves existing knowledge through incremental but quicker learning processes (Holmqvist, 2004; Roth & Corsi, 2023). This, in turn, gradually increases the organisation's knowledge and more likely generates a stable performance (March, 1991). Based on the given explanation, it is ideal for an organisation to balance both exploration and exploitation activities and resources (Benner & Tushman, 2003; Goo et al., 2015; March, 1991; Audretsch & Guerrero, 2023; Stei et al., 2024).

This balance is referred to as ambidexterity, where these activities and resources are balanced versus competing (Goo et al., 2015). The main objective of this balance is to achieve ambidexterity between efficiency and innovation, resulting in dynamic capabilities in an organisation (Hsu & Sabherwal, 2012; Audretsch & Guerrero, 2023). The main challenge of ambidexterity is allocating resources between ExplR and ExplT (March, 1991). Both ExplR and ExplT are essential for organisations. However, they are also competing for scarce resources, especially in the context of SMEs. Thus, organisations have learned from experience how to divide and allocate resources between ExplR and ExplT over time (March, 1991).

The social context

Ambidexterity in ExplR and ExplT faces another challenge for adequately balancing ExplR and ExplT. The balance of ExplR and ExplT takes place in the nested system at the individual, organisational, and social systems levels. This introduces dynamics that affect both ExplR and ExplT. Developing and using knowledge in OL involves mutual learning between employees and the organisational code (March, 1991).

Mutual learning

Initially, the organisation socialises its recruits according to its language, beliefs, and practices, which make up an organisational code. This is referred to as the socialisation of the individual (March, 1991). Simultaneously, the organisational code adjusts to the individuals, beliefs, language and experiences to a degree. This is referred to as the socialisation of the organisation (ibid.). Thus, organisations learn and store knowledge in their procedures, norms and rules. They accumulate knowledge from their employees over time. Similarly, individuals learn from the organisation as they are socialised to organisational norms. In mutual learning, a trade-off between ExplR and ExplT introduces conflict between short-run and long-run

concerns and gains in individual knowledge and collective knowledge. The threat with mutual learning is that individuals can adjust to an organisational code before the code can learn from them. Thus, individuals need to be socialised slowly in the organisation to improve individual and organisational knowledge.

OL in the competitive ecology

The social context of OL is the competitive ecology that organisations find themselves in. This is where knowledge occurs and where it is used. Within the competitive ecology, organisations compete for environmental resources and opportunities. Employees in organisations compete among themselves for scarce organisational resources and opportunities. "In ecologies of competition, the competitive consequences of learning by one organisation depend on learning by other organisations" (March,1991:81). There is an important link between learning, performance and improved competitive advantage. Learning results in increased performance, enhancing competitive advantage in the competitive ecology. Another important aspect is that of strategic choices. Strategic choices are also important; in the long run, they represent the result of organisational choices between investments in learning and consumption of the fruits of capabilities.

4.5.6 4I OL framework

The OL framework views learning as a process that takes place within levels or structures found in organisations. The processes consist of intuition, interpretation, integration and Institutionalisation, hence the theory of the term 4I OL framework (Crossan et al., 1999; Crossan et al., 2023). The learning processes are manifested through structures of individuals, groups and the organisation (Bontis & Hulland, 2002; Crossan et al., 2023). For example, intuition occurs at the individual level (Lawrence et al., 2005). Interpretation also occurs at the group level, along with the process of integration (Bontis & Hulland, 2002). Similarly, integration and institutionalisation take place at the organisational level.

Intuition, Interpretation, Integration, and Institutionalisation

Intuition, Interpretation, Integration and Institutionalisation are processes that occur sequentially in an organisation. These concepts and definitions are outlined in Table 14.

Table 14: 4Is OL concepts

Social & psychological process	***Definition***	***Levels***	***Inputs/outputs***
Intuition	Perceiving similarities and differences, patterns and possibilities. This involves some pattern of recognition (Crossan et al., 1999). It is the subconscious process of developing insights (ibid).	Individual Level	Experiences, images & metaphors

Social & psychological process	*Definition*	*Levels*	*Inputs/outputs*
Interpreting	Explaining or sharing what was once limited in the individual's mind to a group (Bontis & Hulland, 2002). Therefore, environment and language are significant as they are the bases of explaining what was once intuition (Lawrence et al., 2005).	Individual and group Level	Conversations / dialog
Integration	The process of transforming explanations or conversations to mutual adjustments into actions (Crossan et al., 1999). It is also the development of shared understanding (Crossan & Berdrow, 2003).	Group Level & organisational	Interactive systems (planning, strategy meetings), shared understanding, mutual adjustments
Institutionalisation	A process of ensuring that individual learning is embedded in the organisation's structures, systems and processes as a platform (Crossan & Berdrow, 2003).	Institutionalisation Level	Routines, Diagnostic systems, rules and procedures

The most basic level of learning is intuition, which can occur consciously or subconsciously. This is where Individuals perceive similarities, differences and possibilities, which involve some pattern of recognition (Crossan et al., 1999). It is often a subconscious process where individuals get insight and understanding (Crossan & Berdrow, 2003). Whilst there isn't any consensus in the literature on what constitutes intuition (Prado et al., 2023), the one consistent thing is that it is the ability to exploit opportunities that arise by forming patterns from various concepts or observations (Behling & Eckel, 1991). Forming patterns in an individual's mind proves difficult if exposure and knowledge are limited in the relevant environment or field. For example, in this study, individuals in SMEs might have to be exposed to cloud computing through some introductory learning process. The challenge with intuition is that it is individualistic and cannot be controlled by organisations (Lawrence et al., 2005). However, SMEs that are deliberate about learning may introduce cloud computing knowledge to employees.

The next level is interpretation; this level starts operating in the conscious level of the individual's learning process. Interpretation is also realised through shared observations and discussions by the collective or in a group (Tippins & Sohi, 2003; Prado et al., 2023). At this point, interpretation takes place through language, environment, domain, and expertise (ibid.). This allows the forming of cognitive maps among individuals in the group, which creates a platform where what was once a feeling can be explained and understood, leading to a decision or a course of action (Slater & Narver, 1995). Another significant point is the nature and texture of the domain because this is the environment where the process of interpretation is realised (Crossan et al., 1999).

The next level is integration, characterised by interaction, consistency and collective actions (Grant, 1996; Prado et al., 2023). All these characteristics are typical and crucial to shared understanding among individuals, which happens through dialogue (ibid.). Through dialogue, language evolves from a process of interpretation to interaction where the collective can discover and understand new meaning (Crossan & Berdrow, 2003). The new meaning can propel individuals to make spontaneous and mutual adjustments to their routine actions (Crossan et al., 1999). Integration can be realised through teamwork, productive meetings and encouragement of organisational diversity (Bontis & Hulland, 2002).

The last level is institutionalisation; organisational learning differs from individual and group learning (Bontis & Hulland, 2002; Prado et al., 2023). The primary assumption in institutionalisation is that learning does not only stop at the individual and group level (Fiol & Lyles, 1985). Learning continues and is often found and imbedded in structures, strategy, routines and prescribed practices along with IS of the organisation (Crossan et al., 1999). This may be seen as organisational memory, often matured in larger and older organisations than SMEs (Wong, 2005). Though this is the case, start-ups and SMEs tend to adhere to the unstructured organic methods of learning (Levy et al., 2003). Institutionalised learning symbolizes what has been learnt and represents exploitation (Crossan et al., 1999).

On the other hand, individual and group learning symbolises new learning but also represents exploration. Thus, there is often a tension between old and new learning within organisations (Kane & Alavi, 2007). In the context of this study, CC may be a concept that is discussed at the individual or group levels. However, should it prove to bring about benefits in the organisation, it could become part of the day-to-day tools that the organisation is using. This means it could become part of a strategy, a process, or a system (Bontis & Hulland, 2002), where it has moved from being in an individual's mind or as a tool explored in a group to being part of the organisation (ibid.).

Feedback & feedforward

Organisational learning is a dynamic process in that the learning processes occur at the structural levels of an organisation, which also creates tension between feedforward (new learning) and feedback (old learning) (Crossan et al., 2023). Feedforward refers to the assimilation of new knowledge, while feedback refers to the use of existing knowledge in the organisation (Wodnik et al., 2024). The tension is the fact that the feedforward and the feedback processes occur at the same time. This is where the organisation learns from individuals and individuals, in turn, learn from the organisation. Therefore, two relationships become key to the feedforward process. This is the relationship between interpretation and integration. Shared understanding is realised in between these processes. Shared understanding may or may not result in coherent actions. Coherent actions prove that shared

understanding was adequate to progress to institutionalisation. On the other hand, the relationship between institutionalisation and intuition becomes key for the feedback process (ExpIT). Institutionalisation often inhibits intuition, the collective mindset of the organisation (everyday routines, norms and language). The mindset of the organisation re-enforces itself within the organisation, inhibiting intuition. Organisations have to be deliberate in implementing solutions that will encourage intuition. Thus, the tension between assimilation and exploitation of new knowledge arises because what has already been learnt impedes new learning.

The framework of 4I emphasises the dynamic nature of OL (Crossan et al., 2023). It identifies the process of learning (4Is) between levels (Structure) and the tensions (feed forward and feedback) as outlined in Figure 13.

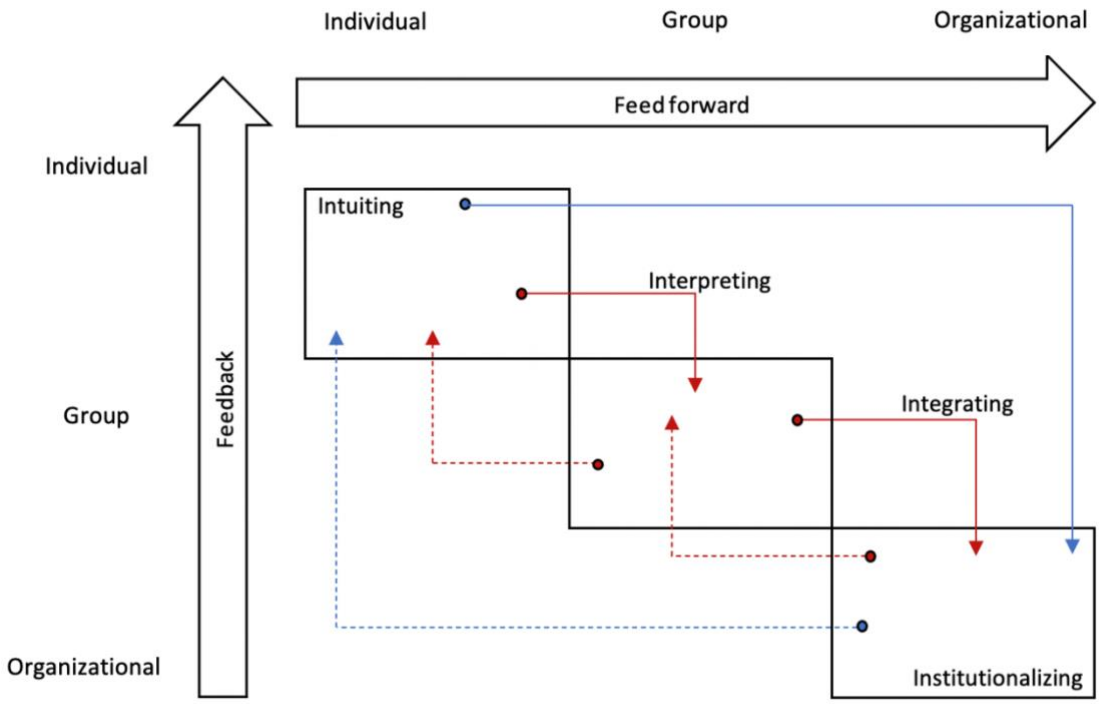

Figure 13: Organisational learning as a dynamic process by Crossan et al. (1999)

4.5.7 Comparative analysis of theories

The theory ExpIR and ExpIT and the 4I framework have similarities and differences.

At a high level, both theories acknowledge that learning takes place at different levels of the organisation. They also acknowledge that OL is operationalised through OL mechanisms.

ExpIT & ExpIR processes and activities

The differences are seen in the theorisation of these concepts. In the theory of ExpIR and ExpIT, learning processes or activities of ExpIR and ExpIT are seen as the main concepts that

lead to positive organisational outcomes (competitive advantage). For example, the ExpIR and ExpIT theory explicitly refers to OL mechanisms that enable learning and can be categorised according to ExpIR and ExpIT learning processes. ExpIR and ExpIT learning processes are essential to the competitiveness of the organisation. On the other hand, the 4I theory views the processes or activities of ExpIR and ExpIT as a product of the organisation's significant social and psychological processes. The 4I theory offers the social and psychological learning processes as stages of intuition, interpretation, integration and institutionalisation as learning processes that lead to ExpIR and ExpIT learning processes.

Levels of learning

The ExpIR and ExpIT theory emphasises the individual, organisational and social system levels. The theory says learning occurs through mutual learning, where the organisation socialises the individual and vice versa, where the individual socialises the organisation in the context of learning. The theory also emphasises the social context, which consists of the competitive ecology where organisations compete and where learning takes place. On the other hand, the 4I theory is explicit about learning at individual, group and organisation levels, where the social and psychological processes (Intuition, Interpretation, Integration, Institutionalisation) link these levels.

Balance and tension

The 4I theory points out a tension between ExpIR and ExpIT activities. After the social and psychological processes have occurred, ExpIR and ExpIT are seen as learning activities that form a feedforward (ExpIR) and feedbackward (ExpIT) loop between intuition, interpretation, integration and Institutionalisation. This is where the organisation experiences tension between ExpIR and ExpIT activities. The theory suggests that organisations must intentionally ensure that ExpIR and ExpIT processes occur. The theory of ExpIR and ExpIT highlights the challenge of balance between ExpIR and ExpIT and proposes a balanced resource allocation between ExpIR and ExpIT processes.

The theories of ExpIR and ExpIT and 4I were identified as theories whose concepts were prevalent in the data. The next phase was the deductive phase, where the two theories were used to deductively analyse the data to develop the OL theory embedded in SMEs' adoption and use of CC in SA. The next section outlines the findings from this phase.

As previously explained, OL processes are operationalised through OL mechanisms (Armstrong & Foley, 2003; Oliver, 2009). OL mechanism themes form the initial findings and point to an underlying OL theoretical explanation of the processes applied by SMEs when adopting and using CC in SA.

Social context of SMEs

The theory of ExpIR and ExpIT refers to the social context of the organisation. The theory considers both the internal and external environment. It extrapolates that the ultimate objective of learning within organisations is for organisational sustainability and to gain a competitive advantage in the competitive environment. On the other hand, the 4I theory does not focus on the external environment; instead, it explains the internal learning processes and structures within the organisation.

4.5.8 The findings of the theory of ExpIR and ExpIT

In most cases, SMEs utilise training, investigative and enquiring activities, collective learning, experimenting, alliances, CC learning initiatives, experience, and documentation (procedures and processes) for exploration and exploitation purposes. The theory of ExpIR and EXpIT activities emphasises that exploration activities are used to achieve exploration objectives (March, 1991). Similarly, exploitation activities are used to achieve exploitation objectives.

The OL mechanisms have already been described and have formed a basis for further developing the OL theory used by SMEs in SA. Upon further analysis, in trying to separate and categorise learning activities into ExpIR and ExpIT activities, it was observed that SMEs use the same OL activities to achieve either exploration or exploitation objectives. This is a deviation from the theory of ExpIR and ExpIT in that SMEs actually use their learning activities for both ExpIR and ExpIT without separating them. SMEs do not necessarily restrict specific OL mechanisms to ExpIR and ExpIT activities. Table 15 presents data that illustrates SMEs approach to using learning activities for both ExpIR and ExpIT processes.

Table 15: The utilisation of learning activities as ExpIR and ExpIT processes

Themes of OL mechanisms	*ExpIR*	*ExpIT*
Training	"*You don't want to get trained when you adopt something. You would rather get trained maybe a few months or a few years before as you would know how to support the system and then you can take over it." R6*	"Then they have refresher courses every couple of years that we send people on regarding that on any updates" R3
Investigative and enquiring activities	"So, I looked at those lists, I went to those websites, tried, you know like demos and whatnot, I read some of the reviews…" R17	"… *let's say you are having an issue and you just Google it, instead of going straight to their docs, we turn to Google, which is a bad option*." R2
Collective learning	"…I will research stacky and I have to do a show and tell. So…*there will be one hour session, we will sit in the boardroom with a big screen and I have to do a show and tell*…" R10	"*They are hungry for knowledge and they're like sponges and they enjoy new things. So, part of my job is to create a culture of learning and a culture of everybody talking to each other and the, most important*…" R4
Experimenting	"*.. that's sort of why we made the decision in my mind to go with… AWS. Then basically*, *I did some more playing around with all the various features. I did some of the labs*." R8 "*People don't just want to pay for something from day one and they don't know what they are going to get."* R10	*"We would actually do something like where, they have a sub account where they can have a little sandbox, where they can experiment and where they play around with some of these things, you know. Where they can practice deploying and writing…so it's sort of trial and error, but also we would be there to sort of assist where we can*." R8
Alliances	"…the journey I would say started with Google. They were very kind to us. They gave us a whole bunch of money on things like 20 or $25,000 for the year and they said these are our tools… we started there." R4	"*You also get a consultant…*" R2 "*They do have customer support, I don't think you can call them, I think it would have to be like a chat online or be it email. And I have had to ask them about things, and they have been helpful*." R5
CCSP's learning initiatives	*"I think you'll find that a lot of the start-ups in this space are very spoiled these days because they have Google knocking on their door, AWS knocking on their door*." R4	"*…we have a lot to do with Google and we have a team that attends a lot of their conferences*." R2
Experience	"*In this case with me, I was most experienced with servers and infrastructure. We went for a dedicated server and then what happened is, we sort of kept the dedicated server and then, our sort of fary (going into) cloud computing was when we got clients who wanted to use our network space, they from the US."* R9	"*…I have worked with cloud-based ecologies before, I kind of knew that you sign an NDA (Non-disclosure agreement) with service provider*." R14.
Documentation (procedures and processes)	"…I think Google has some pretty good documentation on getting self-started…" R19	"…*and you are always learning new things and the nice thing is that their (CCSPs) documentation is really easy to follow and it's quite easy to find*." R13

The theory of ExpIR and ExpIT further emphasises the importance of balancing resources between ExpIR and ExpIT activities (March, 1991). Essentially, the same resources used to achieve exploration activities are the same resources used to achieve exploitation activities. This may be due to SMEs' limited resources compared to large organisations. Thus, SMEs make activity allocation (process) instead of resource allocation decisions. In other words, they do not have enough resources to spread across the ExpIR and ExpIT categorisations. However, SMEs have learning activities for either ExpIR or ExpIT, depending on their needs. Figure 14 provides a visualisation of the approach to ExpIR and ExpIT learning activities.

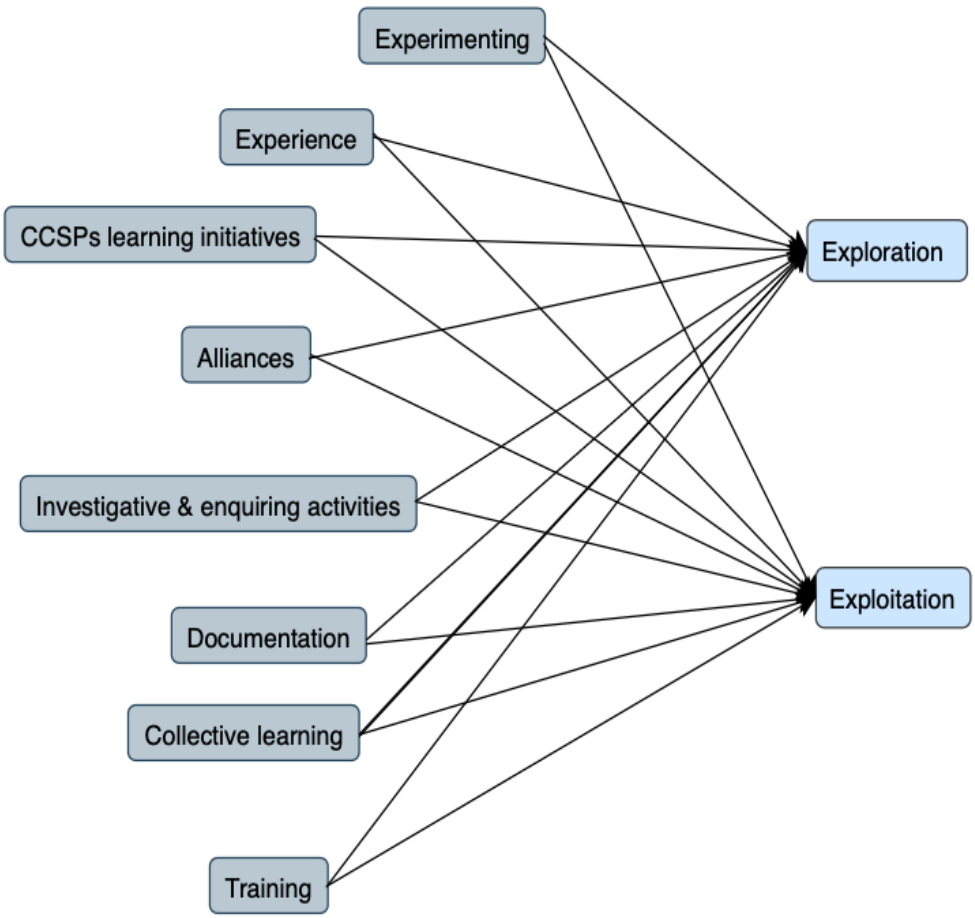

Figure 14: SME approach to the utilisation of ExpIR and ExpIT learning activities

The next set of findings addresses the concepts of mutual learning and competitive ecology from the theory of ExpIR and ExpIT. Mutual learning refers to learning between employees and the organisational code. The main concepts and sub-concepts that were found are outlined in appendices in Table 17. The theory of ExpIR and ExpIT concepts consist of the socialisation of the individual and the socialisation of the organisation.

Socialisation of the individual

The findings revealed that initially, employees learn from the organisation through processes and activities consisting of ***probation, provision of instruction on job procedures, training, using tools to learn and fostering a sense of belonging***.

Organisations socialise their recruits to its language, beliefs and practices, which make up an organisational code (March, 1991). This is supported by what one of the respondents said, "*…there has to be the conversion of all the staff… if we have a junior that starts and they have not done the course, they will have to go for a starter course which is called "The Novice" first and they will do a solid two week course.*" R3_EE_ML_SI. Data shows that in some cases, SME employers will provide instructions on the type of CC service to use and the instructions on how to make use of the CC tools. This is also where decision-making is centred at the management level, where employees are simply instructed to follow instructions. An employee confirmed that "…*they just pushed the Google Drive thing on to us and then we liked it and we went that way*." R2_EE_ML_SI. Another said, "*We spoke to all the staff and then we said these are the two options…not many people were keen on the options but saying as management, it's going to improve this, this and this… It's going to reduce cost in this way, it's going to give us availability and then everybody was on board*." R3_EE_ML_SI. In adopting and using CC, SMEs would provide instructions towards the adequate use of CC. A respondent explained, "*We do have an onboarding process where we teach people how we use Google Drive….*" R2_EE_ML_SI. Another said, "…*I needed to give instructions and say, create a task like this, and once a task is created, upload documents of this size or do this and do that. And then it just became easier after that*." R11_EE_ML_SI. Data also showed that SMEs relied extensively on training to socialise employees to the organisation's practices. For example, as employees explained, "…*they just send a trainer down and then the training will be for that five days*." R3_EE_ML_SI. The probation period was another form of socialising employees, one employer noted, "We've *taken on a lot of young stars from the universities, and they have lasted for about… they last for about 12 months. If they get through that kind of probation period*…." R22_EE_ML_SI. SMEs allow new employees time to adapt to the work environment and practices. If there are unmet expectations or misalignment between the organisation and the individual during the probation period, employees will not stay in the organisation. An example is that "…*a lot of students come out from university thinking we are going to do this… and because can be so creative and immediate, they think that that's what they are immediately going to get into doing. And it does not always work like that"*. R22_EE_ML_SI

Figure 15 illustrates the themes from the findings associated with the individual's socialisation.

Socialisation of the organisation

The socialisation of the organisation refers to organisations learning from employees through various processes and activities. Findings showed that SMEs engaged in processes and activities consisting of ***sharing ideas*** by employees. One respondent mentioned that "*there will be a one hour session, we will sit in the boardroom with a big screen and I have to do a show and tell….*" R10_EE_ML_SO and "…lots of suggestions come from within the team to make certain implementations" R10_EE_ML_SO. Along with the sharing of ideas, what was observed was the significance of previous experienced employees when it comes to the socialisation of the organisation. An SME respondent explained, "I'm *lucky to have a network of engineers behind me, you know, from my history, that I have worked with before, that I can lean on. But that is an issue. If something goes wrong, it's my issue to fix*" R19_EE_ML_SO. Another process is the ***documentation of lessons learned***. *A* respondent shared their activities in adopting and using CC, "*let me document the problems we are facing. Let me address it with a business focus, try and understand the challenges and see how we can work it out*" R14.

In some instances, there was ***concurrent learning*** between employees and the organisation. An example of concurrent learning is employers sending employees for training and giving the employees the choice of the type of technology that they believe will be of value to the organisation. A respondent working on the information technology team said. "…*they actually upskill us, I think at the beginning of every year, we have to select what we want to upskill on. I think there is a budget for training for that*." R1_EE_ML_SO because "*Me, as an employee, I tell them what I want to work on, that is related to my job."* R1_EE_ML_SO. Another example of concurrent learning is through ***collective responsibility*** between the organisation and employees**.** For example, a respondent explained, "*We have to have multiple people with their thinking caps on to be able to solve issues and sometimes we got to market a bit quickly.*" R4_EE_ML_SO. The same respondent added, "*We sit down with all departments because we do Back End, Front End, you know, engineering, hardware and everyone has the nuances the pros and cons of a piece technology that we want to adopt. Maybe the back end guys really like it, but the hardware guys say, hold on, that will never work for me. So, it's a sort of collective responsibility*" R4_EE_ML_SO. This collective responsibility would result in ***shared decision-making*** between the organisation and employees. In other words, employees are empowered to contribute to decision-making. An example is that of a respondent sharing that, "*We mostly share decision-making. So it sort of depends on what kind of decision… if it's a technical decision or like an infrastructure decision*." R8_EE_ML_SO. Another respondent agreed with this sentiment and said, "*…management decision is dependent on the IT recommendation…if we recommend that we move away from a certain provider (CCSP)…they know that we know what we are talking about because they are in top management, but we deal with things at the*

operational level." R2_EE_ML_SO. Figure 15 illustrates the themes from the findings associated with the socialisation of the organisation and the individual.

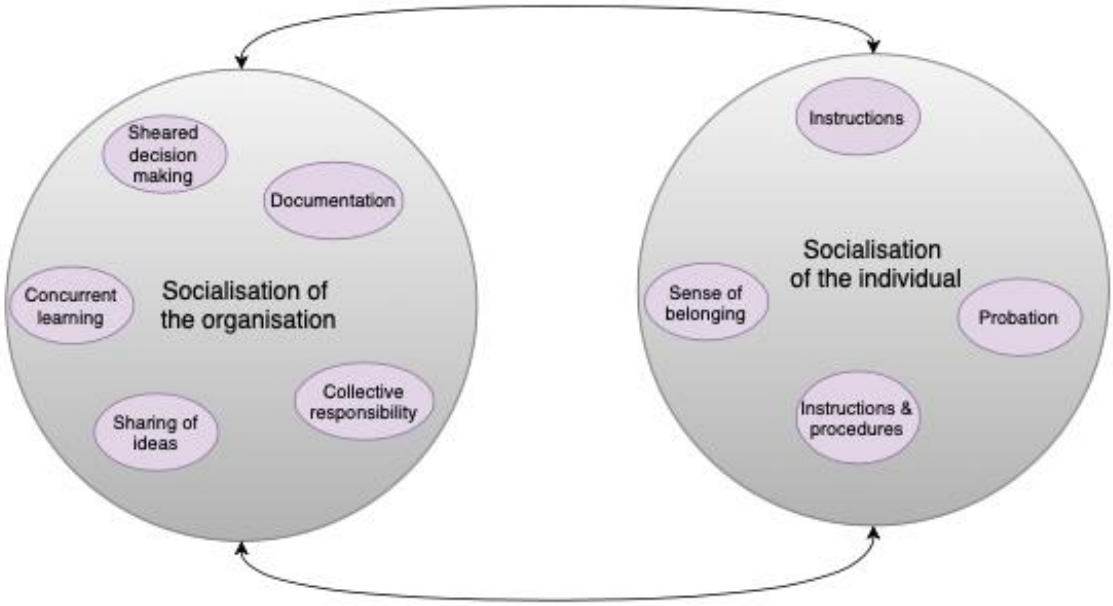

Figure 15: Mutual learning themes (Theory of ExpIR and ExpIT)

The next set of findings outlines the social context of the competitive ecology.

Competitive ecology

The social context of OL is the competitive ecology in which organisations find themselves (March, 1991). Data shows a number of the contextual conditions that SMEs find themselves in and experience. The first is ***business continuity,*** which refers to the ability of SMEs to continue operating. Most SMEs considered CC as a tool that allowed them to operate optimally. Business continuity is related to the benefits that CC provides. In this case, data showed that SMEs appreciated the ***availability of IT resources integrated with the backup system*** that comes with cloud provision. Thus, CCSPs have "*…redundancy on their side (CCSPs)…if there is something wrong with memory… It's also replicated on their side to make sure if anything happens, we still have a backup from their side that's maintaining that…."* R15_EE_CE_BC. In addition, limited downtime of server contributes to availability of IT resources. A respondent explained, "*I don't think we've had any downtime. Other than the downtime that we have inflicted on ourselves. We have had no downtime because of the platform."* R22_EE_CE_BC. Data also showed that some SMEs found CC to be ***user friendly and easy to adopt***. Respondents said, "… *it's efficient, it's easy, it's new, it's the future*." R6_EE_CE_BC and "*It feels very easy, it feels like there isn't a big barrier to entry*." R5_EE_CE_BC.

Another benefit related to business continuity is the ***shared access to IT resources*** for achieving work or job specific objectives and the benefit of ***working remotely***. An SME employee responded and said, "*I am in Johannesburg now and the guys are in Cape Town, if we have a presentation, let's say tomorrow or on Friday, I don't have to do my part, email it to this person and then they do their part…we can all do everything all at once so we can all contribute in one document at the same time*." R7_EE_CE_BC. Another SME owner responded, "*I can log in and see what the restaurant is doing if I am not on site, which is nice*." R6_EE_CE_BC, they added that "…*uploading things and being able to access them anywhere in the world is a big bonus."* R6_EE_CE_BC. Data also showed that CC allows SMEs to ***focus on their core business*** rather than IT capabilities and activities required to support their businesses. One respondent said, "*There is another company that is taking care of that, so you can focus on the operational side of your business instead of focusing on having a big expensive IT team to take care of physical hardware."* R16_EE_CE_BC.

Another aspect is ***business flexibility,*** which is also a result of the adoption and use of CC. The specific benefits of CC found in data related to business flexibility consist of ***Scalability and the speed of computer processing power.*** A respondent commented, "…*our clientele is growing, as we have more and more devices connecting to our platform…our resources also need to grow with that, add more processing, add more memory, add more disk space and the backups are growing, so it's (the business) continuously growing*." R10_EE_CE_BF. Another respondent commented, "…*a lot of the stuff you can change in the flier, in the old days you had to physically go change a hard drive you have to increase and change the memory slots physically if you needed on the dashboards with [CCSP], of a click of a button and it will change it on the flier, you just reboot and it's changed*." R15_EE_CE_BF. The respondent added, "*…you don't have to say oh, now I need to bring down the server for the weekend and that kind of stuff. You just do the changing*." R15_EE_CE_BF. Another aspect is that CC comes with a level of ***customer support,*** which has resulted in quick responses to faults. One respondent commented that they appreciate that CCSPs "**…***are very quick to respond to any issues that we have*." R13_EE_CE_BF. Another explained that "**…** *if a client is sitting at your desk, then you have to assist them, then you contact the help desk and they give you an efficient solution to your problem*. R3_EE_CE_BF.

Other sentiments were that CC has made ***innovation or product development*** easier for SMEs. A respondent said that after adopting CC, they *"started looking at the possibilities for integration and so on with other* systems" R22_EE_CE_PD. Another respondent explained, *"…we have fired up a few more instances, the speed is a lot better, people are happier with that. We have released some new features that we were not able to do before…."* R13_EE_CE_PD.

Bargaining Power refers to a party's capacity or power in negotiating a contract or a deal. In the context of competitive ecology, ***SME clients had bargaining power*** over the SMEs. In addition, SMEs had bargaining power over CCSPs. At first, the bargaining power of SME clients was quite visible in the data. Most SMEs expressed that there was pressure coming from their clients to adopt CC. Respondents explained, "*…sometimes you realise that you need to transition to cloud purely because of the demand from your clients*." R7_EE_CE_BP. Another reiterated this by saying, "…*I am focusing more on the cloud product now because it is what people want"* R20_EE_CE_BP. One respondent confirms these sentiments, *"…when clients message us and say, oh we use this cloud storage and we want you to be able to use it, then that influences our decisio*ns." R5_EE_CE_BP. One of the SMEs had to change the CCSP based on client's complaints. They expressed that client "…*were constantly complaining…they threaten that if you guys can't keep up or can't provide a service that we are paying for, then we will move to other service providers."* R1_EE_CE_BP. Another respondent commented, "…*one of our customers said we won't go ahead with you unless your service provider is in SA. And that's potentially one of our biggest customers… It's no big deal, you know, we deal with it. And so, if we want the customer, we need to jump through some hoops*." R4_EE_CE_BP. As a result, these SMEs adopted a customer-centric approach in aligning themselves with client requirements to the extent that their business models are aligned with the needs of their customers. For example, a respondent said, *"…I would say that it's very much customer first. What do they want? Then, we look at the technology around that. So, a customer could say we want these pieces of Hardware. We don't want your servers in America because of POPI, we want dada dada…and then we make a decision around that*" R4_EE_CE_BP.

Data also pointed to SMEs' ***bargaining power in the CC industry or environment***. SMEs showed a sense of ability, choice, and urgency in deciding the type of CCSPs to work with. This decision seemed to be based on data centre location and the size of the CCSP, the cost of cloud services and the user friendliness of cloud service offerings within CCSPs platforms. SMEs showed that the data centre's location and the number of data centres play a role in comparing CCSPs. For example, a respondent compared CCSPS and said, **"…***they are not reasonable…because AWS is better at securing data centres than them."* R18_EE_CE_BP. Respondents referred to the location as an essential factor for selecting CCSPs, "…*once the AWS cloud is here in SA, I think it's going to be later next year. I think then we are going to start moving our application…to AWS*" R1_EE_CE_BP and "*We don't want your servers in America because of POPI…"* R4_EE_CE_BP. The size of the CCSP was also referred to as a criterion for selecting CCSPs. For example, a respondent said, "…*other cloud providers like the MWEB, they were like quite small, so they were not reliable, so we wanted something reliable*" R1_EE_CE_BP.

Most SMEs saw an ***increased Market share*** in their businesses**,** a respondent commented, "…*before especially when it came to the business side of things. I would get about R5000 or less per month, right now I can make up to R20000 and it has to do with the system. So, it helped me, but when I started out, it was very expensive..."* R11_EE_CE_IMS. Another commented, "…*We have a lot of clients in the UK. So that's maybe also an advantage for us going with a bigger international provider (CCSP)*." R13_EE_CE_ICS. In this case, CC has had an added advantage and made a difference for overseas clients.

Data also showed that SMEs considered CC to have ***increased client satisfaction*****.** A respondent compared a business in their industry that has not used CC and said, "*These long serial numbers, I did not want to be there. And then I'm sure it cost them money, I don't think they were able to process any orders, their clients got frustrated, everybody became frustrated. In a cloud environment, I mean the worst thing that could happen is if your internet connection…if the internet went off…." R*12_EE_CE_ICS.

The aspect of ***employees competing for resources*** was not as prevalent in the data. However, there was clear evidence that employees considered upskilling as an avenue to provide them opportunities within the organisation and in their careers. It also proved that it would keep the employees relevant in their work organisations. *A respondent commented, "…if you do not upskill right now, then you will be irrelevant."* R1_EE_CE_EMF and "*I would not be going for AWS training or Google training if it was not for that, so we take advantage of those opportunities*." R1_EE_CE_EMF.

There were a few instances where SME respondents directly linked ***learning and performance***. For example, one respondent explained that "…*from hiring someone new to when they become profitable, there is quite a big gap. Because they have to learn so much in the beginning and that takes longer if you don't get the training done quickly….*" R2_EE_CE_LP. Another explained that when it comes to learning about new technology, "*…you are going to go with your knowledge of how to make that stuff work so that the learning curve is not massive to the team because even for a small team of 10 people or 11 developers you know, it still costs twenty to thirty thousand a day to run the team*." R4_EE_CE_LP and "…I don't think the technology will be as good as you want because now, they're learning along the way" R4_EE_CE_LP.

Figure 16 illustrates the themes from the findings associated with competitive ecology.

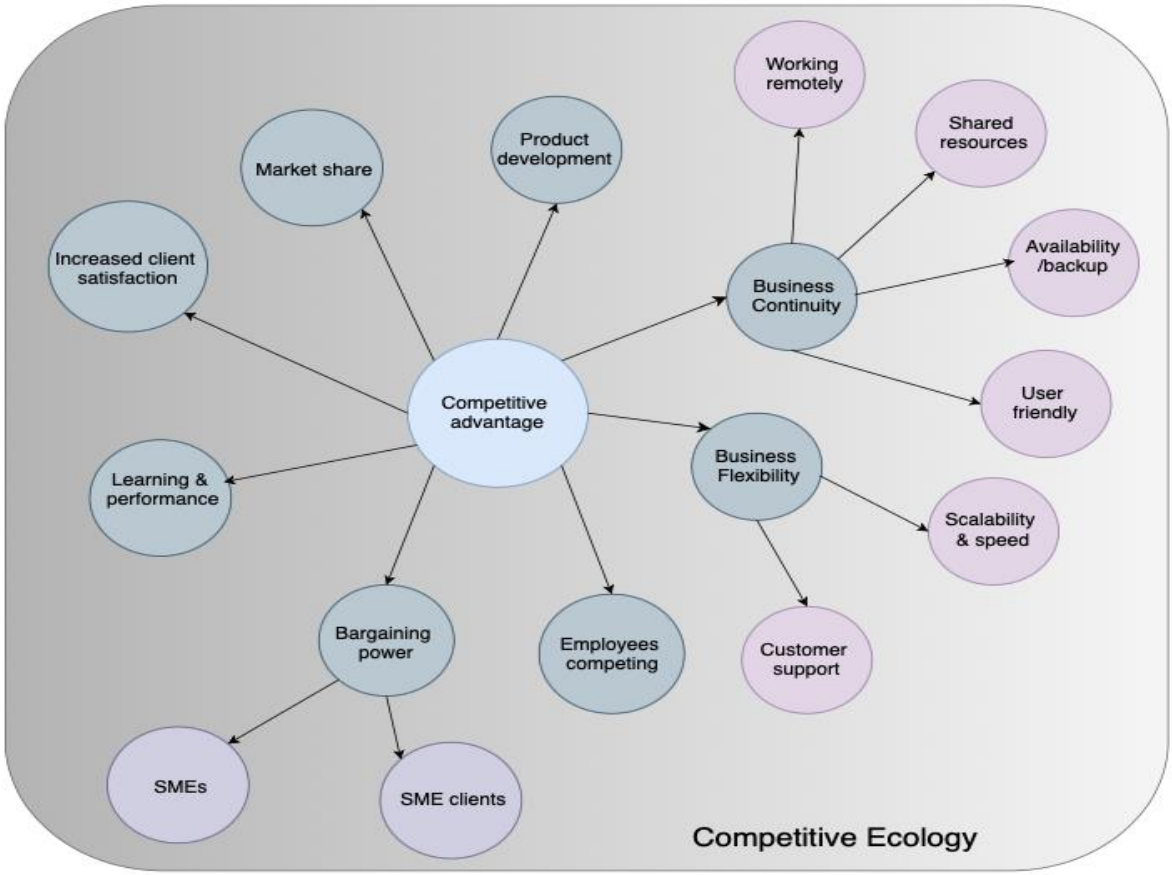

Figure 16: Finding of the competitive ecology

4.5.9 The 4I Theory

As one of the theories that resemble the data, the 4I was used deductively to understand the key elements that can help us further understand SMEs' OL theoretical explanation when adopting CC. The first consideration was to study the social and psychological processes within SMEs. According to the 4I theory, the processes consist of intuition, interpretation, integration and institutionalisation (Crossan et al., 1999). These processes occur sequentially within organisational levels or individual, group and institutional structures. Another aspect is the processes or activities of ExpIR and ExpIT (OL mechanisms) as a product of social and psychological processes within the organisation. ExpIR and ExpIT are understood to have tension referred to as feedforward and feedback.

The findings resulted in a few observations where data was aligned with the social and psychological processes. Another observation was the challenge of differentiating between the social and psychological processes, which were not easily identifiable. In the first instance, intuition occurs at an individual, subconscious level, which was not easily recognisable in the data (Prado et al., 2023). In the second instance, interpretation and integration occurred at a group level. These could be linked to the OL mechanisms that were used for collective learning. Collective learning includes sharing ideas, the show and tell initiatives, employees training

each other, social learning and alliances. Whilst this is the case, there were challenges in that identifying the beginning and the end of interpretation was not feasible. Similarly, determining the beginning and the end of integration was not feasible. This could be attributed to the flexible nature of an SME's organisational structure. On the other hand, documentation as an OL mechanism was aligned with institutionalisation. However, identifying institutionalisation's beginning and end was equally not feasible. The significant aspect of the 4I theory that aligns with the context of SMEs is the explanation of the tension that SMEs experience between ExpIR and ExpIT. This will be explained in the theoretical elaboration section.

The findings of the social and psychological processes that could be identified are given as intuition and individual level, interpretation at an individual and group level, integration at a group and organisational level and institutionalisation at an organisational level are shown below.

Intuition at the individual level

Intuition occurs at a conscious or subconscious level, where pattern recognition of knowledge occurs in an individual's mind (Crossan et al., 1999; Prado et al., 2023). This level is not easily identifiable when interacting with people. However, there is a reliance on employees' existing knowledge and their ability to recognise suitable cloud services or solutions for SME's business operations. A respondent said, "…*our senior Dev at the time or the engineer would have had a look at the solutions out there and made a choice based on his technical information*…." R4_4I_INTU_IND. On the other hand, the inability to recognise patterns and develop insight stifles learning. An example of this was given by a respondent, "*The ones on the low level, they don't care, they need to be reminded every time…so what I do is that at first I show all of them what I want exactly and then after I will have the one on ones …*" R11_4I_INTU_IND. As a result, "…*supervisors that I have who are busy with these things (CC)…are quick to think; hence they are in the forefront*…" R11_4I_INTU_IND.

Interpretation at an individual and group level

What was once intuition and limited to an individual can be explained to a group of employees. This would become interpreting at an individual and group level. At this level, environment and language are significant as they are the basis of explaining what was once intuition (Bontis & Hulland, 2002). Thus, SMEs create an environment where they can freely share their intuitive insights. For example, a respondent explained that *"there will be a one-hour session, we will sit in the boardroom with a big screen, and I have to do a show and tell on sticky...I must explain to people why I think Stacky will be better"* R#_4I_INTE_INDG. A respondent who is part of an SME with different regions added, "*Each IT person is for their specific region, but we share ideas with each other….*" R1_4I_INTU_INDG.

Integration at a group and organisational level

The process of transforming explanations or conversations into mutual adjustments into actions is referred to as Integration at a group and organisational level**.** A respondent explained, *"So lots of suggestions comes from within the team to make certain implementation…."* R10_4I_INTG_GO. Another added, *"So we mostly share decision making"* R8_4I_INTG_GO. In this process and level, there is a development of shared understanding.

Institutionalisation at an Institutionalisation level

The last process and level is Institutionalisation at an organisational level. This ensures that individual learning is embedded in the organisations' structures, systems and processes (Crossan & Berdrow, 2003). Institutionalisation was not as prevalent in the data; however, a few SMEs have initiatives institutionalising processes. For example, "…*once I document that (CC service implementation), I will know how to efficiently handle that for my customers. That's why I got it spearheaded in my company*." R14_4I_INS_O. In another example, a respondent explained, "…*in our onboarding process, when people join the company, we teach them. I mean we have systems of how we use Google Drive, so in certain folders.*" R2_4I_INS_O.

From the analysis process, findings resulted in understanding the OL mechanisms that were foundational in identifying the theories with similarities in data. The theories consisted of the theory of ExpIR and ExpIT, as well as the 4I theory. The findings further revealed that some elements of these theories were found in the data; however, some elements were not. It was also clear that the learning process is dynamic and cannot be adequately elaborated linearly. Therefore, the next section provides a theoretical elaboration of the findings and attempts to give an explanation that can combine the findings, providing an OL theoretical explanation used by SMEs in SA when adopting and using CC.

4.6 Theoretical Elaboration

Perhaps it is important to circle back to an important statement made at this chapter's beginning. That is, OL processes are operationalised through OL mechanisms. OL mechanisms had concepts similar to those of the ExpIR and ExpIT activities in the theory of ExpIR and ExpIT. It was evident that SMEs partake in exploration and exploitation activities through OL mechanisms. The OL mechanisms include investigative and enquiring activities, experimenting, experience, documentation (procedures and processes), collective learning, training and alliances. SMEs use all these learning activities for either ExpIR or ExpIT purposes. This differs from the assumptions of the theory of ExpIR and ExpIT, where Benner and Tushman (2003), Goo et al. (2015) and March (1991) have explained that it is ideal for organisations to balance ExpIR and ExpIT activities and the resources used for these activities.

This balance is called ambidexterity, where these activities and resources are balanced versus competing (Gibson & Birkinshaw, 2004; Goo et al., 2015). The main objective of this balance

is to achieve ambidexterity between efficiency and innovation, resulting in dynamic capabilities in an organisation (Hsu & Sabherwal, 2012). The main challenge of ambidexterity is allocating resources between ExpIR and ExpIT (March, 1991). Both exploration and exploitation activities are essential for organisations. However, they are also competing for scarce resources, especially in the context of SMEs. Thus, organisations turn to learn from experience on how to divide and allocate resources between ExpIR and ExpIT across time.

In the context of the adoption and use of CC, SMEs in SA do not necessarily restrict themselves to specific OL mechanisms for ExpIR and ExpIT. They use most OL mechanisms interchangeably for ExpIR and ExpIT purposes. Thus, SMEs utilise investigative and enquiring activities and experiment mostly for exploration activities. They also use experimenting, experience, documentation (procedures and processes), collective learning, training and alliances for mostly exploitation activities.

March (1991) pointed out that ExpIR and ExpIT activities occur in a nested system with an individual, organisational and social system level. This complexity has dynamic outcomes and affects ExpIR and ExpIT processes. Firstly, it is essential to note that the development and use of knowledge involves mutual learning between employees and the organisation (March, 1991). Secondly, this knowledge is developed and used within a competitive ecology (ibid.).

4.6.1 Mutual learning within SMEs in SA in the context of adoption and use of CC

Mutual learning occurs when SMEs socialise employees (new recruits) to its organisational code, language, culture and practices. On the other hand, SMEs adjust to employees' language and experience. Initially, SMEs socialise their new recruits through ***training and allowing them to experiment with CC technology***. In this aspect, training ensures employee competence and socialises the individual into the organisational code. At this stage, the individual is at the mercy of the organisation, paying attention to what is required of them and working towards ensuring that they are seen to adapt in the organisation. During this period, SMEs monitor and assess individuals to ensure they can adapt to the organisation; this is the probation period. At this time, employees have become familiar with the rules and culture of the SME. Thus, SMEs rely heavily on training as a process of socialising employees. In addition to training, SMEs allow employees to experiment with CC services to introduce CC to the individual. This will enable individuals to have first-hand experience of working with CC services.

In the same manner that new recruits socialise with the SME, ***SMEs adjust to employees' language and practices*** by creating an environment where employees feel free to interact and ***share ideas***. The ideas are often shared in group settings where teams interact with management to address problems and suggest possible solutions. Group or team settings are

characterised by collective learning, collaboration, shared responsibility, and decision-making. The sharing of ideas can be initiated by various incidences, including employees' ***past experiences*** with CC from previous employment, ***research activities, experimenting activities, training*** and ***documentation***. SMEs turn to learning from employees' **past experiences** through discussions of problem-solving and implementing solutions that stem from these ideas and conversations. Tippins and Sohi (2003) explain that organisations can acquire information through the experience of others.

Other shared ideas come from individuals **experimenting with CC services and conducting their research** concerning CC services or new features. These activities may take place within or outside the context of the SME. Nonetheless, it results in discussions and leads to decision-making, mainly refining the use of CC. Training is traditionally used to develop employee competence, where employees are sent for training when an information system has already been adopted (Cha et al., 2009; Lee et al., 2018). However, SMEs send employees for training before the adoption of CC. This was done to understand the strategic fit of CC services for sustainability and organisational goals. Sharing ideas in a team leads to implementing new CC features or services or migrating from one CCSP to another.

Whilst mutual learning takes place in SMEs, it is unfortunate that a few SMEs ***record lessons learned*** after a project, event, or activity is completed. The objective of recording lessons learnt would be to store/archive them for deliberate knowledge assimilation with the SME. This allows access to documents even for new recruits. Engaging in OL is geared towards the adequate adoption and use of CC. An important objective in this regard is to position SMEs to a place where they have a competitive advantage in their context.

4.6.2 Competitive ecology in the context of the adoption and use of CC by SMEs in SA

SMEs adopt and use CC for productivity and efficiency, which improves their competitiveness within the competitive ecology. At the heart of the ability for SMEs to be competitive when adopting and using CC is the introduction or improvement of ***business continuity and flexibility***. Understanding CC benefits for achieving business continuity and business flexibility is achieved through OL mechanisms. They include **inquiry, research, and investigative activities, as well as experimenting with CC services and using alliances**. Research activities are used to gain knowledge about CC in the adoption process. Such activities are also used to improve existing knowledge about CC use. SMEs conduct research and experiment with CC services before adoption and post-adoption, improving productivity experienced in the form of business continuity and flexibility. Initially, it is to gain knowledge of CC capabilities, and once CC has been adopted, SMEs continue experimenting with CC services and gradually refine their use in their organisation.

Business continuity is supported by user friendliness and the easy adoption process of CC. Thus, the transition to CC does not have a negative impact on SMEs' business operations. Similarly, the availability of IT resources integrated with CC's backup system is specifically designed to ensure business continuity. In addition, CC allows the sharing of IT resources, aiding continuous business operations. A benefit of CC that supplements business continuity is business flexibility.

The characteristics of CC are responsible for the allowance of business flexibility. The main characteristics were resource pooling, rapid elasticity, on-demand self-service and measured service (Mell & Grance, 2011). Other benefits of CC, like working remotely, reaching clients globally, and focusing on core business and customer support, have provided both business flexibility and continuity (Osembe & Padayachee, 2016). This results in the competitiveness of SMEs in their competitive ecology.

The adoption and use of CC that afford SMEs business flexibility and continuity lead to ***customer satisfaction***. This re-enforces the refinement of CC use by SMEs in SA. In addition, the adoption and use of CC ***increases return on investments due to the increased market share***. Cloud computing allows some SMEs to ***develop their products or services***. Due to the efficiency or productivity of CC, SMEs can focus on their products by being innovative, introducing new ICTs like the Internet of Things and introducing new features (Sheng & Chien, 2016). In this way, the link between learning and performance is evident (Imran et al., 2016). The more positive the effects of CC on business outcomes, the more desire there is to learn about CC capabilities.

The formation of ***alliances*** is also used as a strategy to gain knowledge about the adoption and use of CC (Robey et al., 2002; Dong & Yang, 2015). This is even more prevalent with SMEs forming alliances or partnerships with Internet Service Providers (ISPs) or CCSPs. This way, there's easy access to knowledge for easy adoption and refinement of relevant technologies like CC (Ngwenyama & Nørbjerg, 2010).

Clients or customers had some ***bargaining power towards SMEs***. Customers have been influential in persuading SMEs to adopt and use CC. In addition, they are also influential in persuading SMEs to migrate from one service provider to another CCSP. This is mainly due to poor service from CCSPs, which leads to poor client satisfaction. In some cases, SMEs would align their Information system's strategies to be customer centric to the extent that their ***business models*** are structured so that customers' feedback and needs are considered in significant decisions.

SMEs have gained bargaining power. They are in an environment where they have sufficient choice in selecting CCSPs. Thus, there is a sense of ability and urgency in making decisions about the CCSP type and the service type to adopt and use. In some industries, like the tourism

industry, SMEs form alliances to gain the power to bargain with CCSPs. Though there are challenges with the adoption and use of CC by SMEs, there are possibilities and opportunities for SMEs to adopt and use CC (Keung & Kwok, 2012), as SMEs have ***bargaining power towards CCSPs***.

Employees play an important role in the adoption and use of CC. While SME owners and managers decide to adopt CC, employees learn about it so that they can use it effectively in SMEs. There was no evidence that **employees compete for resources** within the SMEs. It was clear that employees upskill themselves to attend relevant training courses to increase their knowledge about CC services and operations. Employees generally view knowledge about CC as important for their development and relevance within SMEs and industries. The link between learning and performance was also seen in how SMEs hire or employ individuals. SMEs recognise the value of using knowledgeable people in CC. There is an awareness of the significance and implications of the learning curve. That there is a link between learning and productivity or efficiency in business outcomes (Janz & Prasarnphanich, 2003). In other words, quicker learning results in the efficiency of business outcomes. Similarly, slower learning delays efficiency and desired business outcomes.

4.6.3 The 4I theory within SMEs in SA in the process of the adoption and use of CC

The OL framework is an OL framework that views learning as a process that takes place within levels or structures found in organisations (Bontis & Hulland, 2002). The processes consist of Intuition, interpretation, integration and institutionalisation. These processes take place sequentially. The levels or structures are individual, group and institutional (Dutta & Crossan, 2005).

Intuition takes place at the individual level**,** if there is one thing that is eminent with SMEs, it is that they rely on employees' intuitive insights to develop knowledge around CC services and solutions to improve business operations. When employees lack intuitive insight, they burden the SME owner or manager to create initiatives to encourage knowledge development in CC adoption and use (Lawrence et al., 2005). This is corroborated by the participatory observations (PO_Table 11_LCS), where SMEs that have employees who are educated and who have embraced a learning culture even at an individual level turn to have OL activities that add value to the strategic objectives of the SME.

In contrast to the collaborative team discussion found in most SMEs, some SMEs learned through hierarchical structures. The lack of social, cultural and economic capital characterised these SMEs. These terms are similar to Bourdieu's theory of economic and social capital theory, which includes knowledge capital (PO_Table 11_LCS) (Bourdieu, 1986). These SMEs introduce CC products to top management, supervisors, and workers. These SMEs struggle

to get employees on board and embrace a learning culture. An organisation's learning culture has been viewed as a strength and evidence of an organisation's competence (Janz & Prasarnphanich, 2003). When the learning culture is not embraced at an individual level, SMEs struggle to initiate learning opportunities and create a learning platform for employees. This results in an efficient process of adopting and using CC efficiently.

Interpretation occurs at the individual and group levels, while ***integration*** occurs at the group and organisational levels (Lawrence et al., 2005)**.** Most SMEs create an environment where employees can share their discovered knowledge and ideas. In this space, employees share experiences and knowledge (Crossan & Berdrow, 2003). They can make mutual adjustments to their routine actions (Crossan et al., 1999), discarding what they believe won't improve organisational operations and deciding to implement what they think will improve the SME. At this stage, integration occurs, mainly when ideas are implemented through collective action (Bontis & Hulland, 2002; Grant, 1996).

Institutionalisation takes place at an organisational level**.** At this level, lessons learned, procedures and processes are documented and archived for future reference. Employees can leave the organisation as the knowledge that was once in the intuitive stage is now embedded into the SME so that new employees can be taught this new knowledge. In OL theory, documented procedures are memory mechanisms (Tippins & Sohi, 2003).

Learning processes occur at SMEs' structural levels, which introduces a tension between ***feedforward*** (exploration) and ***feedback*** (exploitation). Feedforward refers to the assimilation of new knowledge, while feedback refers to the use of existing knowledge in organisation recognition (Crossan et al., 1999). The tension is that the feedforward and the feedback processes occur simultaneously (Easterby-Smith & Prieto, 2008). This is where the organisation learns from individuals and individuals, in turn, learn from the organisation. Thus, SMEs don't have the challenge of ambidexterity of balancing the allocation of resources between exploration and exploitation (Gibson & Birkinshaw, 2004). OL literature corroborates that ambidexterity is unnecessary to achieve the desired organisational goals (Goo et al., 2015). In this case, SMEs are challenged by feedforward feedback processes occurring simultaneously.

4.6.4 Organisational learning theory applied by SMEs

The organisational theory that is applied by SMEs in SA when adopting and using CC is depicted in Figure 17.

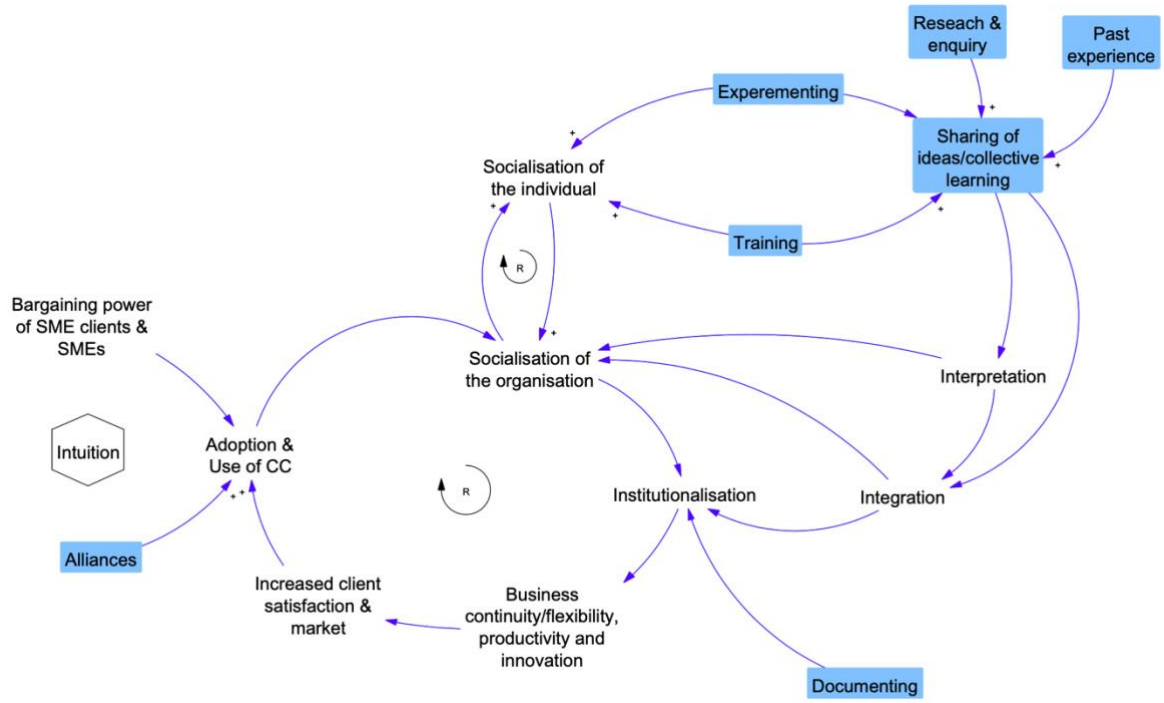

Figure 17: Organisational learning theory for the adoption and use of CC by SMEs in SA

The significant aspects of the competitive ecology for SMEs in adopting and using CC comprised the bargaining power of SME clients and SMEs and alliances. SME clients influenced SMEs to adopt and use CC for improved service delivery. Furthermore, SMEs had bargaining power when it came to selecting a CCSP. This was due to the timing of this study, where CCSPs were entering the cloud market to encourage the adoption and use of CC. Thus, some SMEs have bargaining power, and they used it. On the other hand, some SMEs were already in alliances with IT service providers. Therefore, these alliances played a significant role in guiding, leading and influencing SMEs to adopt and use CC.

The adoption of CC starts with the intuition of an SME owner or an IT employee. Intuition takes place at an individual level and is not managed or controlled by SMEs. It is not possible to observe the process of intuition. However, before adopting CC, these employees had to recognise the connection or link between CC and the value it could add to the organisation. This is the process of a pattern of recognition, perceiving similarities, differences and possibilities (Crossan & Berdrow, 2003). Thus, this starts with the SME owner or an IT employee who can recognise the opportunities with CC adoption.

This differs from socialising the individual as a first step of OL, as stated in the exploitation and exploitation theory. This is because, before adoption, the SME was not knowledgeable about CC. An individual engages with the concept of CC. When persuaded by the value of CC, it is introduced to the SME. This process aligns with the 4I theory, with intuition as the first step of OL. The introduction of CC to the SME or by employees to the SME is the socialisation of the

organisation. Thus, the pressure of the environment and context pushes SMEs to adopt CC. The adoption is initiated through an employee socialising the organisation to the individuals' beliefs and experience (March, 1991). When an SME has been socialised to the extent that CC is adopted and used, it follows that when new recruits join the organisation, they are socialised by the organisation in using CC. This is called the socialisation of the individual. SMEs use OL mechanisms consisting of training and experimenting to assist individuals in learning about using CC in the SME. Training takes place at the individual level. This is when individuals are trained when they are initiated into the organisation. Again, the individual will always come with their own beliefs and experiences and the process of socialisation of the individual and organisation can happen simultaneously.

The socialisation of the organisation is quite important as it takes place at a group level where interpretation and integration take centre stage. Thus, the socialisation of the organisation includes interpretation and integration. The main OL mechanisms that feed into these processes are training, experience, research and enquiry. The engagement of SME employees in these OL mechanisms becomes important for interpretation. That is, taking what was once limited to an individual and sharing it with other employees. Consequently, integration would be the next step: acting on the knowledge and developing a wider shared understanding (Crossan & Berdrow, 2003). When integration has been fulfilled, the process moves to institutionalisation. At this stage, the SME has been socialised. This is seen at the institutional level, where organisational processes have changed or have been altered to accommodate the new knowledge. The learning is now embedded in SME's structures and processes (Crossan & Berdrow, 2003). In essence, the socialisation of the organisations, which consists of interpretation and integration, leads to institutionalisation. The only OL mechanism identified to play a significant role is documentation. This is when the business processes within the SME are recorded for all employees for business purposes.

Institutionalisation would then bear the desired fruit of business flexibility, productivity, continuity, productivity and innovation. These business outcomes led to increased client satisfaction and increased market share. This would further re-enforce the use of CC in SMEs by refining the existing cloud knowledge and learning about new cloud services. This constant learning would re-enforce mutual learning between the individual and the organisation or, rather, the SME.

4.7 The conclusion of the second study

The objective of this study was to describe OL mechanisms that are applied by SMEs in SA when adopting and using CC and to generate the best plausible theoretical explanation of OL in the context of SMEs in SA. Initially, OL mechanisms were investigated through the inductive approach. The OL mechanisms in the data exhibited similar concepts that manifest in the theory of ExpIR and ExpIT; and the 4I theory. The theories were used to deductively analyse

the data to understand the theoretical explanation of OL for adopting and using CC in the context of SMEs in SA. The findings showed that OL mechanisms are used for exploration and exploitation processes. They consist of investigative and enquiring activities, experimenting, experience, documentation (procedures and processes), collective learning, training and alliances for exploitation and exploration activities. In theory, specific OL mechanisms are used to achieve exploration objectives (March, 1991). Similarly, other OL mechanisms are used to achieve exploitation objectives (ibid.). However, findings revealed that SMEs use the same OL mechanisms to achieve either exploration or exploitation objectives.

Additionally, SMEs use OL mechanisms like training and experimenting activities to socialise the recruits into the SME's organisational code. Consequently, SMEs adjust to employees' language and practices by creating an environment where employees can interact and discuss ideas. Thus, OL mechanisms such as sharing ideas, past experiences and training played a significant role. This is also a stage where an employee's intuition moves to a group setting, where knowledge and learning are interpreted and integrated (Crossan et al., 1999). Few SMEs were intentional about institutionalising knowledge that was embedded in employees to the SME as an organisation. OL mechanisms like documentation and recording of important processes were important for some SMEs. The few SMEs that invested in formalizing CC service processes ensured that new employees could easily learn and follow instructions. In addition, ambidexterity, the challenge and complexity of ambidexterity in allocating recourses between exploration and exploitation processes, was not an issue (March, 1991). Instead, SMEs have a challenge of exploration and exploitation occurring simultaneously (feedforward and feedback) (Kane & Alavi, 2007). Therefore, SMEs have to be deliberate in ensuring that the tension between feedforward (exploration) and feedback (exploitation) is addressed (Crossan et al., 1999).

A learning culture and climate are significant for a learning organisation or SME (Janz & Prasarnphanich, 2003). SMEs manage learning progression through collective learning by sharing ideas and knowledge in a group or team setting. This process led to the introduction of new CC services and the refinement of knowledge about CC. The demand for continuous improvement in CC use is due to CC capabilities that facilitate productivity, resulting in business continuity and flexibility. The more productivity achieved through CC adoption and use, the more motivation to learn about CC. Ultimately, the more competitive SMEs become.

5 Study 3: Organisational Changes that Emerge in the Process of Adoption and Use of CC by SMEs in SA.

Abstract

Most scholars in literature acknowledge that the successful adoption and use of Information systems (IS) in organisations requires other organisational factors to be equally assessed and realigned. One of these organisational factors is the need to make changes in adopting and using IS. While this is the case, limited research describes, explains, and provides an in-depth understanding of organisational factors that may be subject to change due to the adoption and use of IS, particularly in the context of SMEs in middle-income countries. This study aims to understand the organisational changes that have emerged in the process of adoption and use of CC by SMEs in SA. A qualitative approach was adopted, using thematic analysis to analyse data. The journey of the adoption and use of CC by SMEs was mapped out and organisational changes were identified. The findings showed that SMEs went through the adoption stages, which consist of pre-adoption, mid-adoption, and post-adoption. The shift from pre-adoption to mid-adoption was aligned with changes in line of communication, business processes, human resource management, learning culture and change in mindset. The shift from adoption to post-adoption was aligned with organisational changes that consisted of business processes and learning culture.

Keywords: Organisational change; cloud computing; adoption and use

5.1 Introduction

The use of IS has gone through transitions, from stand-alone software systems to Enterprise Resources Planning systems (seeking integration between business processes) to ICTs like CC with characteristics of interconnectivity, automation, shared, collaborative and remote accessibility (Kumar et al., 2016; Cirillo et al., 2023; Gadzali et al., 2023). As the transitioning process unfolds, CC remains a disruptive and sustaining innovation that improves organisational productivity and efficiency (Caldarelli et al., 2017; Amini & Bozorgasl, 2023). Unlike other types of IS, adopting and using CC requires a paradigm shift in how organisations understand, and use IS (Sultan & van de Bunt-Kokhuis, 2012; Kumar et al., 2022). As a result, previous research suggested that adopting and using CC leads to organisational changes (Ross & Blumenstein, 2013; Steininger et al., 2022; Tajudeen et al., 2022).

Most scholars in literature acknowledge that the successful adoption and use of Information systems in organisations requires other organisational factors to be equally assessed and realigned (Zafar, Tabish, & Jha, 2012; Enholm et al., 2022). One of these organisational factors is the need to make changes (organisational changes) when adopting and using IS (Olusola

& Oluwaseun, 2013; Steininger et al., 2022; Tajudeen et al., 2022). While this is the case, there is limited research that describes, explains, and provides an in-depth understanding of organisational factors that may be subject to change due to the adoption and use of IS, particularly in the context of SMEs in middle-income countries (Alshardan et al., 2015; Steininger et al., 2022).

Organisational change is a concept that has been adequately considered in various contexts of management and organisation literature (Pollack & Pollack, 2015; Gadzali et al., 2023; Johannes et al., 2024). Research exploring OC has focused on areas like leadership, management, corporate sustainability, procurement, logistics, adoption of AI and many other areas (Lozano, 2013; Elsan Mansaray, 2019; Enholm et al., 2022; Sukhawatthanakun et al., 2023). These studies offer the best explanation of the concept of OC. However, the current study seeks to highlight the significance of OC within the context of the adoption and use of IS by SMEs. In the literature reviewed in this context, it has been observed that there is a lack of consistent discourse and contribution to the subject of OC and IS, particularly in the context of the information age or the Fourth Industrial Revolution (4IR) (Enholm et al., 2022; Morea et al., 2023). The existing limited research on OC and IS consists of studies that have interrogated the concept of OC from a philosophical and conceptual point of view. Some studies focused on empirical evidence, where OC is investigated in the context of IS implication on organisations.

Avgerou and Mcgrath (2007) conducted a study that interrogated OC's philosophical and conceptual perspectives in IS. The authors made a point that historically, OC is studied and understood from a functionalist point of view. However, Avgerou and Mcgrath (2007) explained that the activities, decisions and changes that take place in organisations are not just a product of a functionalist point of view. Social issues and dynamics, shaped by the context in which organisations exist, influence these activities, decisions, and changes. It is, therefore, essential to consider these factors when studying OC. In the current study, OC is examined from a socio technical approach, which can incorporate but not limited to a functionalist perspective.

The prevailing research in the empirical studies category on IS revolves around jobs, outsourcing, productivity, communication and management (Markus & Benjamin, 1996; Ross, 2011; Steininger et al., 2022; Tsou & Chen, 2023). These studies have significance in the research area as they provided insights into the effects and changes brought about by adopting and using IS in organisations.

Several studies have proposed frameworks and models to guide SMEs in adopting and using CC (Adane, 2023; Makelana et al., 2022). These studies offer a prescriptive type of knowledge in the hopes that SMEs can use these frameworks and models as guidelines to achieve successful adoption and use of CC. These guidelines often focus on performance and revenue increase themes like impacts, implications and benefits of adopting and using CC (Santana,

2003; Tajudeen et al., 2022). There is little focus on themes around organisational change as a process and outcome of IS adoption and use (Steininger et al., 2022; Morea et al., 2023). This may be due to the intangible nature of organisational change, resulting in intangible benefits that may not be explicitly acknowledged (Eason, 1988).

Another factor may be that OC is frequently observed following the adoption and use of IS. Studying OC might pose a challenge particularly during the process of adoption and use of IS. Therefore, OC is fairly studied from the end to the beginning of the process of adopting and using CC (Karahanna et al., 1999). This study seeks to offer an analysis of the development of OCs that occurs throughout the adoption and use of CC by SMEs. The outcome of this research can enable practitioners to predict the possible changes that may unfold in the adoption and use of CC. This will provide them with a certain anticipation of change at different stages of the process of adoption and use.

In this regard, the study seeks to answer the research question: What are the organisational changes that have emerged in the process of the adoption and use of CC by SMEs in SA? This study aims to understand the organisational changes that have emerged in the process of adoption of CC by SMEs in SA. Understanding these organisational changes can aid the reimagining of existing ideas or concepts of OC and pave the way for creating new and more effective courses of action in IS adoption and use processes.

The study seeks to contribute to practice, the current body of knowledge of technology adoption and use, and organisational and management studies. In understanding organisational changes, IS practitioners can maximize the successful adoption and use of CC in SMEs. Saeed and Abdinnour (2013) argued that the successful adoption and use of IS, including CC, does not occur in a vacuum. It (adoption and use of CC) becomes a success due to other complementary organisational factors of which OC is one of these factors (Avgerou, 2001; Francalanci & Morabito, 2008; Cragg, Caldeira, & Ward, 2011; Gonzalez et al., 2024). In addition, understanding these organisational changes provides actionable knowledge that empowers SME practitioners on what to do at which point in time in the context of SMEs (Langley et al., 2013; Gonzalez et al., 2024).

This study can also add value to the current body of knowledge on understanding organisational change in the context of IS adoption and use, particularly in SMEs in middle-income countries. The study could contribute to the literature on evaluations of organisational outcomes after adopting information systems. In addition, the study could contribute to organisation and management studies that seek to answer questions of how and why things emerge, develop, and grow over time in organisations (Langley et al., 2013). The importance of timing and, generally, time in the lives of organisations is important (Langley, 1999), yet scholars turn to exclude time or how phenomena emerge over time (Lozano, 2013). This study considers OC over time in comparison to variance-based studies that account for the majority

of studies in organisation and management literature (Langley, 1999; Langley et al., 2013). Furthermore, the study explores studies of organisational change theory within the current industrial revolution (fourth industrial revolution).

The literature reviewed delves into organisation theory to illustrate the transformation of organisation and management theory, its impact, and the resulting implications and changes to organisations. Organisational change theory perspectives are discussed. The characteristics of organisations that are affected by change are presented and described. Finally, the implications of IS adoption and use are discussed concerning organisational change.

5.2 Organisation theory

Scholars have considered the concept of change within an organisation since the beginning of organisational studies (Iles & Sutherland, 2001; Hubbart, 2023). It is evident that change is unavoidable, and the history of organisation and management theory illustrates this perspective (Diefenbach, 2007). Early studies conducted between 1856 and 1915 adhered to Taylor and Fayol's classical, mechanistic, and rational approach (Ogarcă, 2010; Xiao et al., 2023). This approach assumes that organisations are stable closed systems that may not necessarily be affected by environmental factors (Gaspary et al., 2020). Therefore, this classical approach does not regard the environmental and social factors of organisations. As time progressed, the modern organisation theory was introduced. This theory acknowledges the cultural approach, systems theory and contingency theory (Gaspary et al., 2020). These theories are centred on the value of human relations, societal approach in organisations and the relationship between the organisation and its environment (Collins, 1998). The modern organisation theory approach led to the consideration of the efficient operation of entire systems in complex and dynamic circumstances (Gaspary et al., 2020). This ushered in the rational modern organisation theory that was influenced by the introduction of computer systems (Peltonen, 2016). Computer systems analysed complex management incidences possible through mathematical modelling and quantitative optimization.

In this era, approaches such as decision-making theory became prevalent and contingency theory was further developed (Klein, 2008). Decision-making theories focused on helping organisations make either close to perfect or satisfactory decisions in complex situations for organisational performance (Erik & Pratt, 2009; Xiao et al., 2023). On the other hand, contingency theory assumes that an organisation is dependent on its surrounding contextual situation. Woodward (1965) further developed contingency theory by discovering that to achieve an effective organisational structure, the organisation must adjust to the technology it uses. At the time, production technology was adopted and used in most industrial organisations. Following the rational modern theory, the interpretive organisational theory was introduced (Chia, 2005). From an interpretive perspective, organisations are seen as

subjective framing, where they become organised as a meaningful and sensemaking phenomenon for the organisation's participants (Peltonen, 2016). After some time, the critical organisation theory that drew from Marx's theory emerged (Cimini et al., 2021).

The critical organisation theory sought to expose and change the dominant social order of hierarchies to emancipate employees and managers from oppressive and exploitative ideologies (Steffy & Grimes, 1986). Towards the end of the critical organisation theory, there was a shift from the traditional authority in scientific narratives. This shift brought on the postmodern organisational theory (Kreiner, 1992). The postmodern organisation theory challenges the rationale offered by traditional organisation theories like the classical and modern organisation theories (Parker, 1992). It emphasises organisations as transforming, becoming and emerging and cannot be presented as a fixed state (Chia, 1995).

Most scholars agree with the definitions of organisation theories and the times they dominated history until post-postmodernism (Collins, 1998; Peltonen, 2016). Post-postmodernism follows the postmodernism era. Scholars agree that postmodernism has come to an end. However, scholars are still debating the characteristics of post-postmodernism (Jeffrey Nealon, 2012; Kowalik, 2023). They do not address the effects of post-postmodernism on organisation theory sufficiently. It is important to note that the history of organisation theory also speaks to how organisation theory and, consequently, organisations continuously change over time.

In general, organisational change occurs in parallel with the organisation's environment. In addition, organisational changes are influenced by technology, particularly when considering all the industrial revolutions the world has seen (Peltonen, 2016). This study aims to understand the organisational changes that have emerged in the process of adoption of CC by SMEs in SA.

5.3 Organisational change

The research area of organisational change became prevalent in the United States of America and Japan, and it later spread to Europe (Piva et al., 2005; Xiao et al., 2023). Before this era, organisations were not necessarily considered complex until a significant shift from the Tayloristic, rigid, inflexible organisation to a more complex, flexible one. This led to a need to consider the concept of change in organisations.

Kanter (1983, pg 279) says that "*change involves the crystallization of new action possibilities (new policies, new behaviours, new patterns, new methodologies, new products, or new market ideas) based on reconceptualized patterns in the organisation". The architect of change involves the design and construction of new patterns, or the reconceptualization of old ones, to make new, and hopefully more productive, actions possible".*

Thomson and Gray (1999) simplified the definition by explaining that change means old ways must be modified, and new behaviours or conduct must be introduced. The concept of change

in the context of organisations encompasses many characteristics (Doherty et al., 2010; Cirillo et al., 2023; Gonzalez et al., 2024). As a result, several diverse approaches in organisational change theory are used to manage change (By, 2005; Collins, 1998; Gonzalez et al., 2024). These include incremental, discontinuous, contingency, planned and emergent approaches to organisational change management (By, 2005; Gonzalez et al., 2024). The main approaches in current studies are the planned and emergent approaches (Rosenbaum et al., 2018).

The planned approach describes the process (consisting of a series of steps) to change and guides managers in implementing change (Collins, 1998). Kurt Lewin introduced this approach, which has dominated theory and practice from the 1950s to the 1980s (Bamford & Forrester, 2003; Burnes, 2005). While the planned approach has dominated theory for so long, it has received criticism from various scholars. Scholars cited that the approach and its process were complex and challenging to implement and manage (Bamford & Forrester, 2003; Burnes, 2005; Orlikowski, 1993). Critics have also pointed out the inability of the planned approach to recognise complexity and uncertainty in the organisations' environments (Dawson, 1994). Along with other critics, Andrew Pettigrew (1985) questioned the practice of treating change as separate from ongoing organisational processes and criticised the disproportionate emphasis on the rationality of managers directing change. At this point, the emergent approach was introduced in the 1980s.

In the emergent approach, change occurs as employees organise work within the organisational structure (Esain et al., 2008). Orlikowski (1996) described emergent change as new organisational patterns that arise without deliberate, preconceived intentions. This type of change is only apparent or realised through action and cannot be predicted in advance. Emergent change involves ongoing alterations and adaptations that produce fundamental change without prior intentions (Burnes, 2005). Emergent change happens in real-time. It fosters continuous learning and realignment of organisations to the environment (Bamford & Forrester, 2003; Burnes, 2005; Lozano, 2013). This type of change is abstracted and derived from ongoing and practical activities of organisational actors (Orlikowski, 1996). Change is thus driven mainly by expediency and is managed as the need arises. Whether organisational change is planned or emergent, it is clear that organisations will have to address or manage change in their lifetimes (Collins, 1998). Hence, the planned and emergent approaches are the most prevalent in organisational and management studies.

Orlikowski (1996) describes two types of changes that are not as prevalent in literature. They consist of the punctuated equilibrium models and the technological imperative perspective. The punctuated equilibrium model refers to OC that is rapid, episodic, and radical. This type of change is triggered by modifications in the environment or internally in the organisation (Torfs et al., 2023). The triggers for this change could include adopting and using new technology and compliance with industry regulations (Clemons et al., 2022; Fischer & Riedl,

2022). The studies using punctuated equilibrium models have focused primarily on large enterprises, with few focusing on SMEs (Fischer & Riedl, 2022; Newman & Zhu, 2009; Romanelli & Tushman, 1994).

Orlikowski (1996) describes the concept of the technological imperative perspective as where technology is an autonomous driver of OC. This is where the adoption and use of new technology bring about foreseeable change in various areas of the organisation. These areas include organisational structure, work routines, information flows and overall performance (Carter, 1984). This kind of approach is aligned with technological determinism, where actors in the organisation do not have agency. In other words, this perspective provides little room for individual agency and discretion (Orlikowski, 1996). Another limitation of the technological imperative perspective is that certain technologies, such as CC, are open-ended by nature, assuming the need for customisations.

Overall, the successful adoption and use of IS in organisations is inseparable from organisational change (Gadzali et al., 2023). There is consensus among organisational change theory scholars that the capability to manage change is a fundamental organisational competence (Casalino, Ciarlo, De Marco, & Gatti, 2012). Although the emergent approach is prevalent, particularly in fast-changing environments (By, 2005), little research has been conducted to understand the organisational changes in SMEs when they adopt, and use IS like CC.

5.3.1 The push factors for organisational change

Occasionally, organisations face the challenge of change or the need to change (Iles & Sutherland, 2001; Cimini et al., 2021; Gonzalez et al., 2024). This may be caused by several factors, including but not limited to the changes in the external environment (Tsou & Chen, 2023), the need to drive performance and productivity, the need to exploit labour relations to improve operations and technology adoption and exploitation (Cirillo et al., 2023; Johannes et al., 2024). Managers often understand this drive for organisational change; however, the question arises: what can managers change to ensure positive organisational outcomes? In organisational change literature, change is seen to affect predominantly three areas, which consist of organisational structure, organisational culture and organisational strategy (Gadzali et al., 2023; Cirillo et al., 2023).

Change in organisational structure

Organisational structure consists of rules and resources used by employees to interact (Carmack, 2008). Rules include organisational processes, procedures, and practices (Buhr, 2002). Resources include organisational capabilities or capacities like employees' departments to accomplish tasks (Carmack, 2008; Gadzali et al., 2023). Thus, employees are

agents utilising rules and resources to recreate or transform organisational structure (Gediehn, 2010). Organisational change may point to new organisational practices, procedures, ways of organising responsibilities, decision-making methods, and the decentralisation or integration of systems or structures (Hottenrott, Rexhäuser, & Veugelers, 2016). For example, many scholars have suggested a shift in organisational structure from a hierarchical to a flat, networked organisational structure, from vertical to lateral lines of communication (Kenis, Janowicz-Panjaitan, & Cambré, 2009). The call for organisational structure change was motivated by the rapidly changing environment that requires agility and flexibility (Gaspary et al., 2020). Failing to foster this change may lead organisations to a place where they cannot adapt to the complex and dynamic environments, they find themselves in (Child & Mcgrath, 2016). Another area that is predominantly affected by change is organisational culture.

Change in organisational culture

Culture is defined as a set of routines, beliefs, traditions, customs and reactions that are characterised by how a particular society addresses its challenges at a time. (Ogbonna & Wilkinson,1988; Marlina et al., 2023). When culture is framed in an organisational context, it refers to employees' values, norms, beliefs and attitudes (Kumar et al., 2024). Values, beliefs, and attitudes infer habitual ways of thinking, feeling, interacting with people and reacting to situations (Gadzali et al., 2023). An example that portrays the ability of managers to change culture is the concept of human resource management (HRM) (Al-Bahussin & Elgaraihy, 2013). HRM was a venture undertaken to change the culture in organisations (Stacho et al., 2017). HRM became a solution to the problem of rational approaches that ignore the social aspect of organisations (Collins, 1998). When HRM began, employees were seen as a significant resource pool that needed to be explored to intensify organisational performance (Al-Bahussin & Elgaraihy, 2013). Therefore, labour relation changes were adopted to establish trust between managers and employees. This was not the culture in organisations then, where the relationship between employees and managers was estranged because labour relations were collective among workers in unions (Collins, 1998). Essentially, HRM introduced a change in organisational culture, altering employees' values, beliefs and attitudes (Gaspary et al., 2020). Thus, moving from a culture of trusting unions to steer progress to a more individualised culture, where employees can trust the structures within the organisation to move ahead or progress. Another area that is predominantly affected by change is organisational strategy.

Change in organisational strategy

Organisational strategy is "*the unique positions in the marketplace to core competencies that provide a platform for sustainable growth; reengineering and quality enhancement for operational excellence; and learning and growth that drive the development of individual*

capabilities" (Osgood, 2004, p 106). Organisational strategy is mainly concerned with the organisation relative to its environment and its objectives regarding its offerings and performance (Dawson, 2000; Marlina et al., 2023). On the other hand, strategic change refers to interventions planned to transform organisations (Fürstenau & Woo, 2019). Strategic changes may include strategic alliances, mergers, outsourcing, process optimisation, cost minimisation, imitation of innovations and targeting niche markets for specific products (Sackmann, Eggenhofer-Rehart, & Friesl, 2009; Tsou & Chen, 2023). Often, organisational change impacts organisational structure, culture and strategy as these attributes are interlinked (Tsou & Chen, 2023; Morea et al., 2023). In the context of this study, OC is also interconnected with the adoption and use of IS in organisations.

5.4 Organisational change and Information Systems (IS)

It is important to consider perspectives on how IS and OC are linked and have evolved (Markus & Benjamin, 1996; Orlikowski, 1996; Langley, 1999; Langley et al., 2013; Gonzalez et al., 2024). Avgerou and Mcgrath, (2007, p 295) define organisational change in IS practice as "*a process of technical reasoning and acting governed by a mix of concerns about software construction, administrative control and economic gain*". Organisational change has become significant within the field of IS due to rapidly changing technologies and the adoption of new IS in organisations (Jones, 2005; Gonzalez et al., 2024). As a result, scholars have argued that the adoption and use of IS do not yield the desired organisational outcomes without organisational change (Johannes et al., 2024). For example, IS has been known to improve employee collaboration (Gadzali et al., 2023). This phenomenon results in changes in the line of communication and authority, resulting in the organisation's restructuring (Gonzalez et al., 2024).

The changes can include reducing hierarchy and bureaucracy in organisational structure (Piva et al., 2005; Cimini et al., 2021). Adopting and using new IS (technology change) and organisational change are complementary (Hottenrott et al., 2016). The adoption and use of new IS are often accompanied by re-organisation within the organisation (Jones, 2005). Organisational change allows for efficient technology adoption and use (Hottenrott et al., 2016). Earlier research shows that organisational structures should complement IS adoption, enabling organisations to achieve productivity gains from IS (Casalino et al., 2012); (Hottenrott et al., 2016). Thus, the organisational form should complement IS use if the organisation benefits from the adopted technology.

5.4.1 Information systems and organisational implications

Previous studies have been done to understand organisational implications during the process of adoption and use of IS (Cimini et al., 2021; Tsou & Chen, 2023). These studies have been approached from various perspectives, reflecting the organisational implications of adopting

and using IS (Cimini et al., 2021). The organisational implications included IS adoption and organisational change (Ferneley & Bell, 2006; Cirillo et al., 2023). While some research explored the strategic role that is played by IS adoption and use in an organisation (Levy & Powell, 2000; Cirillo et al., 2023), others addressed the implications of IS adoption and use from a training point of view where a professional field is improved through IS, such as accounting information systems (Stefanou, 2002; Casalino et al., 2012; Cirillo et al., 2023).

A perspective of socio-organisational change was addressed by Avgerou, (2001), who argued that the context of an organisation must be considered at the organisational, national and international levels. This is relevant, particularly when one tries to understand the implications of adopting and using IS in organisations. In addition, some researchers also conducted literature reviews to understand an overview of organisational matters in implementing and adopting IS (Creswell & Sheikh, 2013). The outcomes of these reviews resulted in developing and refining frameworks to address the organisational behaviour of IS implementation (Ward et al., 2005; Cirillo et al., 2023).

5.4.2 Pre- and post-adoption Information Systems

To observe organisational change, one must distinguish between pre- and post-adoption (use) in its process (Karahanna et al., 1999). Undoubtedly, organisations will have to periodically adjust or refine the implementation and use of IS (Gadzali et al., 2023; Gonzalez et al., 2024). Some studies focused on pre- and post-adoption of IS in organisations from individual and organisational perspectives (Selensky, 2023; Zhang et al., 2024). Most of these studies focus on the changes or transformations that occur in organisations and are centred on the diverse perspectives of organisations. For example, resource requirements, customer satisfaction and learning have been researched (Saeed & Abdinnour, 2013; Gadzali et al., 2023). Other aspects focus on the beliefs and attitudes of employees pre- and post-adoption (Karahanna et al., 1999). Further studies are more concerned about the level and behaviour of IS use after adoption by organisations (Jasperson et al., 2005; Cirillo et al., 2023). The idea behind the current study, is to understand the state of an organisation's pre-adoption and, post-adoption, enhance the organisational strategy and enable the exploitation of IS (Jasperson et al., 2005).

5.5 Organisational Change and the adoption and use of IS in SMEs in SA

Limited research has focused on organisational change induced by the adoption and use of IS in SMEs in middle-income countries (Enholm et al., 2022; Morea et al., 2023). The reviewed literature on the impact of IS adoption and use in SMEs in middle-income countries, including SA, rarely focused on organisational change as a byproduct or a continuous process of the adoption and use of IS. However, the studies that have been reviewed highlighted influences of adoption and use, such as performance and the increase in production (Santana, 2003;

Steininger et al., 2022). Another example is the increase in the training of employees (Dubihlela & Kupangwa, 2016; Gonzalez et al., 2024).

The primary revelation was that there is a gap in the literature that addresses organisational change induced by the adoption and use of IS in the context of SA, particularly in recently published literature. The argument is that, in this information age where organisations are adopting IS, OC should become one of the key organisational characteristics that should be studied (Morea et al., 2023; Gonzalez et al., 2024). One of the technologies that have been adopted and are being used by organisations in this information age, is CC.

5.5.1 Cloud computing and Organisational change

Cloud computing challenged the traditional offering of IS in organisations to the extent that it is agreed in literature that the adoption and use of CC requires a paradigm shift in IS operations in organisations (Ross, 2011; Gadzali et al., 2023). This paradigm change introduces structural, management practices and cultural changes in various organisations (Sultan, 2011). In large organisations, human resources practices have been impacted by CC adoption through the implementation of downsizing and reducing ICT support staff (Ross, 2011). In learning institutions like universities, CC has introduced changes in the processes that manage teaching and learning. In SMEs, system support changes because CCSPs will maintain CC services instead of an employee (Mokhtar et al., 2014; Jangjou & Sohrabi, 2022). SMEs who plan to adopt or continue to use CC should be prepared to embrace organisational changes enacted by adopting and using CC (Sultan, 2011; Gadzali et al., 2023).

5.5.2 Summary of the literature review

In summarising the literature reviewed, Figure 18 outlines the themes found in the literature. The study contributes to specific areas outlined below.

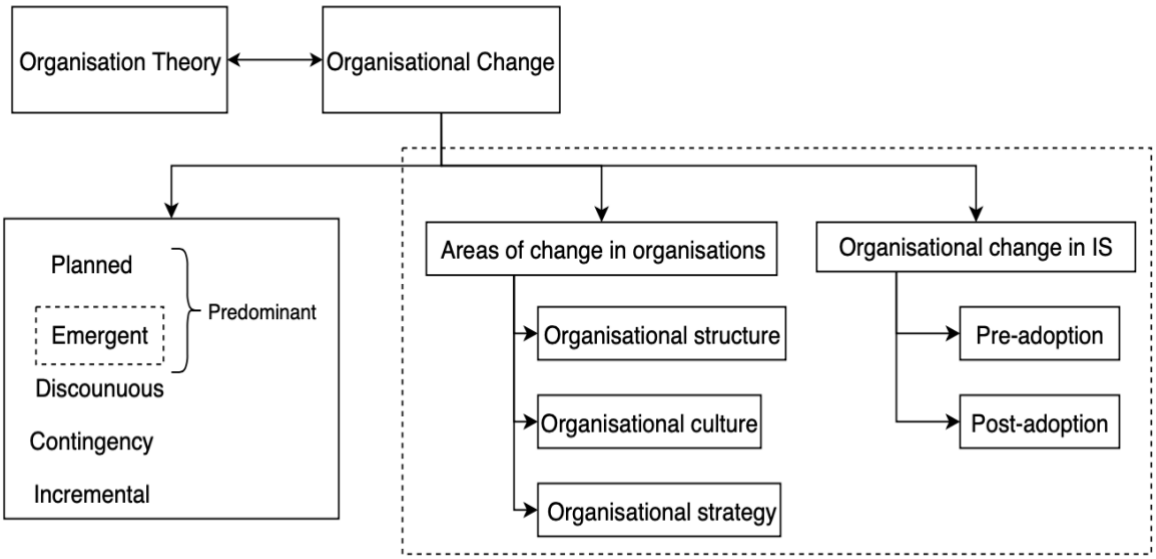

Figure 18 : Literature focused on organisational change

Firstly, the literature reviewed focused on the history of organisation theory. This was done to portray the changes in the different times, the environment that organisations found themselves in, and mainly the change impact this had on organisations. Organisational change was also reviewed, and some approaches were listed in the literature for studying and managing change. The two most prevalent are the planned and emergent approaches. The current study is interested in the OCs that emerged in SMEs during the adoption and use of CC. Therefore, this study can add value to the literature focused on emergent changes in organisations. This is, of course, in the context of the adoption and use of information systems in organisations. Therefore, the current study can also contribute to the adoption and use of IS literature. The study can contribute towards organisation studies situated within the context of studying a process, examining a dynamic sequence of events over time rather than static conditions.

5.6 Methodology

In literature, it has been argued that in order to observe organisational change, a distinction must be made between pre-adoption and post-adoption organisational processes (Karahanna et al., 1999). The retroductive approach was useful in studying OC after it had already occurred, in the process of CC adoption and use. Retroduction involves employing methods that enabled the researcher to trace backwards, from the current utilisation of CC in SMEs to the initial stages (pre-adoption and use of CC), constructing a plausible explanation based on the observations (Kaluzeviciute & Moreton, 2023; Malhotra, 2017). Therefore, through the retroductive approach, OC that occurred in the CC adoption and use process could be more effectively identified. As a result, a researcher can backtrack from post-adoption to pre-adoption of CC. The empirical context consisted of SMEs that have already adopted and are

using CC, listed in Table 16. Therefore, a retroductive approach was used to uncover organisational changes that have taken place within SMEs that have led to the successful adoption and use of CC.

Table 16 : Profile of SMEs for Study 3

Respondents	SME Size	Location	CCSP	CC service	Scope of operation	Industry
R1	Medium	JHB	Local - Global	IaaS moving to S/PaaS	South Africa	Telecommunications
R2	Small	CT	Global	SaaS	Global	Digital Marketing
R3		CT	Global	SaaS	South Africa	Travel & Tourism
R4		CT	Global	PaaS	South Africa	Information Technology
R5		CT	Global	SaaS/IaaS	South Africa	Animation
R6		CT	Global	SaaS	CT	Hospitality
R7		JHB	Global	SaaS/PaaS/IaaS	Global	Information Technology
R8		CT	Global	PaaS/SaaS	Global	Education
R9	Medium	JHB	Global	SaaS	South Africa	Education
R10	Small	CT	Local	SaaS	Global	Private Security
R11		JHB	Global	SaaS	JHB	Information Technology
R12	Small	CT	Global	SaaS	Western Cape	Private Security
R13	Small	CT	Global	SaaS	Africa	Finance
R14	Medium	JHB	Local	SaaS	South Africa	Telecommunications
R15	Small	CT	Global	SaaS/PaaS/IaaS	Global	Finance
R16	Medium	CT	Local	IaaS	South Africa	Retail (online shopping)
R17	Small	JHB	Global	SaaS	Global	Finance
R18	Small	JHB	Global	SaaS	Africa	Finance
R19	Small	CT	Global	PaaS	Western Cape	Education
R20	Small	CT	Global	IaaS	Africa	Beauty and fitness
R21	Medium	CT	Local	IaaS	South Africa	Advertising
R22	Small	JHB	Global	IaaS	South Africa	Tourism
R23	Small	DBN	Local	SaaS	South Africa	Marketing

The unit of analysis consisted of SMEs in the economic hubs of SA, in Durban (KwaZulu Natal), Johannesburg (Gauteng) and Cape Town (Western Cape). The criteria used in selecting the sample consisted of SMEs that had been using CC for more than six months and were dispersed within the spectrum of CC service offerings (SaaS, PaaS, and IaaS). This is because the interest of the study is focused on the adoption and use of CC in SMEs. To acquire rich data and experience from SMEs regarding both the adoption and use of CC, SMEs would need to have at least worked with CC services for a reasonable period. The purposive and snowballing techniques were used as a sampling technique (Neuman, 2006). The sample was selected from the SME population, where the unit of analysis was made up of 23 SMEs. The provision of the industries in which SMEs operate, the cloud services used by SMEs, and the scope of operation provide insight into the context of the SMEs. The unit of observation consisted of 23 participants. Participants comprised SME owners, executive managers, chief executive officers and chief information officers. Participatory observations (summary of

participatory observations shown in Table 3) and ethnographic interviews were used as data collection techniques. Participatory observations were useful and valuable in shaping the interpretations the researcher drew from the data. In chapter 2, section 2.2.1, a detailed description of ethnographic interviews is provided.

Thematic analysis techniques were adopted to analyse data using Atlas.ti as the qualitative data analysis tool. Open coding was used to identify codes associated with organisational change and the events related to the changes (Noor & Darmaningrat, 2023).

The first step was to study the journey of each SME from the end to the beginning of the adoption and use of CC. Thematic data analysis was used to map the journey by identifying the stages SMEs went through from the end to the beginning. The stages that emerged in this process were termed post-adoption, mid-adoption and preadoption. These stages emerged during the process of data analysis.

The second step identified the events that triggered the shift to the next stage. The last step identified patterns in organisational changes that had taken place throughout the journey. Additionally, the organisational changes identified could be linked to the causes that enacted these changes.

The changes in CC adoption and use within the journey were identified by studying the intersection that represents what was previously done and what was changing. The process is depicted in Figure 19.

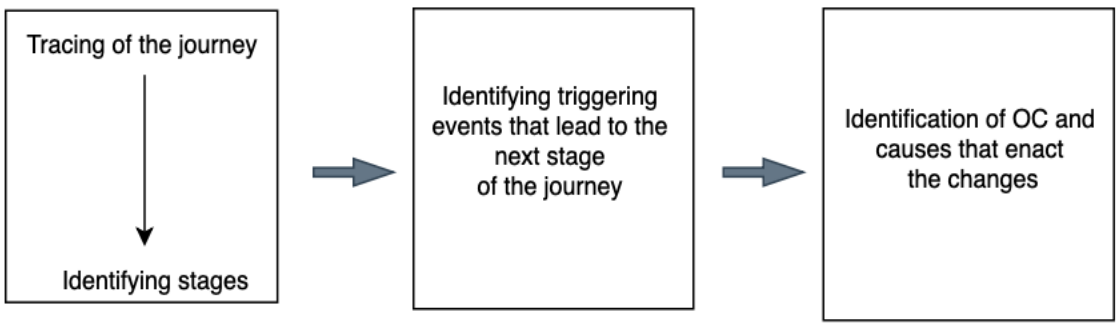

Figure 19 : SME journey in the process of adoption and use of CC and OCs

The data analysis process included the tracing of the journey that the SMEs travelled in the process of adopting and using CC, the identification of triggering events that caused SMEs to shift to another stage in this journey, and lastly, the identification of OC as a result. The findings will, therefore, align with each of these processes.

5.7 Findings

The first aspect of the findings was associated with the actual journey that SMEs experienced in adopting and using CC. The journey started with unfulfilled expectations and a journey travelled to realise the needed changes and benefits of CC.

5.7.1 The journey travelled by SMEs and expected OCs

The findings revealed that most SMEs started using traditional ICT offerings and later adopted CC. Some SMEs started using both the conventional ICT offering and CC. Some SMEs adopted CC from the onset. This can be seen in Appendix 4, Appendix 4: The phases of the journey of adoption and use of CC by SMEs in SA

Table *20*. It was difficult to pinpoint organisational changes in SMEs that were always using CC. However, these SMEs experienced challenges that led to some changes that were observed during the data analysis phase. Cloud computing is a general-purpose technology that can be exploited to further organisational effectiveness and efficiency (Sultan & van de Bunt-Kokhuis, 2012). Thus, SMEs that used CC from the onset were included in the analysis because one could not assume that these SMEs would not go through organisational changes. A respondent clearly articulated in their response that "… *AWS offer about 200 services now, one comes out each week, it seems*" R18. Thus, with the pervasiveness and new releases of CC services with some CCSPs, it is possible that some of the new services will affect the organisations and induce changes.

A common trend observed with most SMEs was that, as they progressed in using CC, they migrated to CCSPs that offered an improved or better cloud service. This migration was financially costly to SMEs. A respondent said, "*…that database product if you want to run it on Azure, it can get very expensive…*" R20. Though this is the case, it also meant an improved provision of CC services for SMEs and user experience, resulting in an increased value for money. This was seen in the following response, "*It will be more like a value thing for you… You don't have to worry, you know, to make sure your employees are skilled enough to handle things like the hardware"* R3. In addition, the migration led to a shift in how SMEs were utilising CC, which further resulted in a shift in how SMEs managed their organisations, reflecting OC.

It was interesting to take note, that SMEs adopt CC for diverse reasons. This had implications for the type of CC service that was used. For example, some SMEs adopted CC mainly to remove the burden of maintaining hardware infrastructure, transferring the burden to CCSPs (IaaS). Other SMEs adopted CC to access specific software applications for core business purposes, such as customer relations management software (SaaS) and enterprise resource planning systems. Some SMEs opted to move some business operations to the cloud and run other operations internally for business-related reasons. A respondent explained that "… *in*

terms of our client's right, it's not like we are 100% cloud, so there is still like some people that are having issues with their internet speed that are still running local installations" R21. This is compared to SMEs, which have moved all their business operations and processes to the cloud. It was therefore noted that the level of adoption and type of CC services used in SMEs have implications on the type of organisational changes that can be experienced in SMEs.

When SMEs adopt CC, they do so because they want change in some form or another. Thus, some changes would be expected. However, some changes may not be expected. Initially, SMEs did not experience the expected organisational changes that CC as a technology promised. However, in the adoption journey, SMEs engaged in the adoption and use of CC to get to a point where they experienced the desired organisational changes. The expected changes were realised through a dynamic process that would eventually lead to the desired organisational change. For example, SMEs expected that CC would mean that there would be fewer breakdowns, there would not be any SLAs, and support would be readily provided by CCSPs (on-demand service). Another expectation, which may not necessarily be about organisational changes, is cost. The cost was the main expected benefit and driver of CC adoption. It turned out that it cost a lot more than what was expected. This meant that SMEs had to wait until they could afford to adopt the type of CC that would offer the expected changes. Therefore, getting to a point where SMEs could experience the expected organisational changes meant they had to go through phases in the CC adoption and use journey. The journey that SMEs had to go through represents this dynamic process in CC adoption and use.

The mapping out of the journey revealed that most SMEs went through three stages, also called cycles; these cycles are repetitive until certain events trigger a transition to the cycle. Common concepts or events within the cycles caused the shift from one cycle to the next. This aligns with Berger and Thomas Luckman's (1966) view that systems stay in their repetitive cycles until a disruptor causes a system to change. Thus, while there are these stages or cycles, there is also a shift that causes SMEs to move from one cycle to the next, resulting in organisational changes. The next sub-section explains the cycles and shifts that are experienced by SMEs in this journey of CC adoption and use.

5.7.2 The stages and cycles in the journey of adopting and using CC

The term pre-adoption is used to define and study a stage that re-enforced SMEs in using traditional ICT offerings prior to the adoption of CC and the causes for changing to the adoption of CC. In other words, prior to the adoption and use of CC. SMEs were operational and using traditional IT methods until there was a need to adopt CC. The concept of mid-adoption was used to define and study a stage that re-enforced SMEs to adopt and use CC with

inadequacies. Post-adoption was used to define and study the last stage that re-enforced SMEs to use further and exploit improved CC services.

The journey of the adoption and use of CC by SMEs is illustrated in Figure 20. The diagram illustrates the stages and cycles, how they are re-enforced, and the shifting from one cycle to the next. The explanation of the diagram is outlined below.

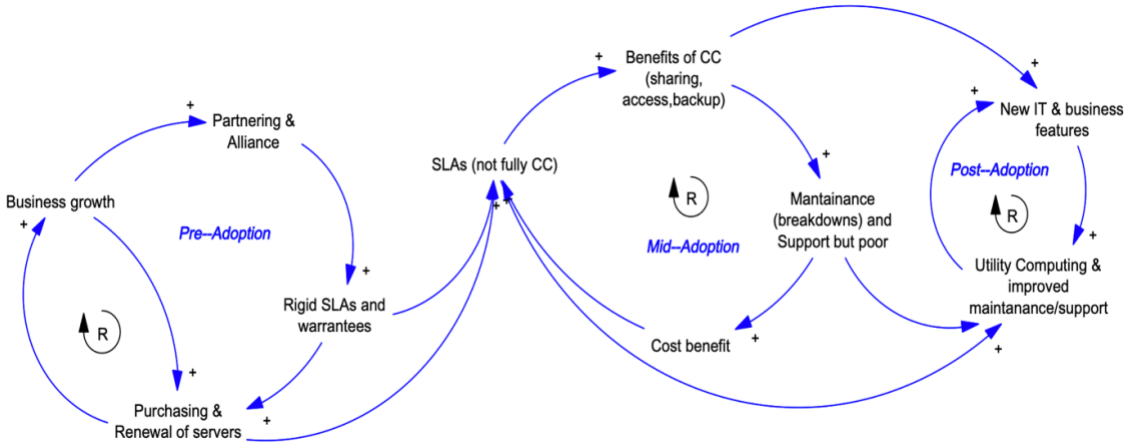

Figure 20 : The analysis of the journey of the adoption and use of CC by SMEs

The Pre-adoption stage in the journey

In the pre-adoption stage, SMEs **purchase physical servers** from service providers viewed as **partners or alliances** to SMEs. A respondent explained that before the adoption of CC, there "*… were physical servers that were not virtualised. So that was a server with an operating system…*" R10. Another respondent added, "*Initially, our organisation was using physical machines…"* R16. The purchasing of servers was facilitated through **service level agreements** consisting of various aspects, including **warranties that elapse after a given period**. Thus, SMEs would be liable for breakdowns and maintenance of the physical servers after warranties have run out. A respondent explained that they have an option of extending warranties once they lapse, they "*… take out for warrantee extension*" R10. Within the pre-adoption stage, most SMEs experienced business growth. This growth placed a strain on their resources and business operations. This strain would lead to SMEs adding servers to existing servers to ensure that business operations proceed without hindrances. An online retail SME explained that one of their challenges was that "…*when running your own hardware, you know that there is a finite amount of resources…*" R16. Another respondent in the IoT industry explained that "…*as the business grew, we got more and more devices connected and then had to improve the server performance, so we added more and more servers…*" R10. Thus, as SMEs grow, there is a requirement to add ICT resources to keep up with the business growth, hence the purchasing of additional servers.

In other words, business growth requires the addition of traditional IT resources. As SMEs acquired these resources, it reinforced the conventional use of IT services, allowing this cycle to repeat itself. This presented challenges in that SMEs often did not have the required skill set to maintain IT equipment and address faulty equipment should the need arise. SMEs often found themselves **extending warranties adding and renewing their servers**. This was vital for supporting business growth and to ensure that there was a backup for their data.

This cycle has been quite costly for SMEs as most SMEs do not have **the capital to buy servers** and constantly keep up, particularly after the warranties expire. The introduction and benefits of CC meant that SMEs could break away from the traditional cycle and shed off the challenges of cost, maintenance and lack of skills in maintaining physical servers.

The shift from pre-adoption to the mid-adoption stage

In order to move away from the repetitive cycle of the preadoption stage, SMEs decided to adopt CC because of its characteristics and benefits. The characteristics of CC consist of an on-demand service, broad network access, resource pooling, rapid elasticity and a measured service (Mell & Grance, 2011). These characteristics should enable the absorption of the challenges experienced by SMEs prior to CC adoption. Thus, CCSPs could absorb the need to maintain servers whilst providing most of the ICT services required by SMEs (Gangwar et al., 2015).

Unlike the traditional method of purchasing servers through service providers, the adoption of CC should not include SLAs. This would imply that SMEs would move away from constantly purchasing servers. Severs themselves posed problems; a respondent said, "…*we had this server, and it was down and it literally took about a half a day for them to sort everything out*" R13. The respondent added, "*I think in a long run, it's still going to be a lot cheaper when you look at the maintenance and staff that's involved with on-prem*" R13. Another respondent added, "*Then the reason why we changed route. I mean, then we were faced with a decision. Are we going to continue buying more and more equipment? Which is very expensive or are we gonna go with an existing cloud provider that specializes in hosting*" R10. In addition, SMEs would not sign **rigid SLAs**, this would also remove the stress of warranties that would expire. An SME employee said that "*we don't have warranties anymore. And that was actually the turning point for us…the reliability is a big benefit; we don't have to worry about warranties*" R10. It was then perceived that the adoption and use of CC would remove the cost associated with in-house server use and maintenance and rigid SLAs.

The Mid-adoption stage in the journey

Unfortunately, most SMEs found that the quality of CC provision is dependent on the CCSP. The better the service, the more costly. The findings showed that local CC services (CCSPs) did not have all the characteristics of CC, whilst global CCSPs had most of the characteristics,

if not all of them. Most SMEs could not afford the superior service and had to settle for an inferior service provided by local CCSPs. The main observed characteristics of the inferior service include **signing SLAs** for storage and processing power that CCSPs offer. For example, a respondent said, "…*they [CCSP] say maximum [1G] and then they got a whole lot of clients doing staff that brings the whole network down*" R15. In other words, this SME signed an SLA to access 1Gb of storage, however, the CCSP had no way of ensuring that other SMEs could not access the same storage. A respondent explained "*In the agreement it said, we can limit your performance without notifying you….but something or somebody else was causing our limiting [resources]. But because there was an issue, the rate limiter should have kicked in for the noisy neighbour, but it did not" R12.* An SME respondent verified that they *"started with a [CCSP], now the [CCSP] is not really cloud, it's sort of half cloud because they've got managed services"* R4.

Cloud computing services should be provided through a utility type of provision. For example, at this stage, SMEs did not experience the pay-as-you-go feature when adopting and using CC. SMEs were provided a specific amount of storage and processing power that was agreed upon, through SLAs. This is not ideal, however, the basics of CC benefits, like the sharing and accessing of business processes by employees and the backing-up of data for availability purposes, were offered at a reasonable cost (Mell & Grance, 2011; Hayat Malik et al., 2019).

A respondent explained that, *"We can all do everything all at once so we can all contribute in one document at the same time… and also a document management system, where you can store all your documents that…if anyone in the organisation is looking for them …or if someone is new in the company and wants to know more about the organisation" (*R7). Another respondent in the education sector explained that, "…it's *online you can also be, like in virtual classrooms. Because you can be a student here in Katlehong or Thokoza and you can engage with somebody in the states or India or Russia or wherever the case, some in Africa right*" R9. At this stage, the adoption of CC had a cost-benefit. The online retail respondent explained that physical servers were expensive in that *"…for Black Friday, we double our resources… the infrastructure has to be 2 to 3 times the size…And you constantly going every year so…you will have to buy more servers to make sure that you have got that extra headway or room to be able to do something like a black Friday. But after black Friday, it goes down again. So now you sit with that server running, its electricity bill, physical space that you have to pay"* R16. Now that they have adopted and using CC, they no longer have to purchase servers/physical space, which reduces the cost of running their IT systems.

Whilst SMEs were experiencing these benefits, they would also start experiencing constant breakdowns of servers or infrastructure from CCSPs, which affected business operations negatively. One of the SME respondents said, "*We started with a CCSP clouds sever, it was down every week basically. It was terrible*" R20. Another respondent had a similar experience

where "*we were using a [CCSP], but their services were not reliable because they had constant downtime even the speeds were also just slow"* R1. SMEs relied on CCSPs to fix breakdown challenges, which took longer than desired. This meant that the promised infrastructure maintenance was still an issue to a certain extent. SMEs were not liable for infrastructure maintenance; however, they were affected by **poor maintenance and the lack of support** provided by the CCSPs. Though there were challenges with the adoption of CC at this stage, SMEs also appreciated the benefits that proved value compared to the pre-adoption stage.

The SLAs that SMEs signed with CCSPs were more flexible whenever they needed to increase resources. They would request the CCSPs to do so and make changes to the agreement. At this stage, it was clear that SMEs would have to accept some of the challenges and unmet expectations of the adoption and use of CC. This was done in the interest of the CC benefits that were being experienced by SMEs. Thus, the improved SLAs, benefits of CC experience by SMEs, the removal of hardware infrastructure liability and the cost-benefit ensured that the mid-adoption cycle was re-enforced in SMEs. This was repetitive until SMEs could shift to the post-adoption stage.

The shift from mid-adoption to the post-adoption stage

The findings showed that some SMEs in the mid-adoption stage eventually experience business growth and a higher ROI. These SMEs would then be better positioned in a place that allows them to migrate to better and improved CCSPs that offer all or most of the characteristics of CC. A respondent noted that "*…there are quite a few instances where you get to that point where the cloud won't be a cost-saving thing, it will be more like a value thing … then it's not about cost anymore, which I think makes sense. I mean, you are getting what is better than what it used to be like, you know…*" R20. Thus, CCSPs are often costly; however, SMEs have seen that a quality CC service offers value to clients.

The shift from mid-adoption to post-adoption cycle is caused by the opportunity for utility computing, improved maintenance and support, and new IT features. Utility computing removes the challenge of signing **SLAs** that have some flexibility, however, they still have the rigidity to a certain extent. The improved CC services offer **utility computing,** where scalability and other services are provided on a pay-as-you-go basis, aligning with CC characteristics. A respondent explained that even "…*in terms of storage, you only pay for what storage you have used. They actually track it and measure it on a per minute, per second basis*" R5. The opportunity for improved maintenance and support offered through improved CC service reduces constant breakdowns in servers, and similar infrastructure has been the cause of migration. Among other similar statements, a respondent explained that they "…*started with an inferior CCSP's clouds sever, it was down every week basically. It was terrible*" R20. Similarly, a respondent explained that their "…*clients would complain constantly of Inactivity, downtime. However, since migrating to another CCSP, they…have been on there for about*

two years…. I don't think we've had any downtime" R22. Thus, eliminating constant breakdowns was a push to migrate to improved CC services.

Lastly, global CC service providers offer services unavailable to local CC service providers. There is a bigger scope in **CC benefits** and the types of **IT services and features** that offer opportunities for innovation for business features and purposes. A respondent said, *"…I mean, AWS offer about 200 services now, one comes out each week, it seems"* R18. A respondent said they "*…have released some new features that we were not able to do before…"* R13. Another respondent narrated various ways that migration has made a difference in the organisation, *"I can go in and create my own dashboards, I can change anything, I am the administrator. So, I can click and drag things from the screen, I can create new charts to present to my expo team in minutes, I can feed new fields before he needed maybe two weeks to design, to program and re-program this thing to design a new field*" R14.

Post-adoption stage in the journey

In the post-adoption stage, SMEs mostly use utility computing (on a pay-as-you-go basis) compared to the pre-adoption and mid-adoption stages. With **utility computing**, **where you will** "…*only pay as you go for usage based on what the service specs are and what the prices are for*" R15. Thus, even "…*in terms of storage, you only pay for what storage you have used. They actually track it and measure it on a per minute, per second basis*." R5. Additionally, in the post-adoption stage, SMEs also reported a rare account of "*…something going wrong they, have got like 4hours turnaround time*" R1. In some cases, server breakdowns and improved support were eliminated. A respondent explained, "*We have had no downtime because of the platform, which we had with our old provider*" R22. This has made it easy for SMEs to focus on taking advantage of CC services to improve business operations. It was also evident that CCSPs have been innovative in offering CC. This is seen in **the new IT features** released regularly, "… *AWS offer about 200 services now, one comes out each week, it seems*" R18. SMEs have found that the benefits of CC have moved from sharing, access, and backing up aspects to other IT features that have allowed SMEs to be **innovative in offering their services**.

In this stage, most SMEs have decided that paying for CC services is a costly exercise however, it's worth the value it offers for business processes and customer satisfaction. A respondent explained that "*because there are all these little bits that go with the cloud. Like the backup server you pay for and storage that goes with the backup is extra, so once you add it all up … that's what I am paying*" R20. Another respondent said that "*the same setup that we got from [the previous CCSP] in comparison to [current CCSP] has doubled in price*" R1. An SME owner admitted that "*it [CC] was very expensive, but I had no choice*" R11. Post-adoption was the last cycle that could be seen in the journey. SMES may have experienced challenges and benefits not identified in this study as the data collection process had to end at

a given point. These cycles and shifts in the process of adopting and using CC were also associated with organisational changes.

5.7.3 General Changes associated with specific shifts in the journey

Initially, the journey travelled by SMEs in the process of adoption and use of CC was mapped out. The ultimate objective was to outline and describe organisational changes that were experienced by SMEs. What was observed was that, in some instances, the shifting (from one stage to the next) in the journey resulted in organisational changes. However, in other cases, the shift did not necessarily result in organisational change. There were general changes that were foundational in aiding the adoption and use of CC by SMEs. In the first instance, it was evident that the adoption and use of CC required a paradigm shift in how SMEs thought about access to ICT resources (Ross, 2011; Gadzali et al., 2023). It was also evident that the adoption and use of CC impacted organisational culture and structure. The OC associated with organisational culture aligned with Sultan and van de Bunt-Kokhuis's (2012) view that CC represents a paradigm shift. Thus, one could observe the shift in mindset in SMEs from pre-adoption to mid-adoption. In this transition, SMEs had to understand that ICT equipment ownership would not be possible with the adoption of CC. SMEs had to accept that personal data would be hosted by CCSPs, resulting in the possibility that CCSPs would access important and personal data. In the beginning, it was a challenging shift in mindset. However, in the adoption process (pre-adoption to mid-adoption), SMEs came to terms with a new way of thinking and working. Essentially, SMEs had to let go of the concept of ownership in this regard. Resulting in the acceptance that there are mitigating laws and non-disclosure agreements that would protect their data. Respondent reflected on their process in letting go of the idea of ICT equipment and data ownership, "*The limitation was kind of old school of thought and a lack of education on what cloud actually brings*" R14. *"Another challenge might be…all our data that we have, it's in the cloud, let's say we want a physical copy of that data, for whatever reason. It's quite a lot of data to download a Terabytes over the internet into our office" R10.* The adoption of CC came with a change in mindset and established a new culture where working on the cloud is currently a "norm". These general changes translated to OC within SMEs.

Organisational Changes in SMEs

The prevalent organisational changes observed were mainly in the organisational culture and structure. The organisational structure changes consist of changes in business processes, communication and Human Resources (HR). Organisational culture changes are comprised of changes in mindset and learning culture. Figure 21 outlines the changes in accordance with the shift in the adoption and use of CC. These changes largely depended on the SME's business type and the reasons for adopting CC.

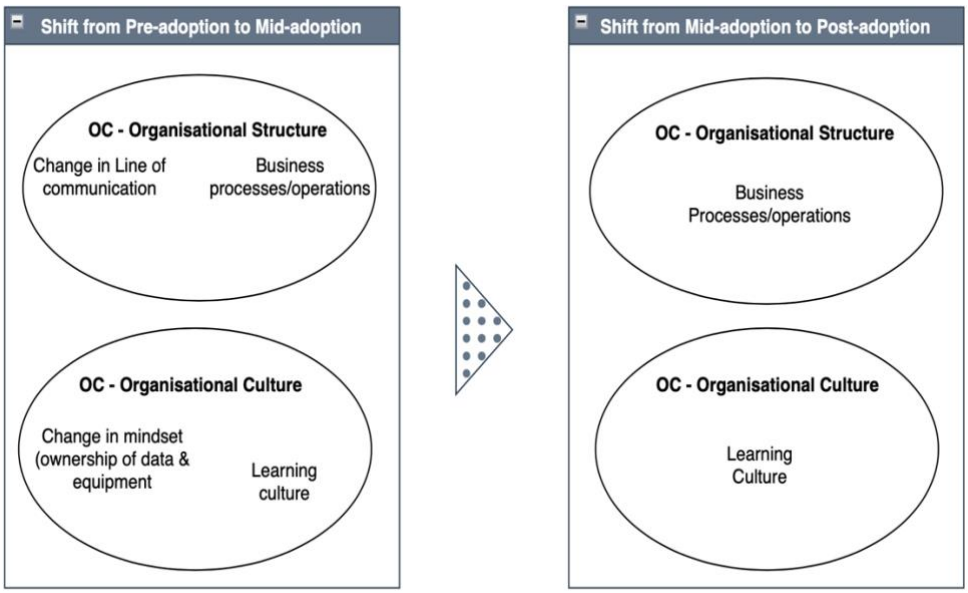

Figure 21 : Organisational changes in the adoption and use of CC

Organisational culture and ownership of equipment and data

The adoption of CC required a change in how individuals thought of outsourcing IT resources. Letting go of the idea of equipment and complete data ownership opened the door for the ability to adopt CC by SMEs. Initially, some SMEs were concerned about the inability to travel and see the data centres hosting their data. A respondent explained, *"I think that's also something that scares people about the cloud is…because in the cloud…there's maybe a head office in Johannesburg or somewhere, now you are here. It's not like you can go and touch the equipment or see where the people are in the cloud" R10.* A respondent explained*, "… with the cloud, I mean, I can't drive anywhere to fetch the data. If we want to do anything right now, the data that is sitting in the cloud, you can't even get a backup. You have to export back over the Internet. You can't get a physical backup"* R16. Another respondent confessed*, "I rarely trust my third-party guys"* R20. Another respondent added that *"they were concerned about security…But because I know that I have worked with cloud-based ecologies before, I kind of knew that you sign an NDA (Non-disclosure agreement) with service provider. They are not allowed to touch the data"* R14. The fact that SMEs faced difficulties in embracing CC and figuring out what they would give up and gain in the process indicates a shift in perspective that made it possible for CC to be adopted and used. The shift in the SME's perspective or mindset aligns with the changes in the learning culture of SMEs. SMEs would have to engage in learning processes that have impacted organisational learning.

Organisational culture and change in learning culture.

Most SME owners and managers acknowledged that they had to create a learning culture within the SME. For example, a respondent explained, *"… so part of my job is to create a*

culture of learning and a culture of everybody talking to each other and the, most important…" R4. Another respondent added, *"I have got quite a number of people that are even not educated. I just tell them, yes, guys. If I manage, you will manage"* R23. SMEs used various learning strategies to create this learning culture, including experimentation. A respondent said, *"And at this point, I sort of started a bit more experimentation with, you know...looked at some of the things from AWS, I played around with Google Cloud"* R8. They further explained that they gave one of their employees *"…credentials that had rights and permission to things, and I said go ahead but ask if you need help, but it was like a vague starting point, and he had to figure it out on his own", "and as far as I know, he made it through by reading the documents, blog posts online"* R8. Another strategy is using online resources. A respondent explained, *"We have evolved to a point where instead of learning in the classroom, we can go to YouTube and download a tutorial that tells us what to do."* R14. Similarly, with training, SME employees can access CC material on online learning sites, a respondent made an example and said, "*I just go to Udemy and I just take a look at the webinars on Udemy and I go through the training."* R1. Thus, creating a learning culture came with adopting and using CC. This is seen in how the SME owners and managers learn independently and then introduce CC to employees as a technology that comes with the need to learn consistently.

Organisational structure and business processes.

The major changes were observed in the actual business processes within SMEs. These changes largely depended on the type of business the SME operates and the reasons behind the adoption of CC. For example, a restaurant started without CC. Upon the adoption of CC, the day-to-day business processes and operations changed. The restaurant owner explained that initially, *"…with the managers, the older waiters. We just stay with them as they make orders. If they have any questions, they come to us"* R6. The older waiters were coached in managing the changes in the processing of customer orders. Another change with the same SME was the accounting processes, *"So the accountants are working via the cloud so they can log in and see what the restaurant is doing…my accountant, who is sitting in town, will log in on his side via the iCantu [CCSPs] back office, and he will see the transactions from iCantu, and he will go over to Snapscan, log on to snapscan back office and snaps can transactions and he will see how it all balances and he will balance it for the bookkeeping for that day and file it."* R6. Another SME owner with a network marketing business model explained the new process and said, *"So yeah, you just click at what you want to do, if there is a person maybe that wants to understand about business, you just go to the website it will say, do you want a presentation, you just click the presentation, then you do the presentation to the person. That's what I have seen recently."* R23. The last example is that of an SME respondent who was a travel agent. The respondent elaborated that the business processes followed in booking flights changed and said, *"And it used to be a long 16 letter entry in order to get information*

about a date flight because now you click on the calendar, you click on the flight and check what flights are there and it gives it all together. So, it has made it all easier… that process differs from the original booking process" R3.

These business processes and operation changes varied according to the SME. They largely depended on the SME's core business or a specified business process that an SME wanted CC to change. One of the core business changes that was evident was the change in communication in SMEs.

Organisational structure and change in communication.

This change was seen in the first shift, from pre-adoption to the mid-adoption of CC. The agreements between CCSPs resulted in constant communication between the CCSP's employees and SME employees. The constant breakdowns and changes that could not be implemented remotely or through an on-demand service resulted in CCSPs being involved as if they were an extension of the IT department in SMEs. A respondent made an example and said, *"So there is much communication between me and them…I try to have [CCSP] own our infrastructure. I just manage it in terms of what they are doing…"* R10. The same respondent explained that they work with "*multiple service providers doing different things and I need to report back to [CCSP]*". Another respondent explained, "[CCSP] *are very quick to respond to any issues. And I think that's the key thing, as we email them and within a day, you have got a response. … if you hit a snag, it does not mean you delay too much"* R13. Another respondent added that they *"get a consultant base key so that anytime there is like one point of contact with [CCSP]"* R2.

This constant communication and reliance on CCSPs changes the internal structure in the line of communication. It constantly opens the line of communication between the CCSPs and the SMEs. In some cases, there were challenges with communication between CCSPs and SMEs. A respondent said that one of the challenges they had was communicating with CCSPs. They re-iterated, *"… like I said, the main issue that I had was communication, I needed everything to be uniform in the business"* R10. It was also interesting to note that one of the SMEs adopted CC to improve communication within the organisation. The SME owner realised that *"They (employees) would then give them (customers) information and then go to another branch (customers) and want the same thing and they (employees) would give them (customers) different information and then I thought no, there is a problem here." R11. The respondent explained that with "…communication, everything needs to be the same…" R11.* Therefore, in this case, CC was adopted to ensure that employees could access CC centrally and account for differences in the service offered in different branches. This results from the benefits of CC, which is associated with all employees' sharing and resource access. Another business process associated with inevitable organisational changes that come with CC was human resource management.

Organisational structure and change in human resource management

The adoption of CC was also evident in its impact on human resources. The main changes consisted of the changes in the number of employees required to manage the IT aspect of the SME. One of the respondents made use of IT staff that would attend to faulty installation on client sites. After CC adoption, software installation no longer occurred on the client site. Software installation was managed and updated on servers hosted by CCSPs. This particular SME reduced its IT support staff. The respondent elaborated, *"… with regards to us doing it ourselves if a hard drive fails, which it always does fail, we would have a team in-house that goes out to whatever data centre to replace the components and manage that, right now we do not have to take care of that, someone else is taking care of that"* R16. Another additional change was seen in job descriptions and responsibilities for IT personnel. The fact that CCSPs were responsible for maintaining the IT infrastructure meant that IT personnel had to focus on core business-related IT matters. For example, a respondent said, "*If something went wrong, the sole responsibility was on me. I had to fix the things… whereas at [CCSP], everything is managed so their expertise…"* R10. Another respondent said, *"… for us, we outsource everything. So, we don't have IT engineers or technicians, and even our ACT is half an IT technician most of the time. And it's been quite beneficial because [CCSP] knows what they are doing, they've got well-qualified staff, like the SQL engineers, that kind of staff"* R15. Thus, the adoption and use of CC affect HR by changing the skill set of IT personnel required and the HR structure for IT departments.

5.8 Discussion of the findings

The study's objective was to understand the organisational changes that emerge in the process of adoption and use of CC by SMEs in SA. The findings showed that, initially, SMEs did not experience the expected organisational changes that CC as a technology promised. However, in the adoption process, SMEs engage in the adoption and use of CC to get to a point where they experience the desired organisational changes. The diagram below, Figure 22 shows important aspects of the findings. First, it highlights the re-enforcing phenomenon that occurs in cycles, referred to as pre-adoption, mid-adoption, and post-adoption. Every time a shift is experienced, the organisation goes through changes. In line with Karahanna, Straub, and Chervany's (1999) view, to study organisational changes in an organisation, one must study the process of adoption consisting of preadoption and post-adoption. Furthermore, Figure 22 illustrates a shift from one cycle to another between the re-enforcing cycles.

This essentially reveals that there were two shifts in the process of realising the desired organisational changes. Every time a shift is experienced, SMEs go through changes. The shift from preadoption to adoption was aligned with changes in the line of communication, business processes, human resource management, learning culture and change in mindset.

The shift from adoption to post-adoption saw organisational changes in business processes and learning culture.

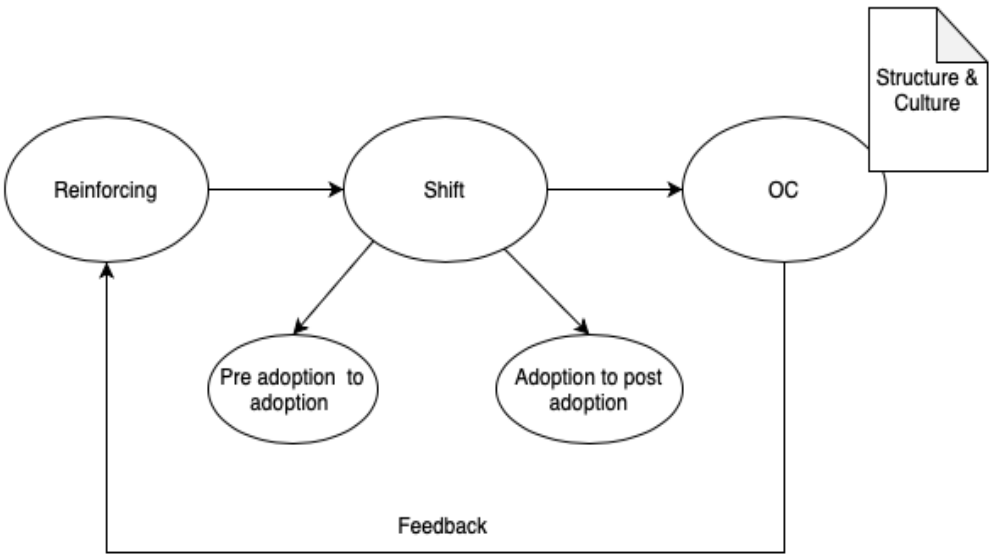

Figure 22 : The dynamic process for realising OC in the adoption and using CC

Information systems scholars have implied that organisations often need to refine the implementation and use of IS (Jasperson et al., 2005; Gonzalez et al., 2024). The journey of adopting and using CC demonstrated that SMEs had to cyclically refine their use of CC to realise their objectives for adopting CC. This aligns with the idea that the adoption and use of Information Systems is not a linear process but rather a dynamic and involved process that requires adaptability. Thus, adaptability is a significant characteristic that enables SMEs to adopt technologies like CC successfully. Mainly when the environment is volatile because it is constantly changing due to IS (Supriharyanti & Sukoco, 2023). Thus, adaptability corresponds to organisational changes required to successfully adopt and use any technology (Olusola & Oluwaseun, 2013; Gadzali et al., 2023). It was clear that each SME had varied objectives and reasons for adopting and using CC. This was evident in the organisational changes desired and expected by SMEs after adopting CC. These changes were expected because of the decision criteria used for adoption (Kitsios & Kamariotou, 2021). The adoption was deliberate, hoping to change some organisational processes and operations. Therefore, most of the organisational changes experienced were expected. However, the process and the journey to realise the changes were unexpected. Changes in business processes were initially limited, but significant progress in organisational changes were experienced later in the journey (post-adoption). Therefore, SMEs had to adapt and progress in the journey, making necessary shifts and refining CC use until they could realise their objectives for adopting CC (Gonzalez et al., 2024). SMEs had options for refining their CC use to further implement improved changes in

their business processes (Kitsios & Kamariotou, 2021; Olusola & Oluwaseun, 2013). Business process changes were based on the decision criteria used by each SME for adopting CC. An example is that of an SME in the hospitality industry (the restaurant), where CC was adopted to improve financial processes, from the point of trading to the point of declaring tax. Another SME adopted CC to change customer relations processes by using a Customer Relations Management (CRM) system. Thus, business process changes are dependent on the type of cloud service that is adopted and used.

The most common business process among all SMEs was the changes in human resource management (job descriptions and responsibilities) among ICT staff, with occasionally no ICT staff members. In a study, Piva et al. (2005) hypothesised that technological diffusion of new technology plays a role in increasing the demand for skilled workers. This phenomenon is not because of technological change but rather a function of organisational change. Ross (2011) investigated human resource matters associated with ICT workers in organisations adopting CC. The findings suggested that the impact of the adoption of CC on ICT workers depends on their job responsibilities. Generic forms of ICT support work will likely fall away, but firm specific work would be retained. Thus, CC adoption and use in SMEs may cause organisational changes in human resource practices.

The change in the line of communication was expected as there would be a need to maintain communication between CCSPs and SMEs occasionally. This was experienced; however, communication was too frequent because of the extensive reliability of SMEs on CCSPs. It ended up looking like CCSPs were part of the organisational structure. This goes back to what organisation management scholars have alluded to, which is that change is inevitable, particularly with the industrial revolutions and the social setting surrounding organisations (Steininger et al., 2022; Tajudeen et al., 2022; Enholm et al., 2022). The fourth industrial revolution is no different. As the information age evolves, organisations must learn to collaborate with external stakeholders, such as CCSPs. Initially, the adoption of ICTs changed the hierarchy structure in organisations, making them redundant, replaced by interactions among employees and a flat organisational structure (Piva et al., 2005). The adoption and use of CC require organisations to consider communication strategies focused on collaboration with service providers. Hugos and Hulitzky (2011) elaborates that collaboration is no longer an option, but it is key in the information age. Therefore, there is pressure on organisations to be agile and responsive to ensure that business objectives are not compromised. This applies to both SMEs and CCSPs, they need to be agile and responsive to present challenges and opportunities.

Learning culture was one of the themes prevalent in the study. This learning culture resulted from the learning that generally takes place within SMEs. For example, it is considered “normal” for any organisation to engage in learning mechanisms to be competent in a specified

technology, particularly a newly adopted technology (Bell & Figueiredo, 2012). In the same way, the adoption and use of CC required learning. The learning culture was also evident in the CC sector, where CCSPs provide learning opportunities for possible users. This created a learning culture in the industry, which filtered through to most SMEs that were exposed to learning resources. SME employees would engage in self-learning mechanisms, using webinars, online blogs and attending CC seminars organised by CCSPs. This phenomenon resulted in changes in learning processes within SMEs.

5.9 The conclusion of the third study

In general, the literature on organisational change and the adoption and use of IS is not as prevalent. The argument is that the digital age, which is characterised by information systems that are changing at a fast rate, requires that OC be studied to understand the critical OCs that SMEs should focus on when adopting and using IS like CC. Adopting information systems is among the ways SMEs can be sustainable in this volatile environment. The sustainability of SMEs become important as they are a vital source of economic development in SA.

Scholars have outlined that the adoption and use of IS require changes in organisational factors (Enholm et al., 2022). This becomes important in that the volatile environmental changes affect the organisation, requiring organisational changes. The proof of this aspect is outlined in section 5.2, which focuses on organisation theory, where the environment and the different industrial revolutions have impacted organisations. Therefore, studies of organisational change become essential in the information age. While some studies focus on the OC and IS, these studies are variance-based. The current research focuses on a process. This was done by studying the process of adoption and use of IS by SMEs in SA. The aim was to unearth emerged organisational changes as a result of the adoption and use of CC. Small and medium enterprises adopted CC due to the previously described benefits.

The findings revealed that there is a delay in SMEs experiencing the benefits that they expected from adopting CC. Eventually, SMEs will experience CC benefits after they experience challenges. These challenges are not easily seen on the surface. However, when the process of adoption and change is interrogated, it is clear that often, the challenges were the leading causes of the shifts that caused organisational changes in SMEs. For example, purchasing physical servers caused SMEs to shift from the pre-adoption to the mid-adoption stages.

Another example is that of SLAs that compromised the on-demand service that CC promises, causing the shift to CC post-adoption stage. Thus, SMEs in SA had to overcome some challenges before they could benefit from a technology like CC. Overcoming these challenges was also intertwined with OCs that emerged in the process of adoption and use of CC. The OCs consist of organisational structure and organisational culture. In the adoption stage,

business processes and the line of communication were impacted by the adoption of CC, and therefore, changes were enacted in the organisation's structure. The change in mindset and learning culture changed due to the adoption and use of CC in SMEs.

It was interesting to note that the challenges of adoption and use can be layered in the process of adoption and use of CC. In this regard, constant change with the adoption and use process becomes necessary to realise CC benefits. This shows that several dynamics are associated with adopting and using a technology like CC.

The empirical situation of the study was on SMEs in various industries. This is considered a limitation in that there may be dynamics of organisational change that have been missed because of the differences and variations in the level of knowledge and general awareness about the use of ICTs. Thus, a similar study can be conducted on SMEs based on industry categorisation. This may further refine the current body of knowledge regarding understanding organisational changes caused by the adoption and use of general purpose technologies like CC. Another study could investigate the impact of CCSPs on innovation in both SMEs and large organisations. CC has become a basis for other technologies like the Internet of Things. A study that focuses on the of CC on innovation would help us understand this impact and therefore, it can highlight the value of CC on innovation in organisations.

6 General Contribution: Integrated Elaboration

This chapter aims to provide an integrated elaboration of the studies presented in this thesis. The studies are summarised, outcomes and implications are provided, and contributions and possible future works are presented. The chapter consists of five sections, section 6.1 reflects the three studies completed to address the study's main research question. The research strategies, methods and findings associated with the three studies are also summarised. The linear process of the adoption and use of CC is also presented. The dynamic interaction between these processes is presented in section 6.2. Section 6.3 summarises the contributions to theory and research practice and discusses the implications of adopting and using ICT in SA and similar middle-income countries. Section 6.4 outlines the limitations of this study, while section 6.5 presents the proposals for future research in line with the research findings of this study.

6.1 Overview of the studies presented in this thesis

The main objective of this thesis was to understand the dynamic processes of the adoption and use of CC by SMEs in SA. The study was relevant because SMEs have a significant position in SA's economy (Eze & Lose, 2023, Al-Sharafi et al., 2023). Additionally, SMEs are in a rapidly changing environment characterised by constantly evolving ICTs (Vines & Tanasescu, 2023). On the other hand, CC plays a critical role as it offers SMEs accessibility to a pool of ICTs that are relevant in this environment (Sanele & Lekhanya, 2022). Existing scientific research on CC adoption and use focusing on the SME sector is generally limited, particularly in middle-income countries situated in Africa. Additionally, this research does not reflect on the dynamic processes associated with adopting and using IS, such as CC. This aligns with the idea that technology adoption and use is not linear due to contextual and environmental factors (Kim, 1993). The volatile and dynamic nature of the environment of SMEs introduces various dynamics in adopting and using CC. This impacts the adoption and use of CC patterns in SMEs.

Another aspect observed in the literature is that several publications do not distinguish between large enterprises and SMEs. However, the dynamics in large enterprises are often not the same as those in SMEs, as outlined in chapter one. Within the scope of Africa, most of the scientific publications are concentrated in SA. Besides the fact that this provides an acceptable foundation for conducting the study, SA provides an interesting case for conducting this study for the following reasons. In the global innovation index, Dutta et al. (2023), SA was cited as the top three innovation economies in Sub-Sahara Africa. In another report, the global information technology report published in 2016 (Baller et al., 2016), SA was cited as the country with the highest NRI in Africa. The business sector in SA was found to be the main contributor to the NRI compared to other countries in Africa, where the government is the

contributor (ibid.). In other words, SA's innovation initiatives are due to the business sector rather than the government initiatives.

From these premises, the study sought to answer the main research question:

What are the dynamic processes of CC adoption and use by SMEs in South Africa?

To adequately address the main research question, a multi-paper approach was adopted where three studies were undertaken to address the main research question. The first study's objective was to describe the challenges of the adoption and use of CC by SMEs in SA. The second study sought to understand and explain the organisational learning processes that facilitate the adoption and use of CC by SMEs. Lastly, the objective of the third study was to understand and explain organisational changes that have emerged in SMEs due to the adoption and use of CC.

The methodological approach differed in each study. An inductive approach was adopted for the first study. The inductive approach was necessary, not just to investigate the challenges faced by SMEs in SA when adopting and using CC. It also played a valuable role in providing conditions for exploring and studying SMEs in the cloud computing industry or environment. The study was a descriptive study that exposed and described the challenges of CC adoption and use. The sample size consisted of 12 SMEs. Participatory observation and ethnographic interviews were used as data collection techniques. Thematic analysis was used as a data analysis technique. The second study adopted an abductive approach, enabling theory development (Haig, 2008).

The abductive approach combined the inductive and deductive processes, leading to an OL theoretical explanation for the adoption and use of CC by SMEs. Participatory observation and ethnographic interviews were used as a data collection technique for the study with a sample of 23 SMEs. Thematic analysis was used for data analysis.

The last study adopted the retroductive approach, which allowed for backtracking from the post-adoption of CC to the pre-adoption of CC (Malhotra, 2017). This facilitated the mapping out of the journey of the adoption and use of CC by SMEs. The mapped out journey was used to study and analyse organisational changes that SMEs experienced due to adopting and using CC. Through the analysis of the journey, OCs were identified and explained.

The multi-method approach gave insight into the diverse perspectives of the dynamics associated with SMEs' adoption and use of CC. It is important to note that participatory observations were instrumental in observing cultural practices and embedding the researcher in the empirical situation for understanding (DeWalt & DeWalt, 2002; Chamberlain, 2006). It was also important to understand the context of SMEs and the CC industry. Participatory observation helped frame the research questions that were investigated in this study. On the

other hand, the conversational nature of ethnographic interviews allowed for a shared understanding of the questions and responses between the respondents and the interviewer.

The findings of the three studies are represented in Figure 23 and Figure 24. The figure incorporates and integrates the findings outlining the link between these studies.

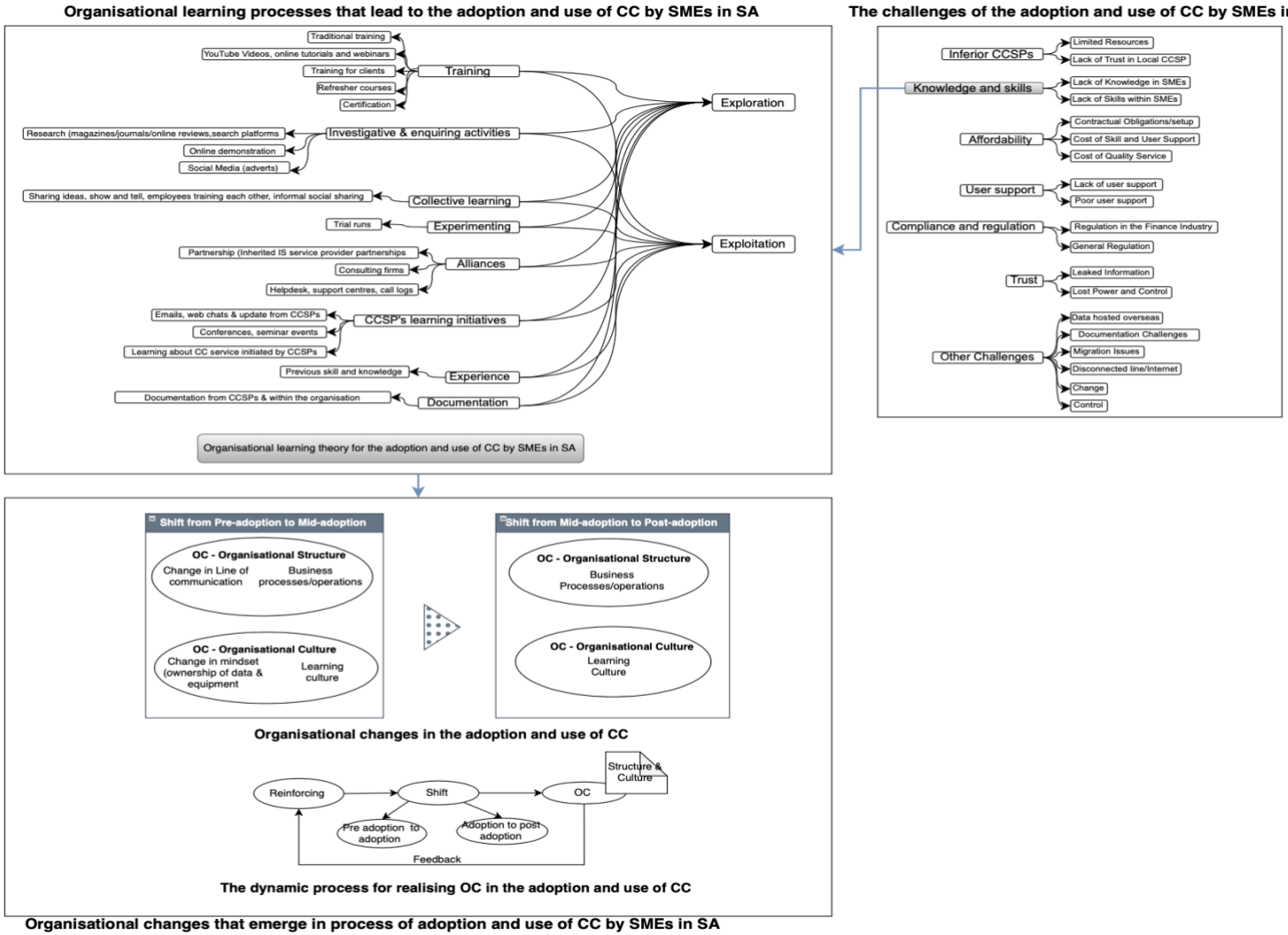

Figure 23: Overview of findings of the three studies

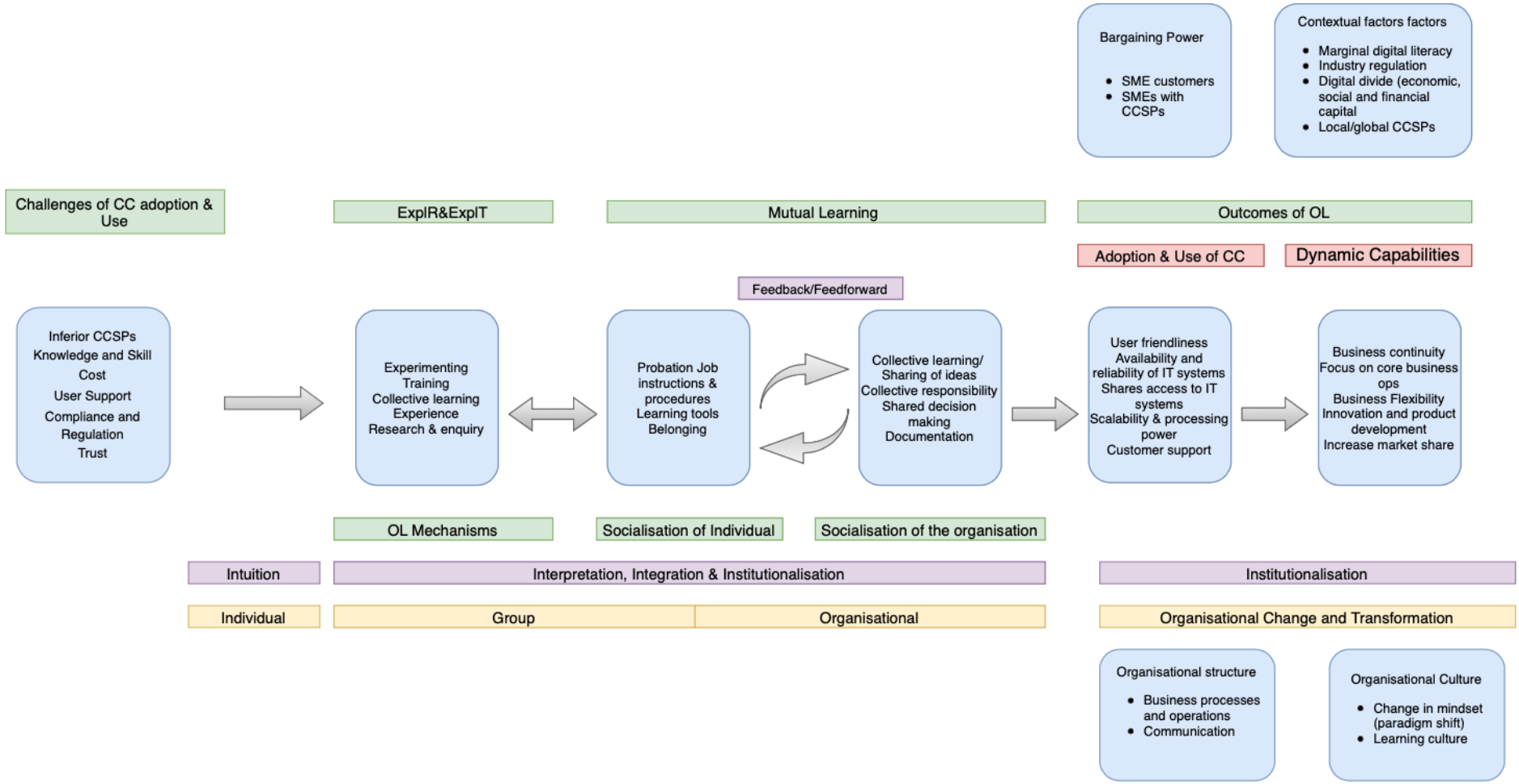

Figure 24 : The linear processes of the adoption and use of cloud computing by SMEs in SA

6.1.1 The challenges of the adoption and use of CC by SMEs in SA

The first study was largely exploratory in that it sought to understand the social challenges from an insider's point of view. The insider's perspective was instrumental because it allowed the researcher to socialise themselves in the context of the SMEs within the cloud computing environment. This facilitated deeper, broader insights and understanding (Cilesiz & Greckhamer, 2022) into SMEs in this context. Thus, the first study laid a foundation for exploring the dynamics associated with SMEs' adoption and use of CC in SA. The first study's findings provided a rationale for investigating the second study. The findings of the first study described the challenges faced by SMEs when adopting and using CC. The identified challenges included inferior CCSPs, lack of knowledge and skills, high priced services, lack of user support, compliance and regulations, and trust. Other challenges that were not prevalent in the data consist of issues of data being hosted overseas, documentation challenges, migration issues, poor internet connection, and challenges of adapting to change and making desired changes to the cloud infrastructure. The challenge consistent with SME respondents was the provision of inferior cloud services, mainly from local cloud providers. Another prevalent challenge was the lack of CC knowledge and skills in SA and within SMEs.

It is important to note that the significance and the benefits of CC, specifically for SMEs, have been outlined in previous chapters. Fundamentally, cloud computing offers SMEs access to ICT resources essential for the information age and competitive advantage (Tarhini et al., 2017; Al-Sharafi et al., 2023). Therefore, understanding these challenges and furthering the study by investing in aspects of these challenges can provide insights for SMEs on the adoption journey and those exploiting CC provision. The challenge of the lack of knowledge and skills was significant as it raised a question of understanding how learning takes place within SMEs that have adopted and are using CC. As a result, the second study focused on articulating and explaining the theory behind OL in the adoption and use of CC. Organisational learning is of interest to this study because the type of learning in question is at an organisational level. Gaining insight into the learning processes applied by SMEs when adopting and using CC can provide SMEs with practical tools that can enhance CC knowledge and skills. In addition, understanding these learning processes can be relevant to other types of ICTs. Therefore, the objective of the second study was to understand and explain the organisational learning processes that lead to the adoption and use of CC by SMEs in SA.

6.1.2 The OL processes that facilitate the adoption and use of CC in SMEs

In seeking to understand the OL processes used by SMEs when adopting and using CC, the second study sought to develop an OL theoretical explanation that facilitates the adoption and

use of CC by SMEs in SA. Organisational learning is significant as it facilitates the adoption and use of IS in organisations (Imran, Rahman, & Aslam, 2016; Lek et al., 2022). Organisational learning is operationalised through OL mechanisms (Battistella et al., 2020; Wicher & Frankus, 2023), which are Institutionalised structures and processes that aid learning (Oliver, 2009; Armstrong & Foley, 2003). Therefore, the starting point was to investigate the OL mechanisms SMEs use during the CC adoption and use process. Understanding OL mechanisms provided some direction and laid a foundation for developing and articulating the OL theory that facilitates these Institutionalised learning structures and processes. The findings for OL mechanisms consisted of training, investigative and enquiring activities, collective learning, experimenting, alliances, CCSPs learning initiatives, experience and documentation (procedures and processes). These OL mechanisms were observable and on the surface of learning (Avery and Kassam, 2011). They provided a means of unearthing the underlying OL theory that supports these OL mechanisms. While analysing the data, it became clear that the OL theory in SMEs is aligned with two existing theories in OL literature. Namely, the theory of exploration and exploitation by March (1991) and the 4I theory by Crossan et al. (1999).

The theory of ExplR and ExplT assumes that OL comprises mutual learning and competitive ecology. Where mutual learning is about the socialisation of the individual by the organisation and the socialisation of the organisation by the individual. In this sense, the organisation and the individual are constantly learning. This is seen in the backdrop of OL mechanisms that SMEs utilise as a process of socialising the individual and the organisation. On the other hand, competitive ecology brings to light the importance of the context of organisations in a competitive environment. This context is focused on the competitive environment and nature of organisations that seek to make profits. The theory of ExplR and ExplT draws a relationship between learning and this competitive environment. Ideally, organisations that engage in learning turn to experience positive organisational outcomes. For example, the successful adoption of IS leads to increased competitive advantage and revenue.

The competitive ecology concepts were quite significant in this study as they captured some contextual factors that influenced the adoption and use of CC. It was also useful in revealing the outcomes of OL as a process that facilitates the adoption and use of CC, leading to improved business productivity, flexibility, continuity and innovation.

The second theory is the 4I theory, which views OL as a process consisting of intuition, interpretation, integration and institutionalisation. According to the theory, intuition takes place internally. It is a subconscious process at an individual level. This is where an individual processes information internally to make sense of what is observed and known (Crossan & Berdrow, 2003). As a result, intuition is not easily identifiable or observed. In the context of the study, one could get that SME owners and some employees recognised the significance and value of cloud computing and were able to link that value with their immediate business needs.

It started with their knowledge about their environment and the business needs of the SME. Individuals recognised the significance and value that CC could add to the business and its operations. This happens at a level of intuition, where adopting CC for the organisation makes sense in the individual's mind. As a result, it was not observable in the data, even though one could make inferences. Once the process of intuition has taken place at the individual level, the individual can now share their thoughts and views. At this point, the individual socialises the SME to the possibility that CC adoption can occur. This is done through interpretation and integration with collective learning mechanisms at the forefront. Interpretation and integration take place at the group level. Interpretation and integration feed into the socialisation of the organisation through collective learning mechanisms. When the organisation is socialised and has adopted and is using CC, it can socialise new recruits into using CC for business purposes. The socialisation of the individual and the organisation can then take place concurrently.

Institutionalisation is the last level at the organisational level. This is where shared understanding and practices are institutionalised in the organisation. When learning has taken place at this level, it essentially means that learning has shifted to the organisational level. In other words, what was learnt now forms part of the practices and procedures that are Institutionalised in the organisation. Initially, it did not seem like most SMEs deliberated in ensuring or addressing the institutionalisation of what was learnt. However, the learning processes came together at the institutionalisation level and became part of the day-to-day organisational processes. While very few SMEs had formally documented learnt processes and practises, SME structures, processes and cultures had changed. Thus, developing OL theory made it clear that institutionalisation is also seen in organisational changes that have emerged because of the adoption and use of CC. It was also clear that OC is a process that takes place continuously and concurrently with OL. Thus, understanding the organisational changes that emerged within SMEs due to CC adoption and use was logical. Investigating OCs that had emerged within SMEs was necessary for adequately describing and articulating another aspect of the dynamic process of adoption and using CC in SMEs.

6.1.3 Organisational changes that have emerged in the adoption and use of CC by SMEs in SA

The objective of the third study was to understand the organisational changes that have emerged in the adoption and use of CC by SMEs in SA. As the investigation of the second study progressed, it became apparent that organisational changes formed part of the process of adoption and use of CC. This was in line with what scholars have rationalised that the successful adoption and use of IS in organisations requires additional organisational factors to be equally assessed and realigned (Olusola & Oluwaseun, 2013; Yu et al., 2023). Scholars have also acknowledged that organisational change is often not the focus when the objective

is to adopt and use IS. However, it is an outcome that organisations must embrace to sustain the success of IS adoption and use (Fischer & Riedl, 2022). Whilst this has been found in literature, there is limited knowledge of the emerging organisational changes produced due to IS adoption and use. Investigating and understanding organisational changes provided an insightful and holistic view of the dynamic processes associated with adopting and using CC.

At first, the journey that SMEs took as they adopted cloud computing was mapped out. The journey revealed instances where organisational changes took place within SMEs. The main stages that came out of the process of mapping out this journey consist of pre-adoption, mid-adoption, and post-adoption. Understanding these stages made it possible to identify organisational changes as these stages progressed. These changes were identified under the theme of organisational structure and culture. Organisational changes were seen in specific business processes and operations. Some changes differed among the SMEs; however, common organisational changes were observed in business processes amongst all SMEs. They consisted of human resource management, with changes in job descriptions, responsibilities and communication. These changes were categorised under the theme of organisational structure. There were changes in the mindset, a paradigm shift from people (SME employees and owners) and changes in the learning culture. These changes were categorised under the theme of organisational culture.

6.1.4 Summary of the linear process

The lack of knowledge required SMEs to embark on OL. This starts with an individual, through intuition, an SME owner or IT employee who can recognise CC as an opportunity that can add value to a particular SME. The individual would need to be convinced about the value of CC for the SME. Then, the individual socialises the organisation through interpretation and integration. The socialisation of the individual (new recruits) can only occur when the organisation has been acquainted with using CC.

The socialisation of the organisation encompasses interpretation and integration as these processes take place at the group level through collective learning. The socialisation of the organisation-initiated institutionalisation, leading to organisational change. At this point, organisational learning and change occur concurrently, resulting in favourable business outcomes. Among other business outcomes, business productivity, flexibility, continuity and innovation were at the forefront. Thus, the more SMEs experience favourable business outcomes, the more they engage in learning processes by exploiting existing CC services and exploring new cloud services offered by CCSPs. This, in turn, leads to the further use of CC. The whole process that has emerged is constantly re-enforced with the exception that adoption has already taken place, and SMEs would be enhancing CC use.

6.2 The interaction between the linear processes of CC Adoption and Use

The previous section outlined the phased linear processes associated with the adoption and use of CC by SMEs in SA. Further analysis of these three studies showed a dynamic interaction between these processes.

In the first instance, CC adoption and use by SMEs are driven by their need to fulfil specific business objectives that are linked to CC benefits. For example, the ability to access ICT resources without purchasing ICT infrastructure, the ability to work remotely and the pay-as-you-go utility type of service that CC provides are among the benefits (Tarhini et al., 2017, (Saratchandra & Shrestha, 2022). This translates to affordability, the main driver for adopting and using CC (Oduh et al., 2018). When considering the benefits CC offers SMEs, it would be ideal for the adoption and use process to be linear. However, there were challenges identified in the first study that partly brought about dynamics that affected the process of the adoption and use of CC. When SMEs embark on the journey of adopting and using CC, they experience challenges, as shown in Figure 25.

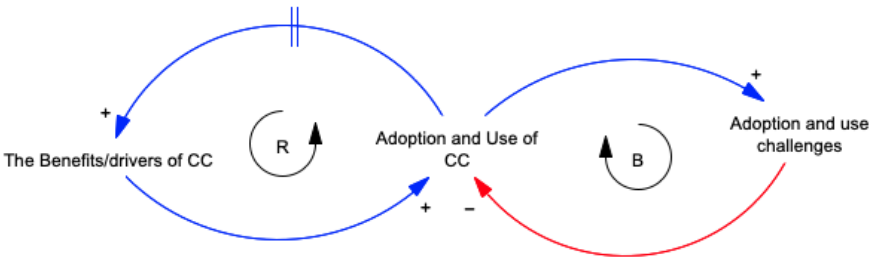

Figure 25 : The dynamics of the challenges of CC adoption and use

The diagram shows the high-level view of the dynamics associated with the adoption and use of CC and the challenges. The more challenges experienced by these SMEs in this process, the poorer the adoption and use of CC by SMEs in SA. This is in line with the claim brought forward in the first study. In that there are challenges in the process of adoption and use of CC. These challenges hinder the adoption and use of CC. Nonetheless, SMEs face some challenges while overcoming others. This still allows SMEs to experience and share some of the benefits CC provides. These benefits and positive organisational outcomes experienced through the adoption and use of CC re-enforces the further use of CC (Vines & Tanasescu, 2023). It is important to note that CC services are constantly upgraded and innovations in the cloud infrastructure are released for consumption (Avinash, 2022). Therefore, the constant renewal of cloud benefits further re-enforces SMEs' use of CC. It is also important to note the delay from the moment of CC adoption and use to the realised benefits of CC.

This delay is due to the organisational processes that SMEs engage in to ensure the adequate and successful adoption and use of CC. The processes highlighted in this study (organisational learning and organisational changes) form part of the processes that SMEs must engage in to ultimately realise the benefits of CC adoption and use (Pratono, 2022).

In the second study, a claim was made that organisational learning is an important aspect of CC adoption and use process. It was further explained that it is not possible to adopt and use technology without engaging in learning processes (Archibugi & Pietrobelli, 2003; Nerland, 2022). Figure 26 shows the high-level view of the dynamics associated with OL in the adoption and use of the CC process. The findings from the second study showed that, the greater the learning in SMEs, the more the use of CC. This is also evident in how CCSPs are at the forefront of educating potential customers about CC. Thus, a re-enforcing relationship exists between the adoption and use of CC and OL. This feedback loop is vital for the successful adoption and use of CC by SMEs.

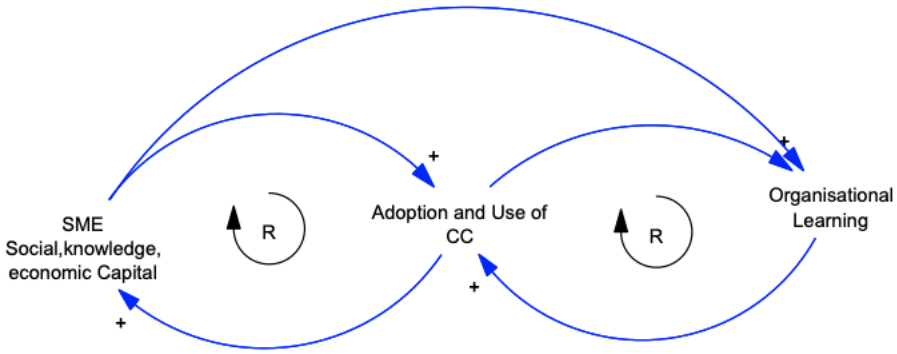

Figure 26 : The dynamics of OL in the process of adoption and use of CC

It was also observed that the more social, knowledge, and economic capital an SME possessed, the more learning and use of diverse cloud services. Similarly, SMEs with less social, knowledge, and economic capital had a poor learning culture and knowledge of CC. Thus, there is another re-enforcing relationship between OL and SMEs' social, knowledge and economic capital. Unfortunately, disadvantaged SMEs (with less capital) would remain disadvantaged unless social, knowledge, and economic capital improves, or the learning culture improves. In turn, the relationship between the adoption and use of CC and SMEs' social, knowledge and economic capital is directly proportional. When organisational learning occurs within an organisation, the organisation is also transforming. Hence, there has been a consensus in technology adoption literature that adopting and using CC requires organisational change (Yu et al., 2023). Figure 27 depicts the dynamics of OC in the process of adoption and use of CC at a high level.

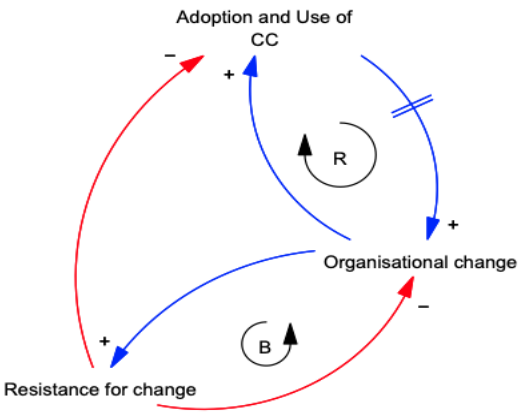

Figure 27 : The dynamics of OC in the process of adoption and use of CC

When an organisation embraces organisational changes, it is likely to adequately and successfully adopt and use CC. This relationship is re-enforced, therefore, the ability for an organisation to shift due to needed change is beneficial for adopting and using technology (Yu et al., 2023). Organisational changes did not occur immediately after the adoption and use of CC. It took time for the organisation to transform into its new form. Some SMEs resisted change, which hindered the adoption and use of CC. It also hindered organisational change in structure and culture. As a result, there is also a balancing relationship between OC and resistance to change. Thus, unless resistance to change is addressed in the system, the state of the adoption and use of CC will not be progressive.

The dynamic interaction between these processes or studies is given in Figure 28.

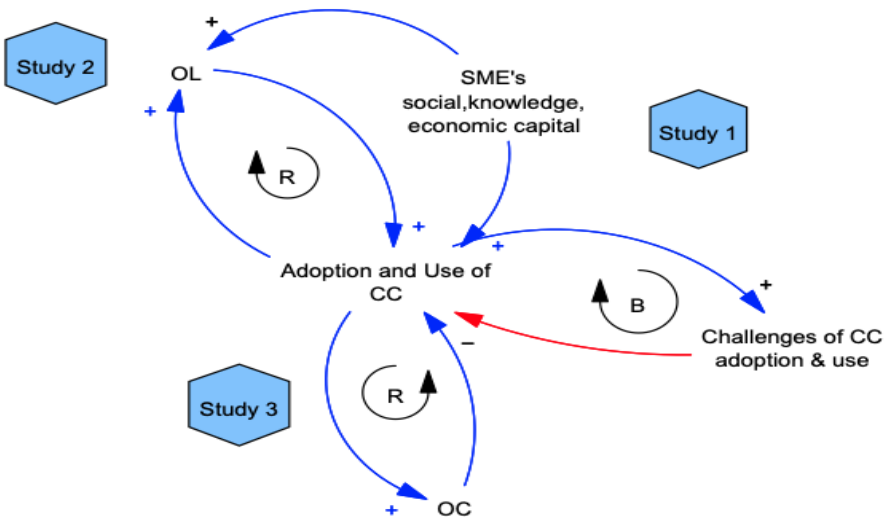

Figure 28 : The emergent dynamic process of CC adoption and use by SMEs in SA

In Summarising the dynamic interaction between these processes, the challenges of adopting and using CC remove the possibilities of a linear process. This aligns with the balancing feedback loop between the challenges of CC adoption and use and the adequate or successful adoption and use of CC. If the CC adoption and use challenges are not addressed in the process, the rate of CC adoption and use will be slowed down. The challenges of CC adoption introduce dynamics in the process of CC adoption and use. There may be various other dynamics linked to SMEs' adoption and use of CC that have not been mentioned in this study. The dynamics that have been investigated consist of the OL process and the OC process. They show that these processes should be considered when SMEs adopt and use CC.

The importance of OL has been explained, which is also in line with the relationship between OL and CC adoption and use. This is ideal considering that the objective of the selected SMEs was to adopt CC and continuously grow in using the technology (Gonzalez et al., 2024). OL re-enforces this objective, providing SMEs with the desired goals for their organisations. However, another re-enforced relationship exists that may re-enforce undesired results depending on the level of social, knowledge, and economic capital of the SME. The greater the social, knowledge and economic capital, the more successful is CC adoption and use. The less social, knowledge, and economic capital there is, the less successful the adoption and use of CC. This also shows that whilst OL provides the desired organisational outcomes, it is also important for SMEs to consider their position in their environment and improve their social, knowledge and economic capital.

OL and OC occur concurrently; the more learning, the more OC there is in SMEs. This, in turn, re-enforces the successful adoption and use of CC in SMEs (Gonzalez et al., 2024). Some SMEs experienced resistance to change, however, through the process of OL, SMEs eventually embraced change. As a result, SMEs seek to keep themselves constantly updated with added and improved CC services.

6.3 Contribution to theory and practice

This thesis makes a theoretical contribution to the body of knowledge (research areas). The areas consist of the adoption and use of IS, Information Systems strategy (ISS) and the methodological contribution in the discourse of IS adoption and its use by SMEs. The aim was to understand the dynamic processes of CC adoption and use by SMEs in SA.

6.3.1 Information systems adoption and use as a process

Most research on IS adoption and use has often taken a snapshot approach to the phenomenon rather than investigating and understanding its process. This research sought to understand the dynamic processes associated with the adoption and use of CC.

The dynamics of the adoption and use of CC by SMEs in SA was observed in the types of challenges that were experienced by SMEs. These dynamics were also observed in the OL processes that the SMEs engaged in that facilitated the adoption and use of CC. Lastly, the process included managing organisational changes that facilitated the adoption and use of CC. Thus, the first level of contribution is in the IS adoption and use literature.

6.3.2 Adoption and use in terms of ISS/Capabilities and context

Another level of contribution is towards the Information Systems strategy (ISS) literature. The literature on the adoption and use of CC in SMEs is focused on themes associated with the benefits of CC, the factors influencing the adoption of CC, the impact of CC, the implications of CC and the adoption models developed for aiding the adoption and use of CC in SMEs. These are all important aspects for understanding the phenomenon associated with CC adoption and use. However, one of the main justifications outlined in the literature is that the adoption and use of IS support business strategy, which is at the heart of ISS (Chen et al., 2010). Adopting and using IS is a strategic decision organisations like SMEs make to foster organisational growth and development. Currently, there is minimal focus on framing the adoption and use of IS, such as CC, from the capabilities point of view. This study brings to the fore the significance of the capabilities of SMEs in adopting and using CC (Bollou, 2010).

OL has been investigated in the second study and is significant in ISS because organisations can adopt, and use IS effectively through OL. Therefore, the study will contribute toward developing and understanding the OL theory underpinning dynamic capabilities that enable SMEs in SA to adopt and use CC (Morea et al., 2023). The OL theory that was developed is an addition to existing OL theories. It contributes towards an extension of a theoretical explanation that is consistent with existing OL theory. Furthermore, the third study also investigated OCs, where the journey travelled by SMEs was mapped out and the OCs that had taken place within SMEs were outlined. Understanding the journey led to understanding the OCs that had to take place. Ultimately, there seems to be no blueprint for managing change as it depends on the organisational and external contexts. The ability to shift and allow organisational changes at a reasonable time is a valuable capability. Particularly in the volatile and dynamic environment characterising the digital age (Sanele & Lekhanya, 2022). The third study contributes to ISS by presenting SMEs' strategies to manage change and allow organisational change based on their capabilities and context.

6.3.3 The contribution towards research methods

This thesis makes a methodological contribution to the discourse on CC adoption and its use by SMEs. Most studies focused on CC adoption and use by SMEs use a single method (Faasen et al., 2013; Mokwena & Hlebela, 2018; Ayong & Naidoo, 2019). These studies use

methods content with the "outsiders" perspective or analysis of the empirical situation. In this thesis, a multi-method approach was employed, which enabled the interrogation of the phenomenon from different perspectives. The significant aspect of using the selected methods in this study was that they require the researcher to understand the adoption and use of CC from the "insider" perspective and CC users in SMEs. This strategy provided richer and more reliable results that contribute to IS literature, specifically in the context of CC adoption and use by SMEs in SA. In essence, the reliance on multi-methods to study the phenomenon enhances the rigour and reliability of the findings.

6.3.4 Contribution to information systems practice

The objective of this thesis was to understand the dynamic processes of adoption and the use of CC by SMEs in SA. Thus, the study can offer a practical contribution to SMEs and CCSPs. Additionally, the study can contribute to SA's national development plan, which is geared towards ICT goals (National Planning Commission, 2013). SMEs could use the outcomes of this study as a strategic guide for adopting and using CC. For example, the OL theory from the study can be utilised to develop CC skills in SMEs based in SA. In addition, SMEs can also Use the theory to build their dynamic capabilities, considering the rapidly changing environment they are exposed to. CCSPs can use the study's outcomes to inform their marketing strategies, which may positively contribute to the adoption and use of CC by SMEs. CCSPs can understand and address the challenges faced by SMEs, that are within their control. CCSPs have primarily been involved in educating their customers about CC and offering opportunities for hands-on learning that will ease CC adoption and use. However, they may not have the perspective of SMEs' experiences when it comes to learning. Therefore, CCSPs can improve their learning strategies and gear some strategies towards improving SME adoption and use of CC. Lastly, the outcomes of this study can be used to support the national governmental goals for the ICT sector. Particularly, the aspect of accessibility to ICT services informs the National Development Plan vision (NDP) that: "*By 2030, ICT will underpin the development of a dynamic and connected information society and a vibrant knowledge economy that is more inclusive and prosperous*" (National Planning Commission, 2011). The government can develop strategies to complement the 2030 vision. Issues of digital literacy can be addressed through partnerships with SMEs and CCSPs. This is because CC is becoming a foundation of other global technological innovations (Piva et al., 2005; Kumar et al., 2022). Delayed learning or skills development may have undesired consequences for the country and mainly for SMEs in disadvantaged communities.

6.4 Limitations of the research

It is important to note that the study was focused and based on the context of South Africa. According to the Global Information Technology Report, SA has the highest NRI in Africa

(Baller et al., 2016; Dutta et al., 2022). SA has consistently been at the top of the list among countries in Africa that invest and adopt technologies. In SA, the business sector is the main contributor to the NRI compared to other African countries where the government is the contributor (Dutta et al., 2022; Dutta et al., 2023). This illustrates that South African businesses have acquired dynamic capabilities to adopt and use technologies like CC in this information age. Therefore, the findings of the study can be generalisable to middle-income countries that have contextual factors similar to SA. However, there is no guarantee that the contextual factors observed and understood about SMEs and the adoption and use of CC in SA are identical to all middle-income countries. While there may be differences, this study can offer insights into understanding the concept of dynamics in the process of adopting and using CC.

The study required that the researcher gain access to the SME sector and the CC sector. Gaining access to the SME sector came with challenges, particularly considering that the sample consisted of SMEs that have adopted cloud computing. At first, the researcher decided to approach CCSPs to gain access to their clients (SMEs using their cloud services). While this seemed logical, it became apparent that it would not yield the desired results.

This was due to the approved Protection of Personal Information (POPI) Act in SA. This research was conducted when the information regulator published the final POPI act in December 2018. The Act applies to all businesses that record individuals' personal information. The Act was established to ensure the right to privacy of information. It compels businesses to protect client's data against unlawful collection, retention and distribution of personal information. At the time, the ICT industry was concerned about the Act, particularly its implementation. As a result, most businesses were aligning their operations with the POPI Act. This was the main challenge that most businesses could not share their client's (SMEs) information that could have been used in this study. This required the researcher to find innovative ways and opportunities that would allow access to SMEs that use CC. Additionally, the researcher needed to find opportunities to embed the researcher into the empirical situation. This was important because the study was qualitative, requiring participatory observations and ethnographic interviews for data collection purposes.

In overcoming these challenges, the researcher began with an enquiry of opportunities, including meeting with CCSPs and discussing CC matters from the SMEs' and their perspectives. This was instrumental as it opened the researcher's understanding of the CC industry. In addition, the researcher enrolled on a cloud computing foundation course that allowed for a deeper understanding of the cloud services offered by CCSPs. It also improved the researcher's understanding of the jargon used in the cloud computing industry or environment. This added value in embedding the researcher into the cloud computing industry. Due to these opportunities, participatory observations were satisfactory. However, at times, the depth of participation would be hindered by time constraints and SME representatives

being preoccupied and focused on day-to-day business objectives and operations. Through participatory observations, doors started opening for attending seminars organised by CCSPs, which was a place that allowed access to SME respondents. Initially, the plan was to use purposive sampling. However, applying the purposive technique on its own became a challenge. The researcher added the snowballing sampling technique to further improve access to SME respondents. The researcher had an initial sample size of twenty-four (24) SMEs; twenty-five (25) respondents were interviewed; however, the relevant SMEs added up to twenty-three (23). The research did not use the data from two respondents because one of the respondents worked for an NGO that did not make a profit. The other respondent owned a company that only had three employees. Both organisations fell outside the SME category based on the National Small Business Act.

Additionally, the study took place at the time that CCSPs became interested in the provision of CC services in Africa. At this time, the CCSPs who were at the forefront of providing CC services were in the process of building data centres in SA. They were of the view that the SA market was ready for CC services. This conclusion was made on the premise that the mobile penetration in SA at the time (2019) was +/-70%. At that time, SMEs were not in a rush to adopt cloud computing for their business operations. It was also observed that CCSPs were at the forefront of teaching individuals/organisations about the value of CC. CCSPs used various strategies to educate possible customers about cloud services. For example, they started collaborating with university departments. CCSPs engaged in discussions and processes that led to the inclusion of CC modules in the curriculum. Another example is that they provided limited access to various organisations, including SMEs, to experiment with their CC services. The aim was to prove to organisations that their CCSPs were truly beneficial at a practical level for any user.

This was the main reason behind the attendance of the events that these CCSPs organised. They were at the forefront of equipping SMEs with knowledge, using their learning strategies to expose them to CC benefits. They understood that learning about CC was one of the most fundamental keys to adopting and using CC in SA.

Completing this research project was also dynamic as it came with changes in the approach to the study. The first and the second study followed the planned research strategies and titles following the research proposal. However, as the study progressed, some changes were made to complement the data and findings from the first and second studies. Initially, the plan was to investigate the decision criteria SMEs used to adopt and use CC. An Ethnographic Decision Tree Model (EDTM) was going to be developed to contribute to an understanding of how SMEs made decisions to adopt and use CC services. However, it came to light that the journey of adoption was at the centre of constantly changing the organisation to complement and enable further CC use for developing dynamic capabilities in the SMEs. Therefore, studying the

continuous organisational change process was compatible and coherent with the first and second studies.

This study has not exhausted the dynamic processes of the adoption and use of CC by SMEs in SA. Other dynamic processes were not explored due to time constraints. Additionally, the researcher sought to focus on how learning takes place and did not emphasise the details of how learning was hindered. Therefore, the dynamics aspect of addressing these learning barriers were limited in the study.

6.5 Future work

The decisions that propelled SMEs to adopt and use CC were diverse, based on the mapped-out journey of the adoption process outlined in the third study. Thus, an investigation into understanding the decision criteria used by SMEs in adopting and using CC would be beneficial. An adoption model focusing on decision criteria can be developed to guide other SMEs in adopting and using CC. A similar study that investigates the dynamics associated with the adoption and use of CC can be done in other middle-income countries. A broader understanding of dynamics associated with the adoption and use of ICTs like CC can assist middle-income countries in navigating the current stage of the information age. The investigation would further add value in supporting the developmental goals of developing countries.

South Africa plans to increase initiatives for digital transformation (based on the NDP) in various areas of society. Therefore, it is vital to encourage learning, invest in learning, and incentivise learning at different levels of society. Learning is essential for the whole of SA, removing the digital divide/ increasing digital literacy and trying, by all means, to get the nation to learn and minimise the digital divide. Future research could include a study that seeks to understand how the learning culture increases or decreases the digital divide at various societal levels and its impact at the organisational level.

Other investigations could explore the relationship between organisational learning and digital literacy in SA, focusing on building digital business skills. Another study could focus on how SMEs address challenges experienced in the process of learning about CC.

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Appendices

This section provides additional information and references for elaborative inferences on the work contained in the thesis.

Appendix 1: Participatory Observation and Reflection

Table 17: Participatory observation and reflection

Date	Time	Description	Setting	Participation/Observation	Reflection
January – June 2018 (continuous meetings)		Cape Town (Informal meetings)	Informal Conversations with one of the local CCSPs in SA on the adoption and use of CC by SMEs in SA.	Discussions and follow ups on the contextual issues, the challenges and the drivers of the adoption and use of CC by SMEs in SA. These discussions were taking place in the same period where three client SMEs were being interviewed and/or observed in the context of understanding the challenges and OL processes.	It seems like the money an SME brings into the business the more attention they get from CCSPs. In other words, CCSPs would rather spend time ensuring that the clients who pay the most are the ones who are supported in terms of addressing faults and any issues that they may face. This ends up affecting the experiences of SMEs that do not have financial capital, which is why they find themselves with extra challenges.
18 – April-2018	12:00-12:45	UCT Techfest (Event) Cape Town	Two-day event organised by the University of Cape Town • Provides an opportunity for engagement between students, academics and ICT industry stakeholders • Made up of sessions/talks/presentations that cover various topics o Paperless, cashless and faceless services o Office 365 collaboration and productivity o Digital workplace in higher education • One session attended & focus (relevant for the study) o Azure (CCSP) in Africa - How small start-ups can use CC to instantly match Fortune 500 companies in technical and agile power.	Participated as an audience and later networked/engaged with the guest speaker.	The event was short and not much engagement was happening in this regard. However, I took some time to talk to the guest speaker. It became clear that CC was yet to be the next big thing in SA. This is where I found out that the global CCSPs were planning to build data centers in SA. I asked about the timing of this, considering that CC has been around globally for some time, I was told that the mobile phone penetration (+/-70%). This means that there is a readiness in SA for the adoption of CC. There might be enough SMEs who can adopt CC. In other words, there is enough market.
15-May-2018	14:00-16:00	Johannesburg	Informal visit to the ICT division in one of the biggest telecommunications service providers in Africa.	Discussion on CC provision and use with one of the company's ICT engineers and manager in the enterprise support services. The discussion focused on the role of the CCSP in the ecosystem on CC sector in SA.	I realised that they took time in building the CC infrastructure and acquiring the necessary skills for CC provision. All they had were virtual machines that had some aspects of CC characteristics. They were mostly offering/renting out their infrastructure to local CCSPs for use. Therefore, this major player in Africa could not offer a CC service as one would have expected considering the size and

					maturity of the enterprise in terms of resources.
5-June-2018	14:00-15:30	Cape Town (Informal meetings)	Informal visit to the ICT division in one of the biggest telecommunications service providers in South Africa.	Group discussion on CC provision and use with the enterprise support services manager and 3 ICT engineers. The discussion focused on the role of the CCSP in the ecosystem on CC sector in SA.	They were hybrid cloud (Private cloud and public cloud). Like they never saw the need to offer cloud services, so they use the services for their own use. They also had to make a decision as to whether they would provide the cloud services, but they decided not to because they did not have the required skills and necessary technology to provide CC, though they had the hardware.
12-July-2018	8:00-17:00	AWS summit (Event) Cape Town	One-day event organised by AWS CCSP • Provides enterprises an opportunity to learn about the AWS CC. • Made up of sessions/talks/presentations that cover various topics o Basic & new services o Performance o Operations • Sessions attended & focus (relevant for the study) o Small business representatives' presentations and talks on their experiences of the adoption and use of CC. • Attended by various stakeholder for the purpose of sharing information and networking. o Local customers (including SMEs) o AWS third party/Partners CCSP o Expo (various organizations in the ICT sector)	Communicated with SME representative, CCSPs and various stakeholders. Attended sessions with SME representatives on topic such as security services. I interacted with various personnel from the global CCSP, representatives of third party CCSPs, SME representatives/owners.	It is interesting to observe a lot of stakeholders with interest in CC services. In this event I managed to get acquainted with a number of SME owners/representatives. I observed that there is an ecosystem to the provision of CC. And therefore, certain stakeholders influence learning more than others. For example, global CCSPs seem to drive the learning aspect of CC to various spaces like universities, SMEs and larger organizations.
1-31July-2018	Continuous	AWS Cloud foundations course	Online certification course covering the basics of CC • Core services o Compute o Networking o Storage o Databases • Security • Cloud Architecture • Support services	Participated in online AWS cloud computing foundation course (the theory and the practical component)	The course facilitated a deeper understanding of the concept of CC. Because of the course it was easier to relate to CC users and providers. It bridged the language gap but also assisted the researcher in being able to critically view or observe the SMEs use of CC services and provided a better understanding of the SME's social accounts. Assisted the researcher in understanding the type of resources required to run a CC service

					for efficient adoption and use by organizations including SMEs. Assisted in the understanding of the CC pricing model in relation to the type of technology/infrastructure required to facilitate it (pricing model). As a result the researcher could address the differences between local and global CCSPs and therefore the experiences that SMEs have with these CCSPs. It assisted the researcher in understanding the challenges faced by SMEs when it comes to support services, as to who and when can an organisation access support service.
19 March-2019	15:00-17:00	AWS education sector (Event) Johannesburg	Four-day event organised by AWS CCSP • Provides an opportunity for stakeholders to address key challenges of the fourth industrial revolution in the education sector through engagement and discussion. • Provides stakeholders the opportunity to understand the significance of CC within the context of the fourth industrial revolution and education.	Participated a panel discussion and through the presentation/sharing of the findings of the first study. Networking with SMEs owners/representatives in the education sector, particularly in the private sector.	Various stakeholders were in attendance. And from the panel discussions, the challenges from my initial study were verified in this event. The biggest one was the lack of skills in SA. Through the discussions, it was clear that there lacks a relationship between the university and industry, and this relationship is vital for skills development. These relationships facilitate skills for students who in turn can be ready for industry. There is a partnering with universities in SA with a known global service provider. CC was seen as an important service/tool for the education industry.
11-July-2019	8:00-17:00	AWS summit (Event) Cape Town	One-day event organised by AWS CCSP • Provides enterprises an opportunity to learn about the AWS CC. • Made up of sessions/talks/presentations that cover various topics. ○Basic & new services ○Performance ○Operations • Sessions attended & focus (relevant for the study) ○Small business representatives' presentations and talks on their experiences of the adoption and use of CC.	Communicated with SME representative, CCSPs and various stakeholders. Attended sessions with SME representatives on topic such as security services.	Organizations or stakeholders attended the event for various reasons. Some SMEs were in attendance to learn about specific CC services. Experienced SMEs in the usage of CC share their experiences and information with SMEs who may become potential users. Discussions would move from general CC services offered to cost optimization. • The language is very technical and "*English"* as if everyone is able to understand. • There's a feeling that this one particular CCSP is for elite organizations, including SMEs. These SMEs may only need upskilling on already understood ideas of CC. Unlike SMEs

			○Driving the digital transformation in Sub-Sahara Africa ○Compliance ○Security • Attended by various stakeholder for the purpose of sharing information and networking ○Local customers (including SMEs) ○AWS third party/Partners CCSP ○Expo (various organizations in the ICT sector)		who may still need to understand CC as a concept. Those who have more will be those who will have the first opportunity of exploiting IS/T before the regular man in the street. • During some sessions attended, SMEs owners would present cases that are problematized, and these SMEs would through the problems providing a cloud-based solution. These examples are based on western ideas rather than African ones. For example, when it comes to cost, they speak in dollars. • Most people seemed privileged had therefore had a western point of view • Some companies come with specific problems are looking to find solutions. • The CCSPs encouraged people to experiment and not to only rely on existing knowledge to encourage innovation.

Appendix 2: Themes and sub-themes from the findings of study 1

Table 18: Codes associated with themes of study 1 (The challenges of CC adoption and use)

Knowledge	Inferior CCSP	Cost	Support	Skill	Regulations	Change	Old Thinking	Trust	Control	Bandwidth	Other Challenges
Clattered console	Faulty system	Contractual obligations	Contractual obligations	Inexperience - CCSPs	Auditing	Adapting to changes	Old Systems/ideas	Leaked data	Lack of control	lack of backup	Data hosted overseas
Alignment between CCSP & SMEs	Lack of knowledge	Cost benefit analysis	Costly support	Inexperience -SMEs	Finance/Investments			Misplaced trust		Load balancer	Documentation versions
Lack of awareness of benefits	Limited control/flexibility	Cost variables	Human agent/touch	Skill absorbed by global CCSP	General regulation					Migration issues	Downloading data/for printing
Lack of knowledge by SMEs	Limited resources	Costly Skill	Lack of support		Personal Information					Connectivity/ Offline	
Lack of knowledge in the industry	Not fully cloud	Costly support	Poor support							Over subscription	
Lack of knowledge by CCSP	Poor service	Expensive								Cybersecurity	
Lack of understanding (cloud)	Poor support	expensive in a long run								Trust/ Security	
Old systems	Security/ Trust	Improved service								Software development issues	
		Poor technology									
		Quality service									
		Resellers									
		Sudden expense									
		Costly Training									

Appendix 3: Findings of the theory of ExplR and ExplT and the 4I theory

Table 19: Findings of the theory of exploration and exploitation and the 4I theory

ExplR & ExplT Concepts	Sub-concepts and interpretation of data	Tracking code on empirical observation Respondent =R#_Theory_Concept_Subconcept	Empirical observation
Mutual learning (ML) – The socialization of the employees to the organisational code. And simultaneously, the socialization of the organisational code to the employees beliefs, language and experiences to a degree	**Levels of learning (LL)** – refers to learning that takes place at the different levels (hierarchies) in the organization. For example, worker level, supervisor level and management level. (16)	R#_EE_ML_LL	"The ones on the low level, they don't care, they need to be reminded every time…so what I do is that, at first I show all of them what I want exactly and then after I will have the one on one …" R11_EE_ML_LL. "…supervisors that I have who are busy with these things, I know they are quick to think, hence they are in the fore front…" R11_EE_ML_LL.
	Socialization of the organisation **(SO)**- Refers to processes and activities that allow the organisation to learn from employees. (45)	R#_EE_ML_SO	"There will be a one hour session, we will sit in the boardroom with a big screen and I have to do a show and tell…" R10_EE_ML_SO "…lots of suggestions comes from within the team to make certain implementation" R10_EE_ML_SO. "Let me document the problems we are facing. Let me address it with a business focus, try and understand the challenges and see how we can work it out" R14_EE_ML_SO. "…they actually upskill us, I think at the beginning of every year, we have to select what you want to upskill on. I think there is a budget for training for that." R1_EE_ML_SO "Me, as an employee, I tell them what I want to work on that is related to my job." R1_EE_ML_SO. "We have to have multiple people with their thinking caps on to be able to solve issues and sometimes we got to market a bit ." R4_EE_ML_SO. "We sit down with all departments because we do Back End, Front End, you know, engineering, hardware and everyone has the nuances the pros and cons of a piece technology that we want to adopt. Maybe the Back End guys really like it, but the hardware guys say, hold on that

			will never work for me. So, it's a sort of collective responsibility" R4_EE_ML_SO. "We mostly share decision making. So, it sort of depend on what kind of decision…if it's a technical decision or like an infrastructure decision." R8_EE_ML_SO. "…management decision is depended on the IT recommendation…if we recommend that we move away from Afrihost (CCSP)…they know that we know what we are talking about because they are in top management, but we deal with things at the operational level." R2_EE_ML_SO.
	Socialization of the individual (SI) – Refers to processes and activities that allow the individual to learn from the organization. (41)	R#_EE_ML_SI	"…there has to be the conversion of all the staff… if we have a junior that starts and they have not done the course, they will have to go for a starter course which is called "The Novice" first and they will do a solid 2 week course." R3_EE_ML_SI. "…they just pushed the google drive thing on to us and then we liked it and we went that way." R2_EE_ML_SI. "We spoke to all the staff and then we said these are the 2 options…not many people were keen on the options but saying as management, its going to improve this, this and this…Its going to reduce cost in this way, its going to give us availability and then everybody was onboard." R3_EE_ML_SI. "We do have an onboarding process where we teach people how we use google drive…" R2_EE_ML_SI. "…I needed to give instructions and say, create a task like this, and once a task is created, upload documents of this size or do this and do that. And then it just became easier after that." R11_EE_ML_SI. "…they just send a trainer down and then the training will be for that 5 days." R3_EE_ML_SI. "We've taken on a lot of young stars from the universities, and they have lasted for about… they last for about 12 months. If they get through that kind of probation period.

			They will last for about 12 months and then they go…"R22_EE_ML_SI. "…a lot of students come out from university thinking we are going to do this… and because can be so creative and immediate, they think that that's what they are immediately going to get into doing. And it does not always work like that". R22_EE_ML_SI
	Digital platforms enabling mutual learning (DP) – The ease of grasping learning and using a new technology due to previous use of similar technologies internet and (10)	R#_EE_ML_DP	"…it was easy to learn because if you can use the internet then you can use the CRM tool. So, it helped that the CRM tool was so efficient in how it is used…" R14_EE_ML_DP "The mobile is very powerful, you connect one person, that particular person is having a lot of people in their own contacts, and that's how we are" R23_EE_ML_DP
Competitive ecology (CE) - The competition between organizations for resources and opportunities. The competition between employees for scarce organisational resources and opportunities.	**Productivity/Performance** – part of **business continuity (BC)** from the SME perspective	R#_EE_CE_BC	"…its efficient, its easy, its new, it's the future." R6_EE_CE_BC "It feels very easy, it feels like there isn't a big barrier to entry." R5_EE_CE_BC. "…redundancy on their side (CCSPs)…if there is something wrong with memory…It's also replicated on their side to make sure, if anything happens, we still have a backup from their side that's maintaining that…" R15_EE_CE_BC. "I don't think we've had any down time. Other than the down time that we have inflicted on ourselves. We have had no downtime because of the platform." R22_EE_CE_BC "I am in Johannesburg now and the guys are in Cape Town, if we have a presentation let's say tomorrow or on Friday, I don't have to do my part, email it to this person and then they do their part…we can all do everything all at once so we can all contribute in one document at the same time." R7_EE_CE_BC.

			"I can log in and see what the restaurant is doing if I am not on site, which is nice." R6_EE_CE_BC "…uploading things and being able to access them anywhere in the world is a big bonus." R6_EE_CE_BC. "There is another company that is taking care of that so you can focus on your operational side of your business instead of focusing on having a big expensive IT team to take care of physical hardware." R16_EE_CE_BC.
	Productivity/Performance – part of **business flexibility (BF)** from the SME perspective.	R#_EE_CE_BF	"…our clientele is growing, as we have more and more devices connecting to our platform…our resources also needs to grow with that, add more processing, add more memory, add more disk space and the backups are growing so it's (business) continuously growing." R10_EE_CE_BF. "…a lot of the staff you can change in the flier, in the old days you had to physically go change a hard drive you have to increase and change the memory slots physically if you needed on the dashboards with Dimension Data (CCSP), of a click of a button and it will change it on the flier, you just reboot and its changed." R15_EE_CE_BF. "…you don't have to say oh now I need to bring down the sever for the weekend and that kind of staff. You just do the changing." R15_EE_CE_BF. **"…**are very quick to respond to any issues that we have. R13_EE_CE_BF. "**…** if a client is sitting at your desk then you have to assist them then you contact the help desk and they give you an efficient solution to your problem. R3_EE_CE_BF.
	Increased market share (IMS) – Increased market share of organizations due to the CC	R#_EE_CE_IMS	"…before especially when it came to the business side of things. I would g et about R5000 or less per month, right now I can make up to R20000 and it has to do with the system. So, it helped me but when I started out, it was very expensive but I had no choice." R11_EE_CE_IMS
	Increased client satisfaction (ICS) – The satisfaction of SME clients due to CC benefits	R#_EE_CE_ICS	**"**These long serial numbers, I did not want to be there. And then I'm sure it cost them money, I don't think they were able to process any orders, their clients got frustrated, everybody

			became frustrated. In a cloud environment, I mean the worst thing that could happen is if your internet connection…if the internet went off…" R12_EE_CE_ICS. "…We have a lot of clients in the UK. So that's maybe also an advantage for us going with a bigger international provider." R13_EE_CE_ICS.
	Product development (PD)– Improved service and innovation	R#_EE_CE_PD	"Started looking at the possibilities for integration and so on with other systems" R22_EE_CE_PD. "…we have fired up a few more instances, the speed is a lot better, people are happier with that. We have released some new features that we were not able to do before…" R13_EE_CE_PD
	Employees competing for (EMF) resources – Upskilling tech skills	R#_EE_CE_EMF	"A respondent commented "…if you do not upskill right now then you will be irrelevant." R1_EE_CE_EMF "I would not be going for AWS training or google training of it was not for that, so we take advantage of those opportunities." R1_EE_CE_EMF.
	Cost (C) – the dynamics of the cost of adoption and use of CC. Costly adoption (22) affordable adoption	R#_EE_CE_C	
	Bargaining Power (BP) (55) – The instances where SMEs or SME clients or CCSPs had power or advantage in fostering CC adoption and use	R#_EE_CE_BP	"…sometimes you realise that you need to transition to cloud purely because of the demand from your clients." R7_EE_CE_BP. "…I am focusing more on the cloud product now because it is what people want" R20_EE_CE_BP. "…when clients message us and say, oh we use this cloud storage and we want you to be able to use it, then that influences our decisions." R5_EE_CE_BP. "…clients were constantly complaining…they threaten that if you guys can't keep up or can't provide a service that we are paying for then we will move to other service providers. So, if we continued staying at Afrihost (CCSP) we were going to lose a lot of clients." R1_EE_CE_BP. "…one of our customers said we won't go ahead with you unless your service provider is in SA. And that's potentially one of our biggest customers. But we didn't know that back

			then, so we made decisions based on that and now you sort of have to reverse out of that and try something different but as start-ups, that's what we do. It's no big deal, you know, we deal with it. And so, if we want the customer we need to jump through some hoops." R4_EE_CE_BP. "…I would say that it's very much customer first. What do they want? And then we look at the technology around that. So, a customer could say we want these pieces of Hardware. We don't want your servers in America because of POPI, we want dadadada…and then we make a decision around that" R4_EE_CE_BP. **"…**they are not reasonable…because AWS is better at securing data centers than them." R18_EE_CE_BP. "…once the AWS cloud is here in SA, I think it's going to be later next year, I think then we are going to start moving our application from Internet Solutions to AWS" R1_EE_CE_BP "We don't want your servers in America because of POPI…" R4_EE_CE_BP. "…other cloud providers like the MWEB, they were like quite small, so they were not reliable so we wanted something that was reliable R1_EE_CE_BP. "…if you have your setup from AWS moving to Azure you are most likely going to save up to 10 to 15%. Something like that." R1_EE_CE_BP "…they can be really expensive like one of our tools is R20 000 a month subscription for one of the SEO we use and google drive for extra storage, it's like it ranges from R100 a month onwards. R2_EE_CE_BP.
	Learning & Performance (LP) (10)	R#_EE_CE_LP	"…from hiring someone new and to when they become profitable, there is actually quite a big gap. Because they have to learn so much in the beginning and that takes longer if you don't get the training done quickly…" R2_EE_CE_LP. "…you are going to go with your knowledge of how to make that stuff work so that the learning curve is not massive to the team because even for a small team of 10 people or 11

			developers you know, it still costs twenty to thirty thousand a day to run the team." R4_EE_CE_LP "…I don't think the technology will be as good as you want because now they're learning along the way" R4_EE_CE_LP.
4I Concept	**N/A**	***Tracking code on empirical observation***	***Empirical observation***
Intuition /individual level		R#_4I_INTU_IND	"The ones on the low level, they don't care, they need to be reminded every time…so what I do is that, at first I show all of them what I want exactly and then after I will have the one on one …" R11_4I_INTU_IND "…supervisors that I have who are busy with these things, I know they are quick to think, hence they are in the fore front…" R11_4I_INTU_IND "…*our senior Dev at the time or the engineer would have had a looked at the solutions out there and made a choice based on his technical information*…" R4_4I_INTU_IND
Interpreting/ Individual and group Level		R#_4I_INTE_INDG	"*Each IT person is for their specific region, but we share ideas with each other…*" R1_4I_INTU_INDG *"There will be a one hour session, we will sit in the boardroom with a big screen and I have to do a show and tell on stackfy. I must explain to people, why I think stackfy will be better"* R#_4I_INTE_INDG
Integration/ Group Level & organisational		R#_4I_INTG_GO	*"So we mostly share decision making"* R8_4I_INTG_GO *"So, lots of suggestions comes from within the team to make certain implementation…"* R10_4I_INTG_GO
Institutionalisation/ organisational Level		R#_4I_INS_O	"So, once I document that I will know how to efficiently handle that for my customers. That why I got it spear headed in my company." R14_4I_INS_O "…But in our on boarding process when people join the company we teach them. I mean we have systems of how we use google drive so in certain folders." R2_4I_INS_O
Participatory observation Concept		**Participatory observation Table#**	**Conclusive Participatory observations and interpretation**
Language		PO_Table 11_L	In the process of interpretation language plays an important role because individuals develop cognitive maps about the

			domains in which they operate in (Crossan et al., 1999). Therefore, when an unfamiliar language is used as a means of communicating a message to people or individuals, it makes it difficult for people to comprehend the message. This may affect the ability of recognising the value of new information (Cohen & Levinthal,1990). For example, language may be a barrier for some SMEs, in recognising the value that CC can possibly have in their context. This in turn may affect the adoption and possibly use of CC by SMEs. One of the contextual factors that came from participatory observations and that exist in SA, is the inadequate levels of digital literacy in SA. Where only 50% of South Africans have digital literacy. This ties in well with Cohen & Levinthal's (1990) view that, prior knowledge has to be diverse and must be associated to new information which allows assimilation. Thus, assimilation permits creative utilization of new knowledge (Tsai, 2001). Therefore, the use of technical language and jargon may exclude some SMEs that do not have prior knowledge associated with CC.
Learning Culture in SMEs		PO_Table 11_LCS	SMEs that have employees who are educated, who have embraced a learning culture even at an individual level turn to have OL activities that add value to the strategic objectives of the company. What was observed was that such SMEs easily adopted and used CC with confidence that it would improve their competitive edge and customer satisfaction. On the other hand, SMEs that did not enjoy social, cultural and economic capital struggle to get employees onboard because the learning culture was not embraced at an individual level. This causes SMEs to struggle in initiating learning opportunities and in creating a learning culture.
Learning Culture driven by global CCSPs.		PO_Table 11_LCG	Global CCSPs have established that the adoption and use of IS is driven and influenced by knowledge. Knowledge can only come about through the process of learning. One of the strategies that is used by global CCSPs is to provide learning opportunities and platforms for organizations. Therefore, SMEs that have access to such global CCSPs turn to be knowledgeable about CC services. They also turn to draw from the leaning activities, learning culture and general culture associated with global CCSPs.

Appendix 4: The phases of the journey of adoption and use of CC by SMEs in SA

Table 20 : The phases of the adoption of and use of cloud computing

	Pre-adoption	Mid-adoption – Organisational Changes	Post-adoption – Organisational Changes
R1	Local installations, internet, time consuming,	Afrihost, breakdowns, SLA, poor support, HR reduced; Poor maintenance = poor performance; sharing, access	Testing, good support, reliable, learning, support, training prior adoption, upskilling and training Improved maintenance
R2	Hard drives, backup	Google drive, automatic backup, sharing, access, tracking/monitoring, change in day-to-day ops, support, cost benefit, learning, change in comm, investor influence	
R3	Phone, fax, airways reservation system, more people interaction,	less interaction, change in day-to-day ops, learning, support, change in comms, cost benefit, marketing reasons and access to customers.	
R4		Hetzner - half cloud (non-automated), investor influence. The nature of the business is IOT so CC is a must.	Reliance of CC, security & trust, policy changes (Privacy - POPIA), security concerns, learning, data centres in SA
R5		DropBox, backup, new ways of thinking about data ownership/sharing, support, sharing, access, training, security & trust, storage	
R6	Manual system, non-automated system	change of bus ops, sharing, access, tracking, support, learning, HR responsibility, costly.	
R7		Sharing, access, tracking/monitoring, cost benefit	
R8	Dedicated server, Latency issues	Google cloud, investor influence, Investors influence, latency issues	AWS, improved latency, learning, provides resources, training, self-help (preference) tools, playing with cloud services, cost benefit, trial learning
R9	Paper based, costly, hardware, costly,	Data security, trust, sharing, access, tracking, cost benefit,	
R10	In-house Hardware/SLAs, warrantees, costly, breakdowns,	Mini-Cloud/own severs/hire storage; Business growth (expensive)	Licensing, unnoticed change (no breakdowns), HR (point of responsibility), change in investing behaviour, testing and upgrading, new way of thinking, human interaction. Shared resources became a challenge, change in bus ops, change in communication, learning culture, trial learning, self-help tools, cost benefit, New IT features
R11	Paper based, internet, no servers. Communication challenge, unsatisfactory business ops,	Improved business operations, improved communication and management of the business, trial learning, HR-Responsibility, learning culture, costly, change in investor behaviour	
R12	In-house Hardware/SLAs, warrantees, costly, breakdowns,	Mini-Cloud/own severs/hire storage; Business growth (expensive)	Licensing, unnoticed change (no breakdowns), HR (point of responsibility), change in investing behaviour, testing and upgrading, new way of thinking, human interaction. Shared

			resources became a challenge, change in bus ops, change in communication, learning culture, trial learning, self-help tools, cost benefit, New IT features
R13	Point of responsibility, on-premises	New IT features, point of responsibility compliance, sales process security/trust, documentation conflict, new way of thinking, playing with CC services (learning)	
R14		Had CC from the onset (only HR aspect), security concerns,	Support, remote working, flexibility, self-help tools, new ways of thinking, security and trust, thinking about data ownership, human interaction, webized, collaborative learning, change in day-to-day ops, New features
R15	Initially had physical severs in a data centre - not inhouse (for office use).	breakdowns, physically change memory (not automated), security concerns	DD, change in communication, HR/responsibility, support improved, security and trust, New IT features, automated monitoring, reporting, SLA, Testing, flexibility, change investor behaviour
R16	Physical servers in a data centre, expenditure, limited resources - redundancy, HR responsibility	New ways of thinking, security concerns, lack of support, breakdowns,	Support, flexible, control, improved support
R17	Server, breakdowns	Google drive, Breakdowns (laptop crash), sharing, access, tracking	Back-up, New IT features (CRM) SaaS
R18		Flexibility, security concerns, trust,	
R19		Support is expensive,	
R20	physical servers, outsourced, installations	CC was used for backup only (from the beginning), Afrihost: breakdowns, connectivity challenges.	lack of support, human interaction, no longer installing that much, costly, has cost benefit, lack of trust (CCSPs). Less breakdowns
R21	Local installations, internet, time consuming,	Afrihost, breakdowns, SLA, poor support, HR reduced; Poor maintenance = poor performance; sharing, access	Testing, good support, reliable, learning, support, training prior adoption, upskilling and training Improved maintenance,
R22	Installations, time consuming	breakdowns, security concerns, expensive, SLA, IaaS maintenance,	flexibility, cost benefit, support (no breakdowns), control, change in comm, change in day-to-day ops, learning, Data centres
R23	Using Microsoft suit, laptop, mobile phone (manual)	Cost benefit, change in bus ops, learning, change in comm, automated processes, maintenance	

Appendix 5: Ethics approval

Faculty of Commerce
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05/01/2018

Ms Ayanda Pekane
Department of Information Systems
University of Cape Town

REF: REC2018/001/006

Dear Ayanda Pekane

Project : **The Dynamic Processes of the Adoption and Use of Cloud Computing by Small, Medium Enterprises in South Africa.**

It is a pleasure to inform you that the EiRC has **formally approved** the above-mentioned study.

Approval is granted for the period of 12 months. Should you require an extension or make any substantial changes to the research methodology which could affect the experiences of participants, you must submit a revised protocol to the Committee for approval.

Please note that the ongoing ethical conduct of the study remains the responsibility of the principal investigator.

Your sincerely

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Appendix 6: Respondent's consent letter

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28 November 2018

Re: Request to conduct research and interview participation consent form

Dear Sir/Madam,

In terms of the requirements for completing a PhD in Information Systems at the University of Cape Town a research study is required. The researcher, in this case Ayanda Pekane, has chosen to conduct a case study entitled "The Dynamic Processes of the Adoption and Use of Cloud Computing by Small, Medium Enterprises in South Africa". The objective of the research is to of the research is to investigate the dynamic processes of the adoption and use of cloud computing by Small and Medium Enterprises (SMEs) in South Africa.

Your participation in this research is voluntary. All information will be treated in a confidential manner and used exclusively for the purpose of this study. No individual names will be recorded or published. You will not be requested to supply any identifiable information, ensuring anonymity of your responses. You can choose to withdraw from the research at any time for whatever reason, in accordance with ethical research requirements.

The data collection method will be one-on-one interviews with a small group of the staff responsible for Information Systems in the SME. The interviews will be conducted at location of your convenience and will last +/- 45 minutes. If you are willing to participate in this study, kindly sign the attached form and return to me at your earliest convenience.

Should you have any questions regarding this research, please feel free to contact me on 084 221 1110 or email: pknaya001@myuct.ac.za

Your participation in this study would be greatly appreciated, but is entirely voluntary.

Sincerely,

Student Name & signature

Researcher \ M.Com Student, (UCT)
Department of Information Systems
University of Cape Town
Email: pknaya001@myuct.ac.za

Supervisor Name

Research Supervisor
Department of Information Systems
University of Cape Town
Email: o.ngwenyama@uct.ac.za

Research Participant Consent Form

I, _____, consent to participate in the research on "The Dynamic Processes of the Adoption and Use of Cloud Computing by Small, Medium Enterprises in South Africa".

I am aware that participation is voluntary and that I may choose to withdraw from this study at any time, should I choose to do so.

_____ _____

Signature Date

Appendix 7: Interview Guide

Interview Questions/Guide

Introduction

Below are the preliminary interview questions for the purpose of data collection. The final interview questions will be based on the observed empirical situation from the insider's (SMEs) point of view. The questions below do not adequately reflect the concepts drawn from the day-to-day lives of the respondents. However, the current questions are adequate for illustrating the type of information that the researcher aims to obtain from the respondents in the empirical situation.

The purpose of this study is to investigate the dynamic processes of the adoption and use of cloud computing by Small and Medium Enterprises (SMEs) in South Africa. This study is for academic purposes. It will not be used against the organization and the person who is being interviewed. It is also the interviewee's prerogative to give authority not to use his\her name and the organizations name in the study. The interview will only be recorded with the permission given by the interviewee.

Interview Details

SME Interview ID.	
Date of Interview	
Venue of Interview	
Duration	
Interview Language	

Study 1: The Challenges of the adoption and use of CC in SMEs in SA

Section A: Demographic Information of the SME

SME Location	Johannesburg [ ] Cape Town [CT] Durban [ ] Other:
Description of the SME	Core Business:

SME Classification	Small [ ] Medium [M] Total No. of Employees: Years of operation:
Respondent's Position	Owner [ ] CEO [ ] CIO [ ] Manager [IT] Employee [ ]
Age	18-25 [ ] 26-35 [ ] 36-45 [ ] 46-55 [ ] Above 56 [100 +]
Highest education:	Matric [ ] Certificate [ ] Degree [Degree] Masters [ ] Doctorate [ ] Other [ ]

Section B

1. How would you describe cloud computing?
2. In your view, what kind of reputation does cloud computing have in your industry or in small businesses in general?
3. How long has your organization been using cloud computing?
4. How did you first learn about cloud computing?
5. What made you decide to use cloud computing?
6. Have you always used cloud computing from the inception of the business?
   6.1 If yes, why did you decide to use cloud computing instead of the traditional computing resources?
   6.2 If no, when did you migrate to or adopt cloud computing?
7. How did your business change since the adoption of cloud computing?
8. What was your experience when you migrated your operations to cloud computing?
9. What were the main challenges in this process?
10. How did you overcome these challenges?
11. What is the level of cloud computing adoption and use in the business? (SaaS, PaaS and IaaS)
12. Why have you decided to adopt and use cloud computing at this level?
13. What aspects of the business makes use of cloud computing?
14. Do you think you can migrate more of your operations to the cloud?
15. If yes, what has been the reason for not migrating other operations to the cloud?
16. If no, why is that?
17. How has your experience been since using cloud computing?
    17.1 Can you name the main challenges that you experienced before, during and after the adoption of cloud computing?
    17.2 Can you name the main challenges that you have experienced as you use cloud computing?
18. Have you overcome those challenges?

18.1 If yes, what have you done to overcome the challenges?

18.2 If no, do you have a plan in mitigating these challenges?

Study 2: Organizational learning processes that lead to the adoption and use of CC by SMEs in SA

Section A: Demographic Information of the SME

SME Location	Johannesburg [ ] Cape Town [ ] Durban [ ] Other:
Description of the SME	Core Business:
SME Classification	Small [ ] Medium [ ] Total No. of Employees: Years of operation:
Respondent's Position	Owner [ ] CEO [ ] CIO [ ] Manager [ ] Employee [ ]
Age	18-25 [ ] 26-35 [ ] 36-45 [ ] 46-55 [ ] Above 56 [ ]
Highest education:	Matric [ ] Certificate [ ] Degree [ ] Masters [ ] Doctorate [ ]

Section B

1. What is your understanding of cloud computing?
2. How did you first learn of cloud computing?
3. What is your experience in learning about cloud computing? Was the concept of cloud computing easy to understand?
   3.1 If yes, what made it easy to understand?
   3.2 If no, what steps did you take in ensuring that you have a sufficient understanding of cloud computing?
4. What are the areas of your business that you have migrated to cloud computing?
5. What is your level of the adoption of cloud computing in the scale of the SaaS, PaaS and IaaS?
6. Have you always used cloud computing at this level?
   6.1 If no, what was the previous level of adoption and use?
   6.2 How did you learn of the current level of adoption?
7. Upon the adoption of cloud computing, what was your experience in its application to your business processes?

8. Have you had incidences where you experience problems as you use cloud computing? e.g. (teething problems)
   8.1 If yes, what was your approach in overcoming these challenges?
   8.2 What about the day-to-day use of cloud computing, do you find that it gets much easier or are there challenges that you come across?
   8.3 If yes, how do you overcome these challenges?
   8.4 If no, what would you say is the main contributor to adequate use of cloud computing particularly by the employees?
9. Are there any approaches that you use in ensuring that employees learn the skill behind the use of cloud computing.
10. What are the processes or approaches that you apply to ensure that you stay on par with the technologies that cloud computing can offer your business? (Considering the rapidly changing environment)
11. How do you ensure that there is sharing of information among the employees?
12. Do you document the challenges you have experienced and how you overcome those challenges when it comes to the use of cloud computing?
    12.1 If yes, what system do you use to document relevant information associated with the use of cloud computing?

Study 3: Organisational changes that emerge in the process of adoption and use of CC by SMEs in SA.

Section A: Demographic Information of the SME

SME Location	Johannesburg [ ] Cape Town [ ] Durban [ ] Other:
Description of the SME	Core Business:
SME Classification	Small [ ] Medium [ ] Total No. of Employees: Years of operation:
Respondent's Position	Owner [ ] CEO [ ] CIO [ ] Manager [ ] Employee [ ]
Age	18-25 [ ] 26-35 [ ] 36-45 [ ] 46-55 [ ] Above 56 [ ]
Highest education:	Matric [ ] Certificate [ ] Degree [ ] Masters [ ] Doctorate [ ]

Section B

1. What motivated you in making the decision of adopting and using cloud computing in your business?
2. What were the key drivers of the adoption and use of cloud computing in comparison to the traditional methods of acquiring ICT tools?
3. What was the criteria that you used for making the decision of cloud computing adoption and use?
4. What was the process used for moving to CC?
   4.1 Are there instances when others make decisions besides the key decision makers?
   4.2 If so what would be the motivation for changing to CC?
5. What is your understanding on the various ICT tools that cloud computing providers offer?
6. What is your level of adoption in this regard?
7. What were the key influencers that made you decide to adopt and use cloud computing at this level?
8. Can you recall any specific criteria that was used in adopting and using cloud computing that may have lead to this level of adoption and use?
9. How did you make the decision of adopting cloud computing at this level?
10. Have you always used cloud computing at this level?
11. If no, what was the previous level of adoption and use?
12. Why did you make changes to the current level of adoption? Or what motivated the change to CC?
13. What were the outcomes of changing the levels of cloud adoption and use?