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The impact of cloud computing on the South African Information and Communications Technology (ICT) sector as a result of offshoring the ICT functions.

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ABSTRACT

South Africa's Information and Communications Technology (ICT) sector is heavily dependent on Information Technology (IT) services outsourcing. A study aims to find out how cloud computing affects the South African industry. The study also examined the social and economic implications of offshoring information technology operations. Cloud computing is distinct from typical IT outsourcing in that it incorporates one-on-one agreement terms between the customer and hyperscale cloud providers. That is, services that would have been provided by a local business are now shifted to hyperscale cloud providers' centres of excellence, which may be situated outside of the country. Research is essential for understanding the impact of cloud computing, as well as how offshoring of ICT services has changed the face of the South African ICT sector.

The study used an inductive approach and a multi-method qualitative technique to attain the research goal, and an interpretivist perspective was chosen. The study yielded insights into the industry's particular challenges, such as a lack of digital skills, a lack of enterprise development, ICT regulatory frameworks, and an education curriculum that is not serving its intended purpose. The research also showed that hyperscale cloud providers benefited from lower labour costs in developing nations because of their IT offshoring business model. This offshoring feature has disturbed local governments, which are concerned that employment may be relocated to countries where these cloud corporations' centres of excellence are based. ICT firms in South Africa are increasingly looking to move up the value chain rather than focusing just on IT operations. This trend shows that, for the South African ICT industry to thrive, it calls for creative business models. The study also revealed that South Africa offers sensible policies with outstanding aims for enterprise development, but these regulations appear unsuccessful, because of a lack of effective monitoring and evaluation systems.

The study comprised 15 people from diverse organisations and economic sectors who took part in semi-structured video conference interviews. In South Africa, just 14 people were questioned, and one person in Botswana. The Covid outbreak delayed efforts to expand the scope of the research to include other regions. As a result, generalizability across all places will be limited. This study draws on previous research to fill a gap in the literature by addressing the central topic of how cloud computing has transformed the face of the South African ICT industry. As a result, this research establishes the foundation for a few major contributions to research and practise.

KEYWORDS

Cloud Computing, ICT Offshoring, Comparative Advantage, Vertical Specialisation, ICT Outsourcing

LIST OF ABBREVIATIONS AND ACRONYMS

ABBREVIATIONS	DESCRIPTION
4IR	Fourth Industrial Revolution
API	Application Programming Interface
AWS	Amazon Web Services
BMI-T	BMI-TechKnowledge Group
CA	Comparative Advantage
CAGR	Compounded Annual Growth Rate
CEO	Chief Executive Officer
CIO	Chief Information Officers
COO	Chief Operating Officer
CSP	Cloud Service Provider
CTO	Chief Technology Officers
EC2	Amazon Elastic Cloud
ERP	Enterprise Resource Planning
GCP	Google Cloud Platform
GDP	Gross Domestic Product
GVC	Global Value Chains
HR	Human Resources
IAAS	Infrastructure as a service
IBM	International Business Machine
ICASA	The Independent Communications Authority of South Africa
ICT	Information Communication Technology
ICT	Information and Communications Technology
IDC	International Data Corporation
IOT	Internet of Things
ISIC	International Standard Industrial Classification of All Economic Activities
ISIC	Industrial Classification of All Economic Activities
IT	Information Technology
ITO	Information Technology Outsourcing
JCSE-IITPSA	Joburg Centre for Software Engineering and Institute of Information Technology Professionals South Africa
SAPS	The South African Police Service

DECLARATION

I declare that this research project is my own work. It is submitted in partial fulfilment of the requirements for the degree of Master of Business Administration at the Gordon Institute of Business Science, University of Pretoria. It has not been submitted before for any degree or examination in any other University. I further declare that I have obtained the necessary authorisation and consent to carry out this research.

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1. INTRODUCTION

1.1 Research problem

The growth of cloud computing over the last several years has the potential to be one of the most significant advancements in technological history. Though, for cloud computing to reach its full potential, there must be comprehensive knowledge of the many challenges involved, from the perspectives of the technology's suppliers and users. While numerous research have been undertaken on the technological potential of cloud computing, there is also an urgent need to comprehend the private sector and social issues that cloud computing brings (Marston, Li, Bandyopadhyay, Zhang & Ghalsas, 2011). The South African information and communication technology (ICT) sector is built on information technology (IT) services outsourcing, a business model in which local payers import application or infrastructure and then package implementation, transformation, and maintenance services as a value-added offering back to customers, under a managed services umbrella (Drahokoupil & Fabo, 2018). Cloud computing differs from traditional IT outsourcing in that it involves one-on-one contracting terms between the customer and the cloud computing service provider, including the solutions, service agreement durations, pricing incentives, clear and specific performance targets (Vithayathil, 2018).

The services that would have been delivered and managed by the local ICT service providers are transferred to the hyperscale cloud providers' centres of excellence, which may be located outside of the local country at times (Agrawal, Taylor, Agrawal & Seshadri, 2019). The arrival of cloud computing service providers in the country means that the classic business model is no longer or may not be sustainable. As a result, this study is necessary for comprehending and identifying the influence of cloud computing, as well as how offshoring of ICT services has transformed the face of the ICT sector in South Africa.

The advent of cloud computing marks a significant shift in how ICT services are designed, implemented, scaled, maintained, and charged. Processing as we know it now represents a paradox: on the one hand, computers continue to get significantly more intelligent, while the cost per unit of computing continues to decline sharply, to the point that computing power is now widely regarded as a utility. Utility computing is the supply of computational resources as a subscription-based service, like what a typical public electricity company would do. However, as the IT landscape grows more widespread within an organisation,

the rising complexity of maintaining the whole in-house computing infrastructure of diverse information architectures, federated data, and applications has made computing more expensive than ever before (Marston et al., 2011). This sort of computing is gaining popularity as organisations have begun to expand the notion to a cloud model, offering virtual servers that ICT departments and users may utilise on-demand. Utility computing was mostly used by early corporate customers for non-mission critical tasks, but this is fast changing as trust and dependability issues are resolved (Rittinghouse & Ransome, 2017).

The cloud computing concept enables companies to access third-party computer resources for their daily ICT needs. The goal of cloud computing is to offer all the functionality of current ICT services, while enabling previously unfeasible new capabilities, all while substantially lowering the upfront computing costs that prevent many corporations from implementing various cutting-edge ICT services (Rittinghouse & Ransome, 2017). Cloud computing, in its most basic form, distributes computing services, including as servers, software, databases, networking, and storage, across the Internet to enable faster innovation, more agile infrastructure, and economies of scale. Companies frequently pay just for the cloud computing services they utilize, which reduces operating costs, improves infrastructure efficiencies, and allows them to grow as their business needs change (phoenixNAP, 2018; Microsoft Azure, 2021).

Cloud computing differs from traditional IT outsourcing. It involves one-on-one interactions between the customer and the service provider, longer contract durations, and pricing and terms that include incentives, explicit performance objectives, or time and materials pricing. Typically, such contracts are negotiated and tailored to the client-vendor outsourcing relationship, and the outsourced work is tailored to the customer needs. Cloud computing differs from traditional ICT services and in-house IT services. Traditional computing services and ICT departments arose as internal departments within the firm grew in size, incurring the capital and operation costs of the ICT department (Vithayathil, 2018).

Cloud computing is a virtual pool of cloud infrastructure resources such as compute, memory, storage, and network capacity that are primarily designed for enterprise business requirements; a data centre is a facility that streamlines a firm's common IT functions and

infrastructure for the convenience of processing, storing, and distributing applications and data; the two are not the same. For example, Amazon Web Services (AWS) S3 storage service is accessible over the Internet. It is intended to make computing storage more accessible to cloud users scalable over the web. In contrast, cloud computing eliminates the need for capital and enables on-demand, metered services. AWS revolutionized computing by allowing consumers to access technology-enabled services “in the cloud” without the requirement for knowledge, experience, or control over the technological infrastructure that supports such services. This technique converted cloud computing into an architecture in which data is permanently kept in remote servers accessible over the Internet and temporarily cached on client devices such as personal computers, mobile phones, and so on (Marston et al., 2011).

1.1.1 Cloud Computing deployment models

Behind the scenes, several services and models are at work to make cloud computing practical and available to end users. There are two sorts of working models for distributed computing: deployment models and service models. The types of access to the cloud environment are defined by deployment models. Cloud access is classified into four types: public, private, hybrid, and community cloud (Malik, Wani & Rashid, 2018).

- **Public Cloud**: Customers from outside the cloud can register and utilise the cloud's resources on a pay-per-use model. The public cloud, often known as the external cloud, is a computing environment in which resources are readily provided on a self-service basis over the internet, such as Google Email. Unlike a private cloud, this cloud is not secure. Due to its openness, it may be accessed by any internet user. It has fewer customization options than the private cloud. A principal cloud service provider (CSP) or hyperscale provider owns and operates the cloud infrastructure. The cloud provider is responsible for building the public cloud and its ICT resources and providing ongoing maintenance.
- **Private Cloud**: This cloud was created with a firm having its own data centre in mind. Organizations oversee all cloud resources they own. In comparison to a public or hybrid cloud, the private cloud offers more security. Private cloud resources are more expensive than public cloud resources, but they are also more productive. A company manages the cloud, and it exclusively serves that company; it might be inside or outside the company's borders. Inside a firewall, the internal or corporate cloud, often known as the private cloud, delivers aided devices to a

small number of employees.

- **Hybrid Cloud**: It's a set of cloud services that are private, public and community based. The private cloud, on the other hand, does the vital tasks, while the public cloud handles the non-critical ones. A hybrid cloud can save money since the private cloud is more expensive than the public cloud. Because hybrid cloud models rely on internal ICT infrastructure, redundancy across data centres is essential. A cloud customer, for example, could transfer sensitive information to a private cloud while sending less sensitive cloud services to a public cloud.
- **Community cloud**: A few organisations collaborate to build and deliver a cloud infrastructure that adheres to the same set of rules, requirements, values, and priorities. A third-party supplier may supply cloud infrastructure, or it may be located within one community's organisations. The cloud is administered by a few companies and supported by a community of people who have common interests. In comparison to the public cloud, the community cloud is more secure.

1.1.2 Cloud Computing service models

A cloud may connect with a customer or application in a variety of ways thanks to features known as services. Services Models are the functional models that Cloud Computing is based on. On the internet, there are three basic types of service models (Malik et al., 2018).

- **Software as a Service (SaaS):** End-user programmes are sent to them through the internet utilising browsers. Customers that use the cloud can take use of software that has already been installed and is running on the cloud infrastructure. This method of installing and executing the software application on each system is not needed. Furthermore, software support and maintenance are no longer required. SaaS offers clients with an application programming interface (API) that allows developers to construct custom apps in any circumstance. Two examples are Google Apps and Microsoft Office 365.
- **Platform as a service (PaaS):** This is the provision of a software development and implementation platform as a service to consumers, allowing them to swiftly build, launch, and manage SaaS applications. It also comprises devices for improving and deploying apps, which are required to generate them. PaaS is distinguished by its point-and-click interface, which enables non-designers to construct web applications. It is not necessary for the buyer to purchase expensive servers, equipment, power, or data storage. As a result, scaling up or down in response to

application resource requirements is straightforward. Just a few examples are Google, Force.com, and Apache.

- **Infrastructure as a service (IaaS):** Cloud computing companies supply actual and virtual servers and additional capacity organising devices. Hypervisors manage the virtual machines, which are organized into pools and driven by operational networks. Cloud clients are responsible for installing operating system images and application code on virtual machines. IaaS allows the cloud supplier to genuinely place IT infrastructure throughout the Internet. Some examples are Amazon EC2, Windows Azure, and Google Compute Engine.
- **Infrastructure as a service (IaaS):** Physical and digital servers, as well as additional capacity arranging devices, are provided by cloud computing firms. Hypervisors manage the virtual machines, which are organized into pools and driven by operational networks. Cloud clients are responsible for installing operating system images and application code on virtual machines. IaaS allows the cloud supplier to genuinely place IT infrastructure throughout the Internet. Some examples are Amazon EC2, Windows Azure, and Google Compute Engine.

Gillwald and Moyo (2014) say cloud computing is seen to have the potential to increase economic growth by lowering costs and improving efficiencies significantly. In the small and medium enterprise (SME) and government sectors, some of the benefits of cloud computing can be realized right away. Small businesses can now use cloud computing to access revolutionary ICT solutions previously only available to large corporations, increasing entrepreneurship and creativity. Although cloud providers provide SMEs with customized cloud solutions, adoption of these services has been limited. The notion suggests that the informal business sector, which employs most poor Africans, is the untapped market for cloud computing services. While the public sector has primarily driven cloud adoption in most regions studied, demand for cloud computing services in South Africa is driven by the private sector. Other businesses are also pushing their IT assets as far as they can in uncertain times, attempting to run as leanly as possible (Jacobs, 2018). South African companies such as EOH, Business Connexion, Dimension Data, and numerous local managed IT service providers compete directly with global cloud computing hyper-scale providers (Gillwald & Moyo, 2014).

1.1.3 ICT functions offshoring

In today's global economy, the location of business services is becoming increasingly subjective. When multinational corporations relocate their business services, they employ various location strategies to find unique benefits that meet their requirements (Malik, 2018). Traditional offshoring methods were developed to achieve scale and efficiency. In the face of such globalisation, the pressure on businesses to survive and generate profits for investors has grown inexorably. Many ICT companies, such as cloud computing hyper-scale providers, have turned to offshoring to meet this demand. Economic liberalisation in Prague, China, Poland, and India, among other places, has increased the appeal of ICT offshoring by allowing low-cost supply chains to emerge. The availability of new resources, such as a plentiful supply of lower-cost ICT skills and knowledge, also aided offshoring (Agrawal, Taylor, Agrawal & Seshadri, 2019).

The process of relocating the operations required to produce a specific good or service to a different location is known as offshoring. Previously, design, component development, and assembly were all done in the exact location; now, component production can be done in a second, foreign location, and assembly in a third. Offshoring has sparked much debate in recent years, and it has been portrayed as a phenomenon that allows businesses to cut costs while also causing job losses (Musteen, Ahsan & Park, 2017). IT offshoring is the practice of outsourcing one or more of an organisation's ICT-related tasks to a foreign company. Offshoring is a practice of moving corporate processes to another country to cut costs without sacrificing quality (Agrawal et al., 2019). This business model is attractive to cloud computing hyperscale providers because it provides them with unique economic leverage, allowing them to commit less money up front and enjoy a significant return on investment afterwards. According to their International Data Corporation (IDC) estimate, legacy system administration and maintenance will account for 75% of global ICT investment (Gantz & Minton, 2012). By allowing organisations to relocate their old IT systems to the cloud, the cloud computing paradigm reduces IT spending.

By 2020, according to the World Economic Forum (WEF) (2016), the global labour market would have lost five million jobs due to automation gained through cloud computing. The WEF also claims that work is undergoing a big transition because of cloud computing's rapid advancement in ICT such as robots, machine learning, and artificial intelligence, which necessitates a considerable shift in the labour force's makeup. Since 2014,

according to the National Economic Development and Labour Council (NEDLAC) (2018), South Africa's economic development has slowed and grown more unsteady. Between 2014 and 2017, South Africa's gross domestic product (GDP) rose by roughly 1.1 percent, compared to over 2.5 percent in the previous years. On the other hand, the government has been battling to reduce unemployment since 2014 as a result of poor GDP growth, which has resulted in stagnant net employment and job losses in critical industries (NEDLAC, 2018).

1.2 Purpose of the research

The purpose of this study is to see how cloud computing affects the South African Information and Communications Technology (ICT) industry as a result of offshoring ICT operations. Because of the economies of scale realised in cloud expertise, skills, computing systems, and infrastructure, the cloud computing business model allows businesses to free up cash by lowering the costs of business operations and IT services (phoenixNAP, 2018). South Africa has one of Africa's largest ICT markets (United States Department of Commerce [USDoC], 2021). As a growing contributor to South Africa's economy. International Business Machine (IBM), Microsoft Azure, Amazon Web Services (AWS), SAP, Dell, and Google Cloud Platform (GCP) are just a few of the international companies with South African subsidiaries. It functions as a regional crossroads and a supply base for the countries surrounding it.

South Africa's ICT services sector is expanding in the rapidly developing African market. Most ICT services established across the continent have been provided by South African and locally based multinational corporations. (USDoC, 2021). In 2016, IBM collaborated with Gijima and Vodacom to establish an IBM Cloud Data Centre in Johannesburg. This alliance was formed to allow (a) IBM to drive technology sales, (b) Gijima to provide managed IT services to its clients on top of the IBM technology platform, and (c) Vodacom to provide managed infrastructure services to its customers. This approach highlights global and domestic enterprises' readiness to invest in the South African market, promote enterprise growth, and harness local talent to boost the region's ICT sector in terms of both jobs and income (USDoC, 2021).

In South Africa, the global trend of moving enterprise ICT requirements to cloud-based solutions has gained traction significantly as telecommunications and data centre infrastructure costs have improved. The high level of innovation in the local ICT sector is

increasing the demand for cloud-based services. Cloud-based solutions are thought to be more cost-effective, safer, and efficient by the market. As they aim to innovate, stay competitive, and potentially disrupt incumbents, South African firms are becoming more open to embracing innovative technologies (Jacobs, 2018). IT professionals are among the most in-demand skills in South Africa. Due to skill shortages in critical and developing technology sectors such as the Internet of Things (IoT), IT security, Cloud Computing, Automation, Big data, and Analytics, customers will seek out suppliers with these capabilities. Several ICT companies establish their academies to help with the skills shortage (Jacobs, 2018). In terms of digital adoption, most South African businesses are comparable, and there is a similar demand for new skills related to developing technology.

In the South African ICT sector, there is a chronic shortage of all forms of digital skills. The skills needed to work with the present crop of developing technologies are the most scarce. This has been a prominent finding in past ICT Skills Surveys, and it was confirmed in the 2019 Survey (Schofield & Dwolatzky, 2019). Human resources (HR) operations, according to the WEF (2016), must learn to use strategic foresight to analyse skills shortages and design strategies to align their labour force to address current and future issues. The core idea of job creation is that technological improvement allows for company advancement, which leads to financial returns and the creation of jobs (Gantz & Minton, 2012). The study aims to see how cloud computing affects South Africa's existing data center and ICT outsourcing service businesses.

1.3 Scope of the research

The study's aim was limited to (i) understanding what effect cloud computing has on South Africa's existing data centre and ICT outsourcing services business; (ii) Assessing whether the freed-up ICT budgets as a result of cloud computing cost savings translate into technological innovation that enables company growth and results in job creation; (iii) Identifying if the department of human resources, as recommended by cloud computing, uses strategic foresight to comprehend and plan for future occupations.; and, (iv) Determining how cloud computing has transformed the face of the ICT industry in South Africa due to ICT operations offshoring.

1.4 Academic rationale

The advancement of computer systems has been rapid in recent years. This progression has lately witnessed a transition from enterprise to cloud computing, which reflects

corporate demands. Cloud computing has made significant development in recent years and is likely to continue to do so in the future. Furthermore, Clohessy, Acton & Morgan (2016) asserts that cloud computing represents a business and ICT infrastructure paradigm change. However, cloud computing raises several concerns, including security, privacy, dependability, legal, and economic concerns. Cloud computing is not only a widely discussed topic in the corporate sector, but it is also a current one in academia (Marston et al., 2011).

Cloud computing has a growing literature and a wide range of study areas. A few studies have been commissioned to look at the impact cloud computing would have on the global level ICT sector; a study by Moudud-Ul-Huq, Asaduzzaman & Biswas (2020) highlighted that cloud computing improves and prompts a redesign of the company design with a vital influence on business technique, while making customers' business critical data available from anywhere using any device; and according to a research conducted by (Govindaraju, Akbar and Suryadi (2018) the introduction of cloud computing has altered the way businesses manage their information technology by increasing organisational agility and strengthening the interconnection of IT and business. Nonetheless, there is a lack of knowledge of cloud computing's impact on South Africa's economy. Therefore, in-depth research of what impact cloud computing has on South Africa's existing data centre and ICT outsourced services industry would be helpful. This study followed past studies' footsteps and aimed to fill a gap in the literature by addressing the central topic of how cloud computing has changed the face of the IT sector in South Africa (Bayramusta & Nasir, 2016).

1.5 Business rationale

Consumers in a cloud computing environment are customers who now pay the providers only for the usage of the system on an operating expenditure basis. The promise of cloud computing will relieve the burden on ICT departments by spending less time maintaining systems and more time developing creative applications for the company (Marston et al., 2011). Additionally, do these freed-up ICT funds because of cloud computing cost reductions translate into technological innovation that enables corporate growth, resulting in financial returns that convert into creating employment? By collaborating with industry associations and national and international regulators, corporate cloud computing users

may help ensure that cloud computing delivers on its promise of transforming corporate computing.

1.6 Conclusion

The transition from corporate computing to cloud computing has been discussed in this chapter, and ICT functions offshoring and how organisations must learn new skills and competencies. As the use of cloud computing services grows, businesses begin to look at how they may modify their company structures to fit the cloud computing paradigm (Bayramusta & Nasir, 2016; Agrawal et al., 2019). The second chapter will review the literature on the benefits of cloud computing and how this ICT services delivery model is already changing how ICT departments deliver economic value to established and new ICT markets, especially in South Africa. Furthermore, how cloud computing influenced South African ICT business due to functions offshoring will be investigated next (Agrawal et al., 2019).

The third chapter details the study topics, and fourth chapter discusses the research technique. The findings are presented in-depth in chapter five and then debated in chapter six. In chapter seven, we will conclude and provide some recommendations for further research. The next chapter examines contemporary academic literature to establish the research's theoretical foundation. It also analyses the previous ideas, proposals, and arguments that influenced the development of the research topics.

2. LITERATURE REVIEW

2.1 Introduction

The purpose of this chapter is to provide an overview of the literature on cloud computing, outsourcing, and offshoring business functions. This chapter begins with a definition of cloud computing and its benefits before closing with the chosen theoretical viewpoints and their application to how cloud computing has changed the face of the South African ICT sector. The subsequent discussion will focus on the impact of cloud computing on South Africa's existing data centre and ICT business functions outsourcing. It will then determine whether freed-up IT budgets resulting from cloud computing cost savings translate into technological innovation, company growth, and ultimately job creation. Eventually, discuss whether the Human Resources function uses strategic foresight to understand organisational skills requirements as advocated by cloud computing before discussing the implications of business operations offshoring.

2.2 Definition of Cloud Computing and its benefits

Cloud computing is a worldwide trend that has caught the attention of both corporate and academic organisations during the last decade. Despite cloud computing still has not fully matured, there is still enough research on the topic (Bayramusta & Nasir, 2016). The major purpose of this research is to look into the evolution of cloud computing through time and how it has changed the face of the South African ICT sector. Bayramusta and Nasir (2016) did a content analysis on 236 scholarly journal articles published between 2009 and 2014 to discover probable trends and developments in cloud computing throughout the six years and guide future cloud computing research. The study's findings revealed that most cloud computing research is focused on cloud computing adoption, followed by cloud computing legal and ethical problems. It also seems as if the issue of cloud computing is usually overlooked by management and business publications, even though the influence of cloud computing on companies and institutions is enormous and warrants research (Bayramusta & Nasir, 2016).

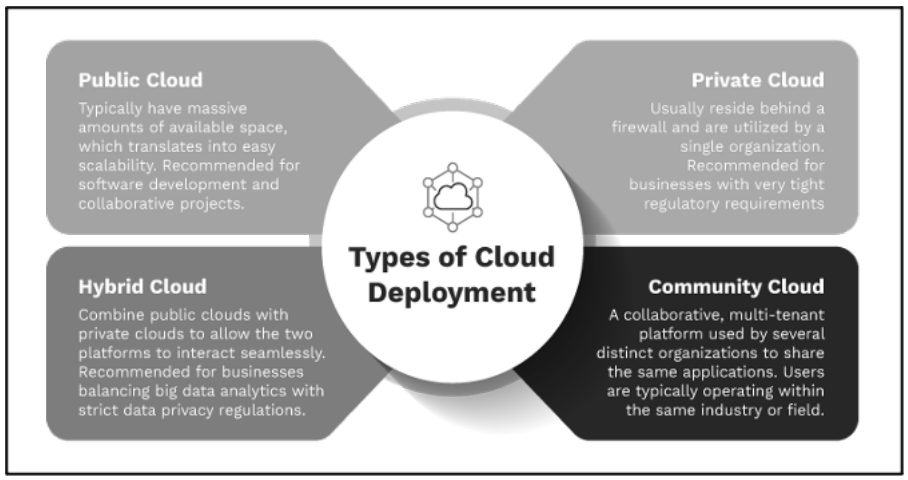
Furthermore, a research by Buyya, Srirama, Casale, Calheiros, Simmhan, Varghese, Gelenbe, Javadi, Vaquero, Netto, Toosi, Rodriguez, Llorente, De Capitani Di Vimercati, Samarati, Milojicic, Varela, Bahsoon, De Assuncao and Rana (2018) reveals that the cloud computing model has transformed the ICT landscape during the last decade, allowing computing to emerge as a utility. The study reinforces my opinion that cloud

computing has emerged as the foundation of the digital economy by providing subscription-based accessible anytime, anyplace using a pay-as-you-go solution. This has resulted in lower start-up times, the development of scalable global corporate systems, improved cost-to-value parallelism for information technology requirements, and various implementation models for pervasive business applications (Buyya et al., 2018). The evolution of the Internet, and later the World Wide Web, has pressured the industry to rethink its business operations. IT infrastructure paradigms have evolved as well, most notably from corporate to cloud computing. Cloud computing emerged in the early 2000s as the final step of IT infrastructure growth, denoting a computing paradigm in which companies or individuals acquire computer power and applications through the Internet (Bayramusta & Nasir, 2016; DeStefano, Kneller & Timmis, 2020).

2.2.1 Models of cloud computing

The four types of cloud computing models are public, private, community, and hybrid clouds. Clients using cloud computing must be aware of the security benefits and hazards connected with the technology, and they must set realistic expectations with their cloud providers. Because each model has distinct security needs and obligations, different services and categories defined by software as a service (SaaS), platform as a service (PaaS), and infrastructure as a service (IaaS), are taken into account (Gasiorowski-Denis, 2015; T. Mosweu, Luthuli & O. Mosweu, 2019). Figure 1 displays the kinds of cloud computing models visually.

Figure 1. Models of cloud computing



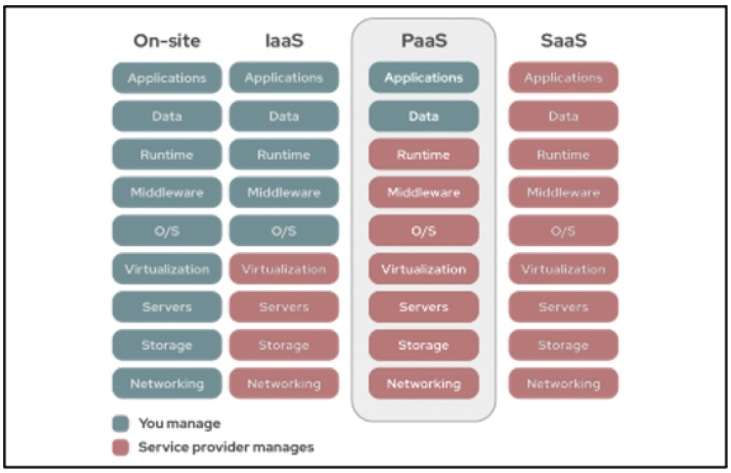
Source: (Felter, 2021).

- The basic cloud computing approach is public cloud, in which customers may access a vast pool of computer capacity through the internet. One of the key advantages is the capacity to swiftly grow a service.
- A private cloud is one where only a few clients have access to the infrastructure. The infrastructure only keeps information from the organisations that paid for the service, and their data is kept separate.
- A cloud service shared by a group of clients is referred to as community cloud deployment. Aside from the benefits of using the service, this deployment provides client organisations with the security of knowing what other customers are doing on the same cloud infrastructure
- The last sort of cloud deployment paradigm is hybrid cloud. The structure is completed by several types of cloud deployment models. Some infrastructure is intended to be in the public domain, while others are intended to be private and secluded.

2.2.2 Types of cloud computing services

According to the literature, there are four types of cloud computing services offered to users: SaaS, PaaS and IaaS (Bayramusta & Nasir, 2016). Figure 2 depicts the three most prevalent forms of cloud computing services.

Figure 2: Types of cloud computing services



Source: Image credit (Red Hat, 2018)

- Software as a service (SaaS) is a provision that allows a customer to remotely

access software that is hosted on infrastructure that the service provider owns and maintains. Its benefit is that the client organization may use software that would have been costly to acquire, install, support, and update if it had been purchased.

- Platform as a service (PaaS) describes the online delivery of bespoke application deployment environments in which programs may be created and operated on service provider platforms. This is accomplished by creating bespoke cloud services without deploying applications on an organisation's computers and installing those programs without specialized network management expertise. Using the platform provided, the client organization can create its software.
- Infrastructure as a service (IaaS) denotes to the supply of digital infrastructure components, including servers, storage, and network connectivity through the internet. It enables the representation of automation using various resources, such as the infrastructure required to develop and run its software applications. The customer rents rather than buy ICT infrastructure on a need-to-use basis, allowing it to scale up infrastructure capacity quickly and efficiently as needed. The client has remote access to the rented infrastructure through the Internet.

2.2.3 Cloud Computing and its benefits

DeStefano et al. (2020) assert that cloud computing facilitates a change in ICT adoption costs from fixed capital expenses to operational expenses, allowing businesses to expand and transform. They looked at the influence of cloud computing on firm growth using start-up firm-level data. They discovered lesser scale impacts but scattered activities for incumbents by shutting enterprises and relocating employees away from the head office. Cloud computing causes emerging businesses to develop employment and income, but they become concentrated in fewer locations. Furthermore, cloud computing usage leads to employee migration inside companies (DeStefano et al., 2020). Kathuria, Mann, Khuntia, Saldanha and Kauffmann, (2018) affirms that one of the most effective competitive differentiation techniques for businesses is cloud computing-based information management. Establishing an integrated capacity with cloud computing is essential for organisational success in the evolving landscape of business competitiveness, given the rising importance of information management in value generation and process support. These concerns have gotten little attention, but the authors propose a cloud value appropriation paradigm for businesses. Through cloud integration, cloud service portfolio, and business flexibility, they established a strategic advantage appropriation route from cloud technological capacity to firm performance. This

study also revealed new details about the underlying processes through which cloud computing influences company performance through cloud-enabled capabilities and the business operations that these capabilities serve (Kathuria et al., 2018).

2.2.4 Cloud Computing characteristics

To satisfy a client or user needs and deliver quality services, cloud computing must have some following qualities (Malik et al., 2018).

- Multi-sharing: By leveraging distributed computing to share basic infrastructure, many customers and applications may function more efficiently and at a lower cost.
- High availability and reliability: Server availability are more dependable and higher, which reduces the likelihood of infrastructure failure.
- Rapid elasticity: Scaling resources up or down at any time is relatively simple. It allows it to happen. Customers' resources are automatically monitored, and resources are currently allotted to customers.
- Broad network access: Virtual machines, storage, and computing power may all be accessible through the internet using various devices such as smartphones, laptops, and desktops. Cloud computing may be accessible at any time and location because it is based on the internet.
- Resource Pooling: Cloud computing enables several users to share a resource pool. A single physical instance of the database and basic infrastructure may be shared. A physical server, for example, may host many virtual machines belonging to distinct users.
- High scalability: This refers to delivering resources on a massive scale on-demand without the need for human collaboration with each service provider.
- Maintenance: Cloud computing apps are easier to maintain since they do not need to be installed on each computer and can be accessed from various locations, lowering costs.
- Agility: It distributes resources to consumers and performs tasks rapidly.
- Measured Service: A measured service is one in which the cloud provider manages and monitors all aspects of the cloud service. Capacity planning, resource billing, optimization, and other factors all play a role.
- On-Demand Self-Service: Cloud Computing enables clients to request services and resources from cloud service providers without engaging with them. A website may be accessed and used at any time. Virtual machines, processing power, and

storage are examples of computing resources.

- Pay-per-use services: Clients are given APIs (Application Programming Interfaces) to access cloud services, and they are charged based on how much of the service they consume.
- Low cost: Because the firm no longer needs to set up its infrastructure, it is cost-effective. It is compensated based on the number of resources it has utilised.

Cloud computing has various advantages. This IT services delivery paradigm has already altered how IT generates economic value in both developed and developing countries. IDC and Microsoft (2018) predicted in their study that cloud computing might produce over 500 thousand jobs in emerging regions between 2017 and 2022. The writers went on to say that these occupations would not be limited to IT duties, but would also include sales, marketing, operations, and finance. As the industrial revolution 4.0 and the changing nature of work evolves in South Africa, the government plans to help workers in tackling the digital gap by upgrading their skills so that they can take advantage of the opportunities that cloud computing and the fourth industrial revolution bring (NEDLAC, 2018).

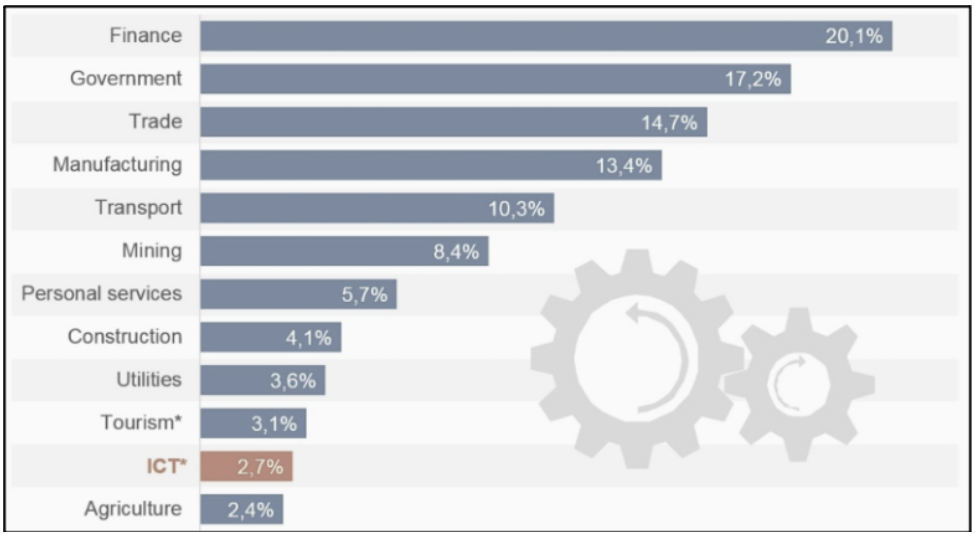
A literature review is a way of gathering and synthesising previous research work in a certain topic in a methodical manner (Snyder, 2019). According to the author, a well-conducted literature review as a research approach provides a solid foundation for theory creation and knowledge expansion. A few studies have been commissioned to look at the impact of cloud computing on worldwide employment. Nonetheless, little is known about cloud computing's influence on the South African economy, particularly what impact it has on the country's current data centre and IT outsourcing services businesses.

2.3 The impact of cloud computing on South Africa's existing data centre and IT outsourcing services businesses

The strategic component of information technology outsourcing (ITO) is well recognised in the literature. First, in terms of the firm's boundaries, outsourcing IT operations and assets is viewed as a highly strategic decision. ITO has been described as leveraging organisational talents and resources. ITO also allows companies to focus on core strengths while relying on external partners for tasks they lack the requisite expertise. Additionally, depending on the strategic motive driving an outsourcing endeavour, such as improved information systems services, efficiency benefits, innovation, or agility, ITO

can assist businesses in achieving their strategic goals (Karimi-Alaghehband & Rivard, 2019). In today's economy, ICT is at the forefront. South Africa's ICT sector accounts for a sizable portion of the country's GDP. Technology is involved in almost every economic element, from telecommunications to improving industry output with robotics and more efficient computer hardware and software. Despite its importance to the South African and international economies, the ICT sector is not a well-defined industry, according to the International Standard Industrial Classification of all economic activities (ISIC). Manufacturing, business services, commerce, and telecommunications are just a few of the industries that employ ICT.

Figure 3: Contribution to South African economic activity as a percentage of GDP, 2014



Source: (Statistics South Africa [StatsSA], 2017).

From cattle production to agriculture, the South African agriculture sector encompasses a wide range of operations. Agriculture provided slightly over 2.4 per cent of total economic output in 2014. The ICT industry in South Africa is somewhat more important than agriculture; nonetheless, the ICT industry contributed 2.7 percent of GDP, or 93 billion rands, slightly more than agriculture but significantly less than tourism, which contributed 3.1 percent. In other words, for every 100 rands created by the economy in 2014, ICT-related activity accounted for 2,70 rand. Telecommunications services accounted for just over two-thirds of the 93 billion rands in revenue. South Africa has imported more information and communication technology than it has exported. Since 2011, the ICT trade

deficit had increased from 42 billion rands in 2011 to 97 billion rands in 2014. When a country imports more than it exports, it has a trade deficit. Broadcasting, telecommunications, and information supply services accounted for 60.5% of all ICT exports in South Africa. The contribution of ICT to overall GDP was 3.0% (Statistics South Africa, 2017).

2.3.1 SA data centre infrastructure business

Organisations provide services to their consumers using various business models to maximize revenue while solving ICT infrastructure scalability, assured connectivity, and security. Businesses reach out to the data centre service providers and lease space in their colocation data centres to solve such concerns. Organizations also expect these service providers to supplement their ICT skills and manage their ICT infrastructure at those colocation facilities (Bano, Qureshi, Rais, Tufail & Qayyum, 2019). According to Jacobs, Nielson and Parle (2016), approximately 50,000m2 of commercial IT white space is available in large data centres throughout the county. Around 2010, there was a surge in the construction of retail data centres in South Africa. Teraco, Neotel and Telkom opened their data centre facilities. With new Tier III or Tier IV facilities, BCX, Vodacom, and MTN followed suit. Standard Bank built its Samrand data centre facility, and Nedbank upgraded theirs, indicating a healthy market for infrastructure suppliers (Jacobs et al., 2016).

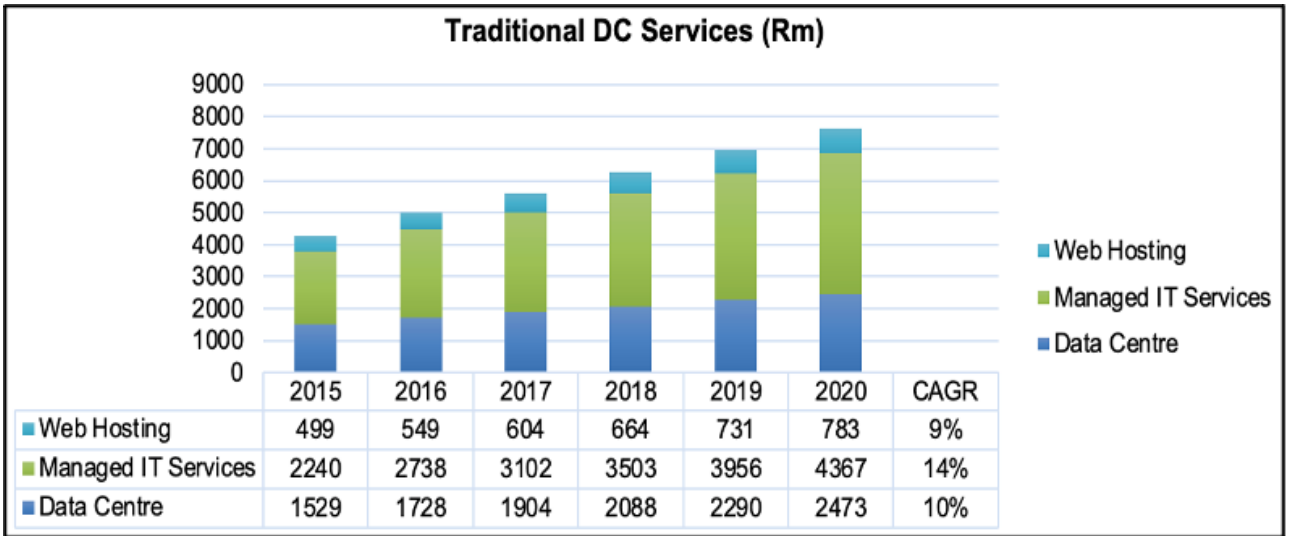
2.3.2 Revenues from traditional data canter services in South Africa

Table 1: Revenues from traditional data centre services between 2015 and 2020

Sub-Sector Year (Rm)	2015	2016	2017	2018	2019	2020	CAGR
Data Centre (Colocation)	1529	1728	1904	2088	2290	2473	10%
Managed IT Services (Hosting)	2240	2738	3102	3503	3956	4367	14%
Web Hosting	499	549	604	664	731	783	9%

Source: (Jacobs et al., 2016).

Figure 4: Revenues from traditional data canter services between 2015-2020.



	2015	2016	2017	2018	2019	2020	CAGR
Web Hosting	499	549	604	664	731	783	9%
Managed IT Services	2240	2738	3102	3503	3956	4367	14%
Data Centre	1529	1728	1904	2088	2290	2473	10%

Source: (Jacobs et al., 2016).

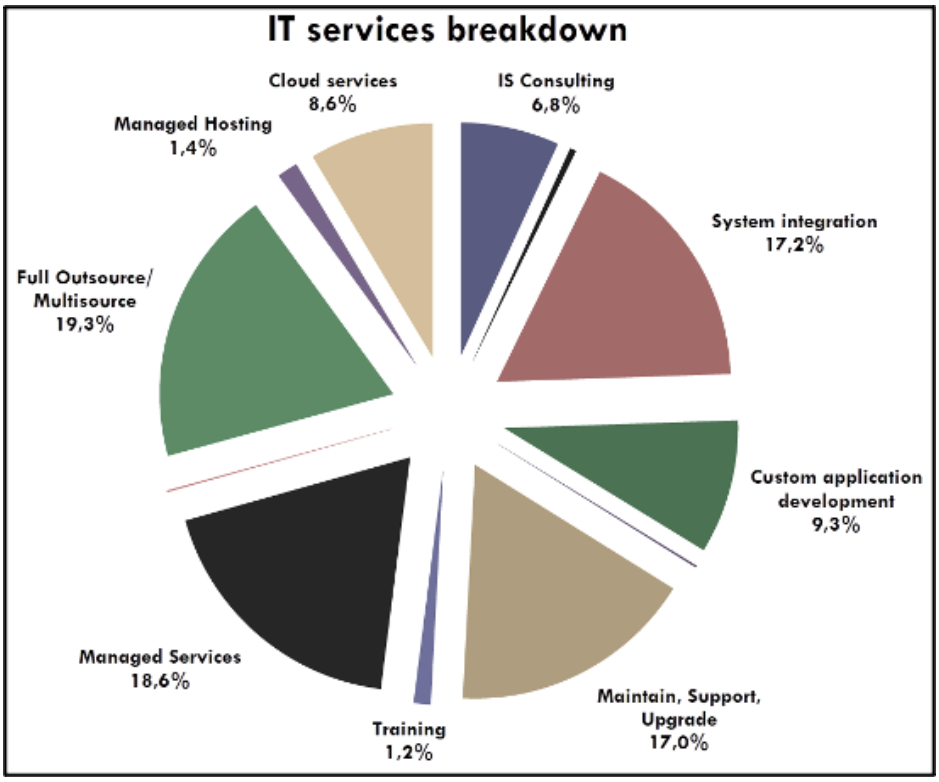
Traditional Data Centre services sales increased by 18 per cent in 2015, with managed hosting accounting for much of the increase. Managed hosting remained an alternative for organisations that wanted to transfer their IT infrastructure off premise but did not want to take the shared cloud computing path as electricity and other facility expenses rose and corporations were forced to accomplish more with less. Over the projection period, these services are estimated to expand at a compounded annual growth rate (CAGR) of 12 per cent, reaching 7.6 billion rands by 2020.

2.3.3 South Africa IT services market by service area, 2018

In the context of India's jobless economic development following the 1990s macroeconomic reforms, the post-reforms India research looked at the interrelationships between productivity, employment, and trade growth (Joshi & Omkarnath, 2020). Most of the research on productivity in Indian manufacturing suggested a boom in the post-reform period, however particular industrial groups had varying levels of increase. The sector's total factor productivity (TFP) rise was attributable to technology-based secondary imports. Shifting trade patterns, particularly export composition, have led to limited employment generation. The shifting character of trade accounted for both productivity growth and a lack of job growth. The study included the period from 1995 to 2014, and the trend growth rates for different productivity indicators, employment, and production were

estimated. The estimates of growth revealed high productivity increase, with rates varying according to the labour intensity of production. According to the report, productivity growth had been modest, particularly in labour-intensive industries. India's portion of global commerce had been small but steadily increasing. Furthermore, India's trade composition was skewed toward the manufacturing sector, while labour intensive industries were overlooked. The increasing import of intermediate goods and services was another emerging pattern in India's trade. A vertical specialisation index was generated using Hummel's framework to establish the link between trade and productivity development. The estimated panel regression with fixed effects result indicated a favourable relationship between vertical specialisation and productivity development. The study also claimed that India had to take a balanced approach to job creation and productivity growth to avoid jobless growth. A deliberate programme of vertical specialisation in goods that depended on the country's huge supply of unskilled and semiskilled labour could go a long way toward achieving this goal (Joshi & Omkarnath, 2020).

Figure 5: IT services breakdown, 2018



Source: (Jacobs, 2018).

In 2018, the South African IT services market was valued at 70.2 billion rands, up 7.5 per cent over the previous year. IT outsourcing and digital transformation are by far the most popular service categories, indicating that companies are looking to service providers to improve and boost efficiencies (Jacobs, 2018).

2.3.4 Overview of IT services spending (Rm) by service area in South Africa, 2017 – 2022

A study to explore the process of comparative advantage evolution and the factors that influence it, by Ding and Li (2018) was commissioned, particularly for developing exporting countries. The study also highlighted the importance of determining what factors will encourage them to export more technologically complex products. The authors used Hidalgo, Klinger, Barabási and Hausmann (2007) study that uncovers that economies develop through diversifying the types of goods they manufacture and trade. Some goods are more easily adaptable than others in terms of technology, resources, institutions, and talents required to create such new items. Ding and Li (2018) also used Rodrik (2006) approach to calculate the product and nation level export technical complexity. They discovered that when a country exports products with the highest product density or increased product path that also have greater technical richness, the nation's export technological complexity generally increases in the near run, while the consequence of distribution of the journey of technical complexity of international trade is more worthwhile in the long term (Ding & Li, 2018).

According to Rodrik (2006) research, China's export performance is shaped by factors other than comparative advantage and open markets. What's more fascinating is that government initiatives have aided in the development of home skills in consumer technology and other advanced fields that would not have emerged otherwise. As a result of this partnership between the public and private sector sectors, China now has an export basket that is far more sophisticated than one would expect for a nation of its economic level. This has been a key factor of China's fast growth, implying that what counts for a country's future growth is whether it can continue to hook on to higher-income items over time, rather than the number of exports. Developing nations have hoped to transform their prospective comparative advantages in high technology and high value products into real comparative advantages (Ding & Li, 2018).

Table 2: Estimated IT services spending between 2017 and 2022

IT Service area (Rm)	2018	2019	2020	2021	2022	2023	CAGR
IS Consulting	4 800	5 184	5 598	6 046	6 530	7 052	8.0%
Business Consulting	300	324	350	378	409	441	8.0%
System integration	12 083	12 929	13 705	14 390	15 110	15 865	5.6%
Custom application development	6 510	7 942	9 530	11 437	13 495	15 654	19.2%
Cloud enablement	93	112	134	156	177	199	16.3%
Training	822	780	749	727	712	705	-3.0%
Maintain, Support, Upgrade	11 905	12 381	12 876	13 391	13 927	14 484	4.0%
Managed Services	13 080	12 557	12 306	12 060	12 060	12 060	-1.6%
Aggregation	67	65	63	62	62	62	-1.6%
Full Outsource	13 518	14 329	15 045	15 798	16 588	17 251	5.0%
Managed Hosting	1 008	902	817	747	693	649	-8.4%
Cloud services	6 022	8 240	11 331	14 665	18 141	21 430	28.9%
IT Services Total	**70 208**	**75 746**	**82 506**	**89 857**	**97 903**	**105 853**	**8.6%**
Growth YoY	7.5%	7.9%	8.9%	8.9%	9.0%	8.1%	

Source: (Jacobs, 2018).

The total IT services market is predicted to grow at a CAGR of 8.6%, with Cloud Services and Custom Application Development leading. As they aim to innovate, stay competitive, and perhaps disrupt incumbents, South African businesses are becoming more open to utilizing newer technologies. In the pursuit of cost reduction, increased productivity, and profitability, Industry 4.0 has hastened the convergence of information and operational technologies. The movement from hardware-based technologies to software-based systems, a computing strategy based on a virtualized infrastructure supplied as a service via software over the Internet, is accelerating. Process automation is becoming increasingly important, and data-driven decision-making is revealing insights that might otherwise go unnoticed. The need for comprehensive, holistic IT security has been underscored even more due to recent significant breaches. Digital transformation is more

than just digitizing operations; it has posed a challenge to the way companies conduct business (Jacobs, 2018).

Cloud computing is seen as a cost-effective ICT solution that, when properly deployed, may assist organizations in overcoming difficulties associated with conventional ICT, such as high purchase and maintenance expenses for ICT equipment (Mohlameane & Ruxwana, 2020). Cloud computing is rapidly gaining traction due to local hyper-scale cloud providers such as Huawei, GCP, AWS, and Microsoft Azure. Data domicile and latency are no longer valid issues, and the focus has shifted from whether to adopt Cloud to how Cloud will be used for business success. Because the number of next-generation technologies is increasing, experts in each domain are needed to help navigate the fast-changing technology landscape (Moyo, 2020). IT expertise is among the most in-demand skills in South Africa. Due to skill shortages in critical and emerging technology areas such as IT security, Cloud, automation, big data, and analytics, customers will seek out suppliers with this experience. To address the skills gap, many ICT corporations are establishing their schools. As Cloud democratizes the availability of resources required to implement, the rate at which innovative technologies are embraced is accelerating. Where service providers can offer value and expand their relationships with organisations, innovation and speed to market are becoming increasingly essential success factors (Schofield & Dwolatzky, 2021). The main service areas are IT operations outsourcing, indicating that organisations are looking to service providers to aid with digital transformation to optimise and increase efficiencies. Table 1 shows that the South African data centre and IT outsourcing business is expected to grow at a CAGR of 12 per cent (Jacobs et al., 2016). Table 2 above paints a very different picture, with the South African datacentre/managed hosting business projected to decline at an estimated -8.4 per cent CAGR and the IT outsourcing business projected to grow at only a 5% CAGR, a significant drop from the estimated CAGR of 12 per cent in 2016 (Jacobs, Nielson & Parle, 2016; Jacobs, 2018).

Over the five-year forecast period, the entire IT services market is expected to grow at a CAGR of 8.6%, with Cloud Services growth at 28.9% and Custom Application Development growing at 19.2%, reaching 105.9 billion rands 2023. The market is still undergoing digital transformation. Digital transformation is more than just digitising operations; it also challenges the way businesses operate. The modernisation of IT

infrastructure is also vital for the growth of the IT services sector (Jacobs, 2018). As the traditional South African datacentre or managed hosting industry and IT outsourcing industry decline and the IT skills gap widens, organisations turn to IT suppliers for technical digital IT services. According to secondary data and literature, the South African IT services market is appealing since it grows faster than inflation. Cloud services are becoming more popular, and outsourced IT services are in higher demand. On the other hand, what is causing a fall in traditional South African datacentre/managed hosting and IT outsourcing businesses, and what is the impact of cloud computing growth?

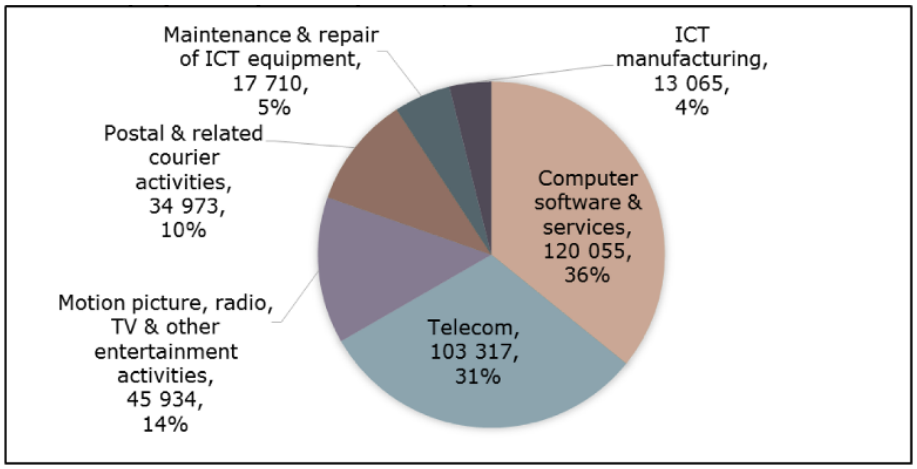
Even though cloud computing services offer significant benefits to both consumers and enterprises, numerous issues have harmed public faith in the technology and harmed cloud computing's competitiveness. The public's lack of trust in cloud computing technology develops concerns about data security and privacy, as well as the lack of control over data in this environment. At the same time, competition issues hinder the expansion of the cloud computing market because they risk creating a digital monopoly, limiting the entry of new local cloud service providers (Mohlameane & Ruxwana, 2020).

2.4 Cloud computing IT budgets cost savings translate into technology innovation that leads to enterprise advancement and job creation

As globalisation extended and deepened, manufacturing in China grew quickly, but only innovation can keep the industry current and improve its global competitiveness. The impact of innovation performance, manufacturing capability, and vertical specialisation on innovativeness in China's electronics, Zhao, Song and Li (2018) study further merged global value chains (GVCs) and national value chains (NVCs) in an integrated hypothesis and used a structural decomposition analysis (SDA) to investigate how innovation capability, manufacturing capability, and vertical specialisation affected innovation performance from the supply and demand sides by examining the impacts of electronic business of China. Significant regional variation in innovation inputs and results was identified in the research. Even though most of China's regions continued to participate in processing commerce or assembly manufacturing in GVCs, NVCs are gradually growing and being led by China's coastal areas. The data revealed that coastal areas had a good chance of producing inventive people. On the supply side, the research found that proactiveness has a favourable impact on innovation success, production output in coastal areas was increasing, and domestic demand for domestic products is growing. In terms

of market value, innovation capability remained positive, production capacity was fast improving, and imported intermediate inputs boosted performance outcomes more efficiently than local intermediate production factors (Zhao et al., 2018).

Figure 6: ICT employment by industry sector, Q3 2015



Source: (StatsSA, 2015).

In the third quarter of 2015, the ICT sector employed 335 000 people, according to Statistics South Africa (2015).

Table 3: Total ICT employment for the ICT Sector, 2021.

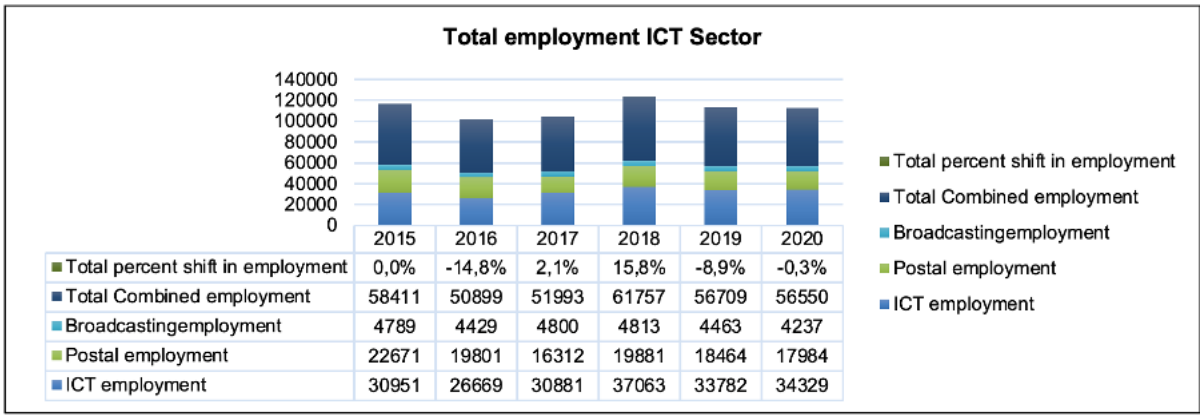
Sub-Sector Year	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**
ICT employment	30951	26669	30881	37063	33782	34329
Postal employment	22671	19801	16312	19881	18464	17984
Broad casting employment	4789	4429	4800	4813	4463	4237
Total Combined employment	58411	50899	51993	61757	56709	56550
Total percent shift in employment	0,0%	-14,8%	2,1%	15,8%	-8,9%	-0,3%

Source: (The Independent Communications Authority of South Africa [ICASA], 2021).

The overall number of individuals working in the ICT industry declined by 8.2 percent in 2019. The telecommunications sector lost 8.9 percent of total of its employees, while the

postal business lost 7.1% and the broadcasting sector lost 7.3 percent. Over five years, employment in the industry declined by 0.7 per cent. Telecommunications employment climbed by 2.2 per cent, broadcasting employment rose by 1.8 per cent, while postal service employment continued to decline by 5 per cent during the same period (ICASA, 2020).

Figure 7: Total ICT employment for the ICT Sector, 2021.



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Source: (ICASA, 2021).

The number of jobs in the ICT business is expected to fall by 0.3 percent by 2020. Telecommunications employment has increased by 1.6 percent, while broadcasting employment has declined by 2.6 percent and postal employment has decreased by 5.1 percent. Employment decreased by 0.6% throughout the six years. Employment with telecommunications increased by 2,1 per cent, employment with broadcasting decreased by 4,5%, and job opportunities decreased by 2,4 per cent during the same period (ICASA, 2021). According to the 2019 Joburg Centre for Software Engineering and Institute of Information Technology Professionals South Africa (JCSE-IITPSA) ICT Skills Survey conducted by Schofield and Dwolatzky (2019), both organisations and individuals know that skills and employment enter unknown territory. Because developing skills in the quantities and levels required will take several years, all stakeholders must address future talent shortages as soon as possible. On the other hand, traditional IT skills are in high demand and will remain for the foreseeable future. The increased intensity of corporate venturing operations provides an excellent opportunity for organisations to reconsider their innovation and financing processes. Even though corporate venturing has gotten a lot of

attention in the research world, past studies haven't fully recorded the growth of corporate venturing activities. Corporations struggle to keep up with the rapid speed of technology and market developments. One method for moving beyond internal innovation development is through open innovation (Battistini, Hacklin & Baschera, 2013). Corporate venture capital (CVC) is a type of open innovation in which incumbent firms make minority investments in entrepreneurial ventures to incorporate external expertise. Investing in new businesses, for example, may be a means to research new technologies and markets, or to develop internal exploitative abilities, making CVC a potential choice for ambidexterity initiatives (Pinkow & Iversen, 2020).

The advent of new and creative technologies continues to pressure businesses, ensuring that the digital skills gap does not close. Is the Human Resources department using strategic foresight to predict future job requirements, as cloud computing advocates? Non-technological elements such as local and international politics, regional labour rate growth, and local societal challenges such as violence and crime have muddied the picture. The provision of work possibilities for the newly skilled is just as crucial as developing the skills pipeline. It will be difficult for the private sector to stimulate jobs and other value-added economic prospects without some central government rethinking the economy. There are examples of employment creation that, like educational programmes, provide hope for the future (Schofield & Dwolatzky, 2021). South African firms are increasingly open to utilizing current digital technology to innovate, remain competitive, and even confront incumbents. The cloud computing business model enables companies to save money by cutting the costs of business processes and IT services (phoenixNAP, 2018).

Businesses can reduce their IT costs by shifting to the Cloud because of the benefits of cloud computing. In today's economic climate, it's widely assumed that if businesses want to maintain a competitive advantage, they must innovate to fulfil complex market demands while delivering supplies, services, or solutions. Organizations, on the other side, often do not have the resources needed to meet market demands, such as great brains, technology, and know-how. Organizations typically use collaborative concepts with other commercial partners, public organisations, and development centres, such as the open innovation model, to overcome this constraint. Companies are still cautious to take advantage of such opportunities due to a scarcity of collaboration-supporting models (Nunes & Abreu, 2020). The question is whether the cost reductions that the businesses

derive from cloud translate into technological innovation and financial profitability, allowing these enterprises to expand and create new jobs? The ICT sector's economic development has been decreasing. While the telecommunications subsector has thrived, the other sectors of the economy have struggled to meet expectations. According to employee data, the labour market has remained flat, with only a 1% growth between 2018 and 2019 (Schofield & Dwolatzky, 2021).

2.5 Human resource's function using strategic foresight to plan for future job requirements due to cloud computing digital or 4IR skills requirement

Nath and Goswami (2018) study emphasise that not only has India's services trade with the rest of the globe grown significantly, but it also had become a leading exporter of services. Their research calculated and analysed several comparative advantage (CA) metrics using yearly exports and imports data for ten disaggregated service categories from 2000 to 2013. For the whole study period, India had a CA in computing and information services, as well as other professional services, which comprise a wide spectrum of information demanding services, according to the report. Together, these two service segments accounted for about two-thirds of India's total professional services exports, along with an alternative CA assessment that took intra-industry trade into account, India appeared to have a competitive advantage over the rest of the globe in a variety of services, including tourism, telecommunication, and social, and associated services (Nath & Goswami, 2018).

Roberts, Gordon, Struwig, Bohler-Muller and Gastrow (2021) research has shed light on how automation resulting from the fourth industrial revolution (4IR) would reshape the industry. Spöttl and Windelband (2021) confirms that work will change, as will consistent automation and production management in real time. The same can be said for work content and human-technology cooperation and communication, both of which have significant implications for ICT users and suppliers. These studies have indicated a rising number of professions and skill sets that are most likely to become obsolete or be replaced by robots soon or over the next decade. Limited roles are more probable in repetitive and regular tasks, whereas specific jobs are more sensitive to automation and entirely replaced by robots. Even though the repercussions of automation in the 4IR is quite well defined, little consideration is devoted to the industry and education sector readiness to meet current 4IR curriculum demand and capacity to deliver candidates or competencies

required to strengthen ensuing economies and technological changes (Mkansi & Landman, 2021).

The 4IR is a name for a complicated set of specified phenomena that focuses on automation and robotics. The phrase alludes to a succession of interrelated technical revolutions such as nanotechnology, quantum computing, artificial intelligence, biotechnology, and human-machine interaction. However, the most visible face of the 4IR is robotics and automation, which has seen the emergence of intelligent machines that have displaced and will replace manual labour in a variety of aspects of life and work. Examples include using robots in the service business, such as automated contact centres, or drones to transport items. Automation and more significant usage of robots might lead to material and non-material improvements in various fields, including education, health, and social services (Roberts, Gordon, Struwig, Bohler-Muller & Gastrov, 2021).

Despite keeping pace with worldwide rivals in the business, South Africa's most significant problem is a lack of ICT skills (Schofield & Dwolatzky, 2021). The ICT sector in South Africa is highly inventive and enterprising, with considerable job creation and export prospects in the coming decade, but a skills shortage is a concern. These problems may indicate that the country's fourth industrial revolution is threatened by developing ICT brain drain and sluggish ICT skills. The government has also spoken out about the country's youth's critical challenges, stating that more must be done to guarantee that South African youth are employable, mainly digital skills. The 2021 JCSE-IITPSA ICT Skills identified that the skills deficit as the single most significant problem confronting the South African ICT sector in the next ten years while reflecting on the sector's main challenges and possibilities in 2021. In addition, new skills that did not exist in the previous decade have emerged, such as in the software design and development fields (Schofield & Dwolatzky, 2021).

According to the World Economic Forum (2020) report on the future of jobs, by 2025, redundant positions will drop from 15.4% to 9% of the workforce, a 6.4 percent reduction, while new professions will grow from 7.8% to 13.5 percent, a 5.7 percent increase in the total employee base of the company responses. According to these projections, by 2025, a change in the division of labour between humans and machines would eliminate 85

million jobs, while 97 million new positions better suited to the new division of labour between humans and machines will emerge across most industries and economies (WEF, 2020). South Africa has seen Microsoft create cloud data centres in Johannesburg and Cape Town, and Amazon establish a presence in the country, all of which provide new chances for our youth to contribute and secure work. The public and commercial sectors must do more to develop and retain talent in the country (Schofield & Dwolatzky, 2021).

The most recent crime figures, which cover the first quarter of fiscal years 2021 and 2022, reveal that crime increased in all but two categories over the time. The great majority of crime categories showed double-digit rises. In comparison to the first quarter of 2020, there was a 66.2 percent rise in murders. The murder rate would have climbed by 6.7 percent compared to the first quarter of 2019. Aggravated robberies, such as carjacking, increased by 92 percent when compared to the previous comparable period. When compared to the same period in 2019 and 2020, this amount would have climbed by 13.1% (South African Police Service, 2021). As South Africa faces continuing instability, there has been a significant surge of experienced workers leaving the nation. The number of migrants leaving the country has risen considerably, with political, criminal, and job security factors cited as reasons; 12.5 percent of those who left travelled to Australia, 12 percent to the United Kingdom, 6.5 percent to the United States, and 4.6 percent to New Zealand (Peter, 2019). Employer perceptions of the ICT skills area are that demand for skills is dropping, but the continued pressure from the introduction of new and creative technologies ensures that the skills gap is not narrowing. Non-technological elements, local and international politics, domestic and global growth rates, and local socioeconomic concerns like violence and crime all muddy the picture. The urgent and constant need to raise the bar in the education pipeline is a common thread, and it is incumbent on the business sector to push the necessary reforms through collaboration with government and growth of existing efforts (Schofield & Dwolatzky, 2019).

The ICT sector in South Africa appears to have adjusted to the problems created by the COVID-19 epidemic and related lockdowns. However, organisations still struggle to fill tens of thousands of positions, resulting in substantial digital skills gaps. Since the outbreak, over 200 ICT professionals have been polled to see how the epidemic and lockdown have affected their working circumstances and their organisations' supply and demand for ICT skills. According to the 2021 JCSE-IITPSA ICT skills survey, over 60% of

employer respondents said the pandemic had had no influence on talent availability, and overall respondent attitude regarding the impact of work-from-home arrangements was favourable. Employees have acclimated to working from home, and many businesses report increased productivity, indicating that this model will likely persist in the long run. According to the poll, there is still a chronic lack of ICT skills to enable local businesses to flourish in the digital economy (Schofield & Dwolatzky, 2021).

How can the South African private and public sectors educate the labour pool to adapt in an era of fast technological change, upheaval, and unpredictability, particularly given that 47 per cent of jobs are already in danger of automation? Even though the 47 per cent danger reflects the situation in the United States, a worldwide view shows that 50 per cent of jobs have the technical capacity to be automated (Manyika, Lund, Chui, Bughin, Woetzel, Batra, Ko & Sanghvi, 2017). This view is supported by multinational ICT businesses stressing the rate of automation in the twentieth century compared to prior periods. Their statement highlights Africa's economic problems, the possible automation impact on the private and public sectors, and the workforce necessary to meet present challenges and future 4IR needs (Mkansi & Landman, 2021). The South African government has taken a notably positive stance on the 4IR, emphasising the essential technological paradigm shift's advantages to quality of life. The 4IR is viewed as an amplifier of human growth, enhancing individual liberties and possibilities. Intelligent robotics has been highlighted as having the potential to benefit the government's social progress goal in various areas, including healthcare, industrial production, and technology. A 30-person presidential advisory commission on the 4IR was created in September 2019 and tasked with developing a national strategic plan to position the country to gain from the revolution. The program aims to define priority actions that will capitalise on rapid technology progress to maximise human growth (Roberts et al., 2021).

There is already a significant unemployment rate in Africa and a shortage of infrastructure and inadequate equipment to support the essential skills in demand in the 4IR. South Africa also need a group of leaders with the savvy and guts to effect the required transformation. This need includes executives with a global perspective, ethics, innovation, communication, and implementation skills. In truth, most African nations lag the rest of the globe in terms of 4IR uptake. However, the continent is fortunate because it has a window of time during which it may learn and adapt because of the errors and

triumphs of developed economies. This is mainly because most emerging economies are still catching up, whereas more developed economies are more susceptible to automation (Mkansi & Landman, 2021).

2.6 Implications of business operations offshoring

Subcontracting, also known as outsourcing, is the practice of receiving input from a third-party vendor, who may be located in the same city as the subcontracting business or another worldwide community (Forte & Ribeiro, 2020). Offshoring, on the other hand, is characterised by its worldwide nature and the usage of components manufactured elsewhere, which frequently sparks more heated debates, both in terms of policies and in terms of economic studies. Offshoring, which is typically connected with outsourcing in the academia, is emphasized here, and is often defined as transnational fragmentation, vertical specialisation, and global outsourcing (Forte & Ribeiro, 2020). Offshoring is generally motivated by cost savings, according to empirical research, and this is especially true in the manufacturing business, where offshoring has been found to hurt lower-skilled or regular positions. In contrast, the main difference between high and low technology industries is the types of offshored labour roles and the affected domestic jobs (Bramucci, Cirillo, Evangelista & Guarascio, 2021).

While it is not new, offshoring in international company operations has grown in relevance, with politicians frequently debating it, particularly in economically advanced nations, where the issue of inadequate job creation adds to job migration. Even though more detailed research has been undertaken, studies continue to give relatively disparate perspectives on the influence on employment in domestic nations (Forte & Ribeiro, 2020). Forte and Ribeiro (2020) further advocate that given the growing popularity of offshoring or foreign supply, it is critical to understand why so many organisations are increasingly using this strategy, especially to know and verify the consequences of its internal labour market. The negative impacts of offshoring on employment concentrates among professionals and artisans in high technology sectors. Consequently, it seeks to strengthen the company's competitive position in its markets. A mirrorlike pattern emerges when employment losses are observed among manual labour in low-technology industries (Bramucci et al., 2021). Shifting activities from one country to another, whether through outsourcing or foreign direct investment, causes changes in the labour market from the beginning. Furthermore, the common assumption that new technology, external competition, and output offshoring,

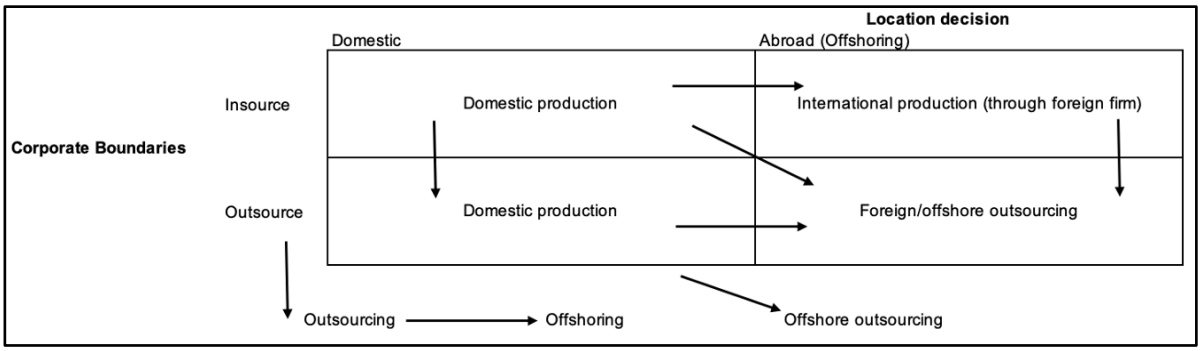
particularly in the United States and other developed economies, are to blame for structural changes in the labour market, particularly in manufacturing, where nearly six million jobs were lost between 2000 and 2010 (Forte & Ribeiro, 2020).

The usage of offshoring appeared to lead to higher employment in the country they studied, though with a minor influence and with a positive and statistically significant relationship with labour demand. The positive association between offshore and employment contends that due to increased sales due to offshoring productivity gains, the number of jobs generated outnumbers the number of jobs lost due to the relocation of some manufacturing operations abroad. Beginning with the unfavourable notion that offshore is one of the causes of rising job loss owing to relocation abroad, offshoring is a chance to nurture and expand firm competitiveness. Offshoring resulted in the creation of more jobs than the number of jobs transferred to foreign countries. As a result, offshoring is critical. However, the study focuses exclusively on manufacturing and excludes the services industry (Forte & Ribeiro, 2020).

Outsourcing is transferring internal business processes to third-party providers, has grown in popularity (Drahokoupil & Fabo, 2018). Technological improvements have assisted this dispersion. Such developments have also permitted the further splintering of labour practices into operations that may later be outsourced or moved in location, involving across borders. In addition, recent ICT developments have cleared the door for online outsourcing platforms such as crowdsourcing and freelancing on-demand services. These developments appear to lead to a new level of outsourcing because such platforms offer direct access to the workforce rather than dependent on subcontractors like conventional outsourcing. Transferring work across company lines and locations has several reasons, including cutting labour expenses by lowering compensation, increasing job intensity, and pushing flexibility costs onto employees. However, by avoiding labour market rules and employee representation organisations, which are territorial in nature and generally constrained by the firm's boundaries, these acts usually result in the deconstruction of the employment relationship. As a result, any shifts in organisational jurisdiction and location will almost likely have an influence on work, conditions for workers, and employment relations in the source or destination country (Drahokoupil & Fabo, 2018).

Outsourcing and offshoring are two terms for a range of similar but separate practises that involve reorganising work and relocating activities across company boundaries and outside of the country. Outsourcing is linked to a few different forms of corporate reorganisation. On the one hand, a merged company may opt to spin off operations that are entirely unrelated to its other lines of activity. A global firm may also choose to supply markets in certain countries through independent resellers (Drahokoupil & Fabo, 2018). The term "strategic outsourcing" refers to outsourcing primary value creation operations inside core business sectors. Unbundling business support functions such as customer service, accounting, and information technology is one example. Outsourcing may also refer to enlisting the help of workers hired through labour market agents or the self-employed to complete fundamental tasks. This is where outsourcing is most likely to have a direct influence on working conditions and employment relations, and outsourcing is frequently driven by a desire to avoid labour market institutions and save money by decreasing the quality of working conditions (Drahokoupil & Fabo, 2018).

Figure 8: Outsourcing and offshoring.



Source: (Drahokoupil & Fabo, 2018).

Outsourcing is the process of contracting out internal activities to vendors in the same country, on the same industrial site, or even in a different country (Drahokoupil Fabo, 2018). Even if the foreign suppliers are part of the same organisation as the outsourcer, offshoring refers to moving activities to other lower-cost countries. The efficacy of current worker representation mechanisms, collective bargaining institutions, and workers' capacity to affect their working circumstances are all impacted by outsourcing and offshoring. Offshoring is a step up from outsourcing in that it entails a move to a new

regulatory environment as well as the relocation of activities and people outside the scope of company-level labour relations organisations (Drahokoupil & Fabo, 2018). In addition to the theoretical expectation that trade will enhance the relative salaries of highly trained employees, the authors state that the consequences of offshoring or offshore outsourcing on employment, inequality, and productivity have been extensively studied. Unemployment causes huge income loss for those directly affected by offshoring. Martínez- and Lucas (2019) disclosed that offshoring is a frequently utilised cost-cutting, productivity-boosting, and flexibility-enhancing strategy. As a result, it strives to strengthen the company's competitive position in its marketplace.

As per Agrawal et al. (2019), offshoring services is growing more common among American businesses; offshoring has recently expanded to include more complicated and advanced processes like Research & development activities, engineering, and product development. There has been few empirical research on the causes of outsourcing in the ICT industry. The service sector, which now accounts for a significant portion of global trade output, has frequently been disregarded in conceptual approaches describing globalisation (Agrawal et al., 2019). For organisations to attain size and efficiency, traditional offshoring techniques were created. Faced with this globalisation, enterprises' demand to survive and produce investment profit has risen unabated. Many IT firms, such as hyper-scale cloud computing providers, have taken outsourcing to accommodate this request. In Prague, China, Poland, and India, economic liberalisation has strengthened the attraction for outsourcing IT through the emergence of low-cost supply chains. New resources, such as an abundance of cheaper IT skills and expertise, also helped offshore (Agrawal et al., 2019).

The authors further postulate that the model helps the offshoring business cut its fixed costs and convert them to variable costs, a significant economic benefit frequently noted by sellers and purchasers of this strategy. In particular, the outsourcing organisation can save money on fixed expenditures such as premises, equipment, ICT, human salaries, and other administrative costs. To enhance a company's cash flow, companies acquire greater financial flexibility by selling previously employed assets in outsourced services (Agrawal et al., 2019). According to industry leaders who have faced the harsh realities of offshore, offshoring has not provided the promised revenues for specific firms. The costs are associated with the complexity of coordination caused by environmental

dynamism and the environment's volatility, unpredictability, and uncertainty at dispersed offshore sites (Agrawal et al., 2019). Offshoring presents several potential risks, including reliability for external service providers, hidden offshoring costs, decreasing permanent employee morals due to fallen employees' standards, problems in IT management, loss of critical skills, and the loss of essential skills (Agrawal et al., 2019).

Offshoring, according to Hummels, Munch and Xiang (2018), is separate from similar ideas such as outsourcing, global corporate operations, and import competition. Offshoring might be confused with outsourcing, which implies the production of certain functions by dismantling them organisationally. Domestic outsourcing and offshoring, on the other hand, can be done by linked partners within the same global corporation. Offshoring, according to the authors, is the act of changing the geographic assignment of the mix of jobs required to produce a single end item or service. Traditionally, design, part manufacture, and assembling were all done in the same site; however, component fabrication and assembly can now be done in separate locations. Over time, outsourcing increases the relative level of human capital within industries, according to the authors. These outcomes support the theory that offshoring permits countries to specialise in sectors based on factor abundance. Offshoring has a major influence on salaries and employment, according to the study's second wave (Hummels et al., 2018).

2.7 Conclusion

The initial literature review discussed the literature on cloud computing, outsourcing, and offshoring business functions. It also unpacked the definition of cloud computing and its benefits before closing with the chosen theoretical viewpoints and their application to how cloud computing has changed the face of the South African ICT sector. The subsequent discussion focused on the impact of cloud computing on South Africa's existing data centre and ICT business functions outsourcing. Then provided a determination on whether freed-up ICT budgets resulting from cloud computing cost savings translate into technological innovation, company growth, and ultimately job creation. Eventually, we discussed whether the Human Resources function uses strategic foresight to understand organisational skills requirements as advocated by cloud computing before discussing the implications of business operations offshoring.

In conclusion, the literature findings revealed that some interventions might be relevant to address the impact of cloud computing on the South African ICT industry due to ICT functions offshoring. The most notable is transforming the traditional hosting, data centre business, maybe due to the country's lack of digital ICT or 4IR skills. However, based on the literature review results, it can be stated that these studies are insufficient to give a compelling insight into how the offshoring of ICT functions owing to cloud computing impacts the South African ICT sector. Furthermore, the discussion point is whether these findings are adequate to address how cloud computing has changed the face of South Africa's ICT industry. The next chapter delves into the research questions developed from this review of the literature.

3. RESEARCH QUESTIONS

3.1 Introduction

This chapter contains the research questions that will form the basis of this research. These questions will investigate the impact of cloud computing on the South African Information and Communications Technology (ICT) business due to ICT functions offshoring. The critical study question is: How has cloud computing changed the landscape of South Africa's ICT industry? The literature study in chapter two aided in the formulation of these queries. The study's goal was to answer the following research questions to tackle a real-world problem:

3.2 Research question 1

i. What effect does cloud computing have on South Africa's existing data centre and IT outsourcing services business?

Cloud computing is a significant driver of South Africa's digital revolution. It is a revolutionary delivery approach of information technology services based on a flexible and on-demand business model. Companies that supply these computing services are known as cloud service providers, and cloud computing services are generally charged based on consumption, similar to how utility services are invoiced (Bayramusta & Nasir, 2016; Schofield & Dwolatzky, 2021).

3.3 Research question 2

ii. Do these spare IT budgets due to cloud computing cost savings translate into technology innovation that allows enterprise advancement, which could yield financial returns that translate into job creation?

Cloud computing services are increasingly being adopted by organisations all around the world, including South Africa. According to the literature, companies use them because they provide efficient and cost-effective solutions. Cloud computing offers valuable tools for enterprises to run more effectively and enhance their ICT processes (Mosweu et al., 2019).

3.4 Research question 3

iii. How does the human resource's function use strategic foresight to understand and plan for future jobs requirements due to cloud computing?

Despite extensive study into the relationship between technology and the changing labour landscape, there are rising concerns about the advent of automation and its influence on

the employment market. The focus of research has been on jobs that are most likely to be affected by automation in the 4IR age. There have been minimal number, if any, of studies on the South African ICT industry's readiness to fulfil current and future demand demands and the capacities of labour force skill set that support market and technological developments (Mkansi & Landman, 2021).

3.5 Research question 4

iv. How has cloud computing transformed the face of the ICT industry in South Africa due to ICT operations offshoring?

The way cloud computing grows puts a strain on how stakeholders must approach skill development. For example, cloud computing has progressed to the point where, instead of installing programs on specific equipment, cloud computing now employs a new form of technology known as containers, which allows the distribution of applications on any infrastructure. Individuals with the ability to create and deploy such technologies are in great demand and are frequently sought by South African firms and worldwide corporations. The use of cloud computing services raises legal and regulatory issues all over the world, especially in terms of data security and privacy, among other issues. Problems have been expressed regarding whether South Africa's ICT legislation and regulatory frameworks are adequate to address the country's growing cloud computing regulatory concerns. As a result, a study is needed to see how applicable existing legal frameworks are to cloud computing, as well as the issues that come with it (Mohlameane & Ruxwana, 2020; Schofield & Dwolatzky, 2021).

3.6 Conclusion

The first part of the research used the quantitative approach, which included reviewing and analysing the quantitative data from reputable secondary data providers to answer research question number one. The subsequent qualitative technique led to the research questions, as highlighted in this chapter. The answers to these questions were analysed to understand better the impact of cloud computing on the South African ICT sector due to offshoring ICT functions. The next chapter addresses the issues presented by the study's selection methodology.

4. RESEARCH METHODOLOGY

4.1 Introduction

The impact of cloud computing on the South African Information and Communications Technology (ICT) industry due to ICT operations offshoring were investigated using a multimethod qualitative technique. This chapter discusses the method and other components of the research design. The population, sampling technique, size, measuring device, data collection procedure, and analytic strategy were all chosen to support the research's robustness. Each of them was covered, as well as the quality control procedure and the identification of the research's limits (Denzin & Lincoln, 2018; Saunders, Lewis & Thornhill, 2019).

4.2 Purpose of research design

Qualitative research assisted the researcher in gaining a better understanding of how people interpret their experiences to explain their actions and adequately answer the study questions. A reliable qualitative research technique fosters collaboration between academia and practice in business and management, which is precisely what this study aimed to do (Saunders et al., 2019). The following section discusses the methodology and research. The population, unit of analysis, sampling procedure, and size are all included in the scope. Section 4.9 explains the data gathering process and the method used. Section 4.10 contains a detailed analysis of the data. Section 4.11 discusses ethical compliance and section 12 discussed ways to ensure data integrity, reliability. Sections 4.13 and 4.14 discuss the quality controls and limits of this study strategy, respectively.

4.3 Research methodology and design

The study design, sampling, and data analysis were all done with an interpretative mindset to answer the research questions. An inductive method was utilised to get a better understanding of present theoretical ideas. The qualitative research technique was the most appropriate way of investigating the complicated cloud computing phenomenon and its impact on the South African ICT sector. The method attempts to uncover individuals' ideas and feelings deeper than a quantitative approach can reveal (Saunders & Lewis, 2018).

To investigate research question one: what effect does cloud computing have on South Africa's existing data centre and ICT outsourcing services business? The researcher

utilised the quantitative research method. Because they are well-known and recognized, provide thought leadership, and are credible, the researcher gathered information from a few institutions that give statistics on the sector. The data examination was conducted to see if there was a link between cloud computing and how the ICT industry in South Africa has developed. The research addressed a few questions, the most important of which is to see the impact cloud computing has on South Africa's existing data canter and ICT outsourcing services businesses. The following are the three additional research questions:

- Do these spare IT budgets due to cloud computing cost savings translate into technology innovation that allows enterprise advancement, which could yield financial returns that translate into job creation?
- How does the human resource's function use strategic foresight to understand and plan for future jobs requirements due to cloud computing?
- How has cloud computing transformed the face of the ICT industry in South Africa due to ICT operations offshoring?

This study was critical to understand human ideas, perspectives, and experiences surrounding the phenomenon under investigation (Dawadi, Shrestha & Giri, 2021). As a result, it was critical to grasp participants' perspectives on how cloud computing has changed the face of the South African ICT sector in the last seven years. From an epistemological standpoint, interpretivism philosophy was used in the study to understand and comprehend the significance of reality's nature (Denzin & Lincoln, 2018; Neubauer, Witkop & Lara, 2019).

4.4 Research Strategy

A phenomenological research design was used in the study strategy. Phenomenological investigation and inquiry are frequently defined as returning to what is essential in lived or transcendent experience. The phenomenon or event that manifests itself in lived experience is what emerges in awareness. And the importance of the lived experience concept is that it allows us to address the fundamental phenomenological inquiry (Van Manen, 2017). To give an in-depth knowledge of the phenomena under examination, the study used a multi-method qualitative research methodology (Creswell, 2015; Saunders et al., 2019). The qualitative research method stresses observation and interpretation as

data collection methods to learn about the respondents' daily lives. An interpretivism position was determined to be best appropriate for this study's objective since it allows for the focus on new, nuanced, and detailed descriptions of the phenomena, as it was concretely lived (Dawadi et al., 2021). This approach leads to a better understanding of people's reactions to circumstances beyond their control (Van Manen, 2017; Denzin & Lincoln, 2018; Saunders et al., 2019).

The challenge of the phenomenological research design is going from meaning to text and not getting from text to meaning. Until we ask the phenomenological inquiry, “What is this phenomenon of experience like?” there is nothing vibrant, deep, secret, or strange about the incarnation of the lived experience. The phenomenality of the phenomenon thus challenged us. Because phenomenology is the study of experience as lived rather than the meaning of concepts, words, or texts, the chosen research method allowed the researcher to understand the rich, deep, hidden, lived experience of the respondents and unpack the research subject in detail. The research technique also allowed the study’s findings to be applied to the population and answers the research questions (Van Manen, 2017). According to Esser and Vliegenthart (2017) in order for research articles to contribute to knowledge creation and theory, they should all have the same study purpose, deal with the same issue, use the same research methodologies, and pick the same academic emphasis.

Due to the Covid-19 pandemic and lockdowns, information gathering used the multimethod data collection. To give solid intellectual foundations on the issue, this strategy includes virtual semi-structured interviews, an interview schedule with a chosen group of ICT industry specialists and experts, ICT HR experts, and current scholarly literature. The researcher was able to gain insights and learn from the individuals through conducting interviews and observing them (Park & Park, 2016).

4.5 Population

The target population denotes to the whole subset of the people or elements relevant to the study issue as their knowledge of the topic of interest, access to details, availability of subjects, and time frame, are all practical considerations that influenced this study (Hair, Page & Brunsveld, 2020). The purposeful and snowballing sampling approach was employed, and the selection criteria required participants to have a basic or expert

understanding of cloud computing and the ICT sector. The criteria also required participants to have held senior positions (Chief Information Officers (CIO), Chief Technology Officers (CTO), ICT Industry Specialists, ICT Consultants, ICT heads, Human Resources (HR) heads, or HR Business Partners) in the ICT sector. The interview sample was selected using the following criteria:

- Individuals were ICT and HR experts with at least seven years of experience
- Were in or previously management position
- Held a diploma or bachelor's qualification, and
- Were an ICT business owner and has previously worked in government, banking and finance, a prominent South African ICT firm, or a professional services provider (i.e., EY, EOH, Dimension Data, Gijima, BCX, IBM, etc. Vodacom, MTN and Liquid Telecom).

As a result, this study included 15 participants from various institutions and economic sectors (such as ICT, Government, Banking and Finance). All the participants took part in semi-structured video conferencing interviews. Following the qualitative data analysis, a theme analysis approach was used (Creswell, 2015).

4.6 Units of analysis

The unit of analysis specifies who or what should be analysed and at what level of detail. Correctly selecting the unit of analysis is a crucial stage in the research process, and the research topic determines the unit of analysis. The respective ICT and HR professionals and specialists were the unit of observation in this research. The effect of cloud computing on South African ICT business growth was the study's unit of analysis. The independent variable is the local ICT market size and the industry annual growth rate; the researcher used these parameters as lenses to detect the upwards or downwards movements of the South African ICT industry emanating from the influence of cloud computing (Hair et al., 2020).

4.7 Sampling method and size

Some factors go into the purposeful sampling strategy in qualitative research, and these considerations differ depending on the technique. They are the selection on who to choose as research participants, the sort of sampling technique to use, and the sample size investigated. All respondents must have prior knowledge of the phenomena examined. In

qualitative research, the notion of purposeful sampling demands that the researcher chose participants for the study because they may deliberately inform an understanding of the research topic and primary phenomenon. In qualitative research, the sample size is to examine a few people and collect a lot of information on each of them. Qualitative research aims to elucidate the specific rather than generalise the data (Creswell & Poth, 2017).

The convenience purposeful and snowballing sampling techniques were employed to choose the study subjects. The screening verified if the participants matched the population requirements specified in section 4.5. Additional screening questions were utilised to check that the participants had prior knowledge of the researched phenomena and better appreciated the research topic (Creswell & Poth, 2017; Saunders et al., 2019).

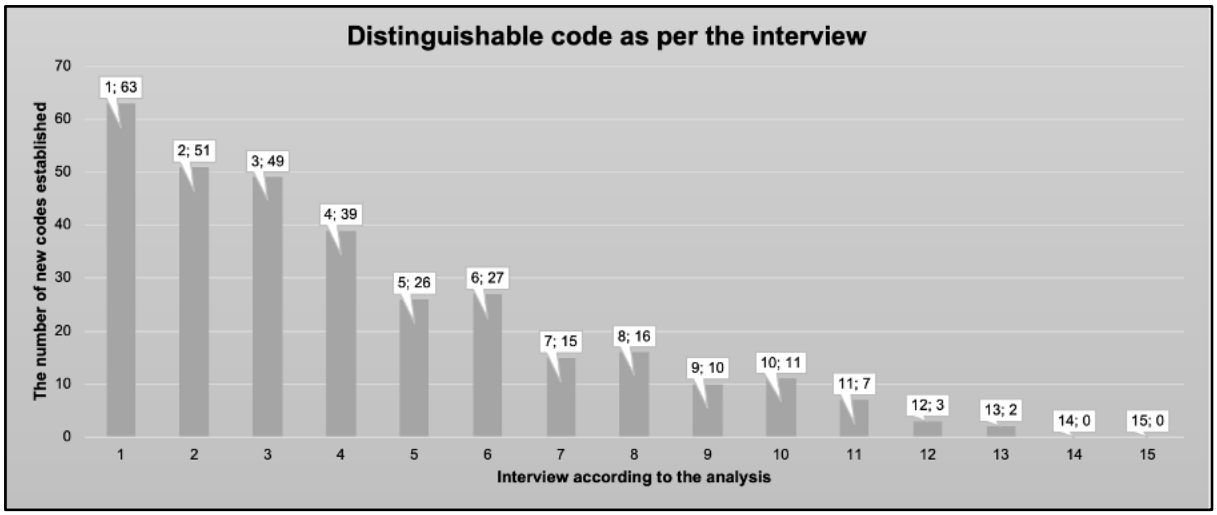
- How many years and months have you worked in the ICT field?
- What is your academic qualification?
- How has cloud computing changed your work? And what are the primary advantages and disadvantages you can share?

The researcher chose a sample of 15 participants from a homogenous population. The sample was based on the participants' seniority, duration of experience, and job function. Because of previous business encounters, the researcher had personal relationships with some of the target audience, making the sampling technique convenient. As a result, this study included 15 participants from various institutions, and economic sectors (such as ICT, Government, Banking and Finance). The fourteen of the participants were from the Gauteng province in South Africa and one person from Gaborone in Botswana. All the participants took part in semi-structured video conferencing interviews. Before participating in the discussion, the respondents were given informed consent letters, which they were asked to accept and sign.

The first part of the research used the quantitative method, which included reviewing and analysing the quantitative data and literature from reputable secondary data providers. To answer the research question, during the qualitative phase of the study, the researcher endeavoured to extract as much data from the interviews up until the data saturation was achieved (Saunders & Lewis, 2018; Hair et al., 2020). When performing the analysis after interview 15, Figure 9 displays distinguishing code as per the interview. the analysis after

interview 15, Figure 9 displays distinguishing code as per the interview. After interview analysis number 13, the saturation point was achieved; in other words, no new themes were discovered. 80 percent of the total unique codes were created during the examination of the first six interview analysis. The data was effectively analysed using a theme analysis technique (Creswell, 2015).

Figure 9: Distinguishable code as per the interview



4.8 Measurement instrument

The data was gathered through a multimethod approach that included virtual semi-structured interviews, a schedule of interviews with a select group of ICT industry specialists and ICT experts, ICT HR experts, and existing scholarly literature to provide solid intellectual foundations on the subject. Since semi-structured interviews are effective in exploratory research, the discussions and the researcher served as study measuring tools. The semi-structured interviews served as a measurement tool since they were used to determine how cloud computing has changed the face of the ICT sector in South Africa. The researcher also served as a measurement instrument since he might detect any extra information throughout the interview and recollect it afterwards when analysing the discussion (Saunders et al., 2019). Because of the Covid-19 outbreak and lockdowns, the 15 participants were interviewed online using simple video conferencing services (Microsoft Teams, Google Meet or Zoom). The researcher could get insights and learn from the individuals by interviewing and observing (J. Park & M. Park, 2016).

These interviews ranged in length from 33 to 77 minutes. The interview schedule was guided by the literature study, which included themes to be addressed and questions to be asked. Appendix B contains the interview schedule. Thus, preparation was critical to guarantee the interview's flow and content authenticity. To ensure the success of the interview sessions, the technical infrastructure utilised to collect and record the online discussions were tested ahead of time. It was critical that the participants were at ease and that there were no interruptions throughout the interview. Before taking part in the discussion, respondents were asked to provide permission to record the meeting and were given informed consent letters to accept and sign (Saunders et al., 2019).

4.9 Data gathering process

The interview's objective was for the inquirer and participants to exchange information and establish rapport. The semi-structured interviews allowed for more flexibility in how questions were presented, allowing for cooperative, two-way dialogues that generated more data, and were excellent for data collection because the questions were also open-ended (Saunders et al., 2019). As a data collection tool, an interview schedule (see Appendix B) was used. The researcher used a quantitative data approach from credible and trusted secondary data suppliers to explore research question one: what effect can cloud computing have on South Africa's existing data centre and ICT outsourced services business? And to better understand the research issue, the researcher obtained information from these organisations to gather valuable statistics on the ICT industry since they are well-known and acknowledged, provide thought leadership, and are reputable. This combination provided the researcher with new views on the problem and novel approaches to understanding it (Creswell, 2015).

These interviews ranged in length from 33 to 77 minutes. The interview schedule was guided by the literature study, which included themes to be addressed and questions to be asked. Appendix B contains the interview schedule. Thus, preparation was critical to guarantee the interview's flow and content authenticity. To ensure the success of the interview sessions, the technical infrastructure utilised to collect and record the online discussions were tested ahead of time. It was critical that the participants were at ease and that there were no interruptions throughout the interview. Before taking part in the discussion, respondents were asked to provide permission to record the meeting and were given informed consent letters to accept and sign (Saunders et al., 2019).

The interviews lasted in length between 33 and 77 minutes. To ensure unity with the study objectives and coherence with constructs examined in the literature, an interview schedule with semi-structured questions were established and linked to the research topics (see Appendix A Consistency Matrix). The literature review, which contained themes to be covered and questions to be answered, led the interview schedule. Respondents were requested to offer permission to record the meeting before taking part in the interview. They were given informed consent letters to accept and sign (see Appendix B), which is done to ensure participant anonymity and that the data obtained is used ethically. All handwritten notes and audio recordings were taken during the discussions were electronically backed up and will be stored for ten years (Saunders & Lewis, 2018; Saunders et al., 2019).

To maintain anonymity, no business or participant names appear on this report; instead, respondent names are written as (Participant 1,2,3, etc.). When participants indicated the name of their employer, the names of the firms were changed in the appropriate transcription to "the organisation I work for." Interviews were recorded using audio-recording equipment to ensure that the conversations were kept for the research with each participant's permission. Handwritten notes were taken during each consultation. The participants were questioned following the study questions indicated on the interview schedule (see Appendix A). Each question was explained to the participants to ensure that they grasped the context. Following that, follow-up questions were asked to provide the correct interpretation of the findings. The data were then examined to see if there was a link between cloud computing and the growth of the South African ICT industry. Various additional research problems were addressed (Creswell, 2015; Denzin & Lincoln, 2018; Saunders et al., 2019).

4.10 Data analysis

Content analysis is often employed in mixed methods academic research because it enables the measurement, quantification, and comparison of qualitative data in scalable, quantitative formats (Denzin & Lincoln, 2018). Researchers frequently use coding to assist them in doing qualitative studies. Coding is the process of providing meaningful numerical values or names to material that has been reduced from a large volume of homogeneous text to a smaller number of relevant and representative parts. The goal of coding is to

allow the researcher to focus on the most critical aspects of the data (Saunders et al., 2019).

The researcher utilised a qualitative method to investigate the topic under research. In its basic definition, phenomenology seeks to bring to our attention some experience we had to reflect on and the living significance of that experience (Van Manen, 2017). The researcher converted the data numerically, undergoing twofold analysis, performing content analysis and statistical modelling. They were then followed by searching for internal relationships in our data set, intentionally including complex data in the data mix and structuring the semi-structured interviews data in a suitable format. Data collection and analysis took the lead from literature to ensure data clarity and ongoing refining. The audio recordings of the interviews were transcribed, and the handwritten notes were converted to an electronic format. The interview transcripts and associated notes were entered into the programme for analysing qualitative data ATLAS.ti. According to the researcher's judgement, the interviews were then reassembled in terms of interview validity. The researcher analysed the interviews that he believed were more connected with the substance of the study subject first, and the interviews that he felt were less relevant were done last. The file name now includes both the analysis sequence number and the interview sequence number, owing to the addition of an analysis sequence number as a prefix (Denzin & Lincoln, 2018).

The interviews were rearranged according to apparent validity to improve code assignment throughout the coding process. The number of new unique codes assigned were greater at the start of the study, and as the validity of the interviews decreased, the amount of new unique codes generated decreased as well. It also assisted with ATLAS.ti analysis because the more relevant codes were listed at the top of the list, along with quotations for each code. The category group numbers that were prefixed to the code text resulted in this project being listed at the top of the Atlas.ti project list section. The researcher began by doing a literature study to discover concepts connected to the research topics. The codes for these identified concepts were then created, and the related quotes from the individuals who were questioned were then connected to these codes. The researcher inserted new codes as they appeared rather than pushing data into pre-existing codes. Codes that had already been generated required to be improved when new information was obtained from data that closely matched the codes that had

already been created. To make the coding and data analysis process easier, category groupings were developed to organise the codes in a separate excel file. Each category group was given a number, which was then appended to the code with the category group's sequence number. Table four shows the initial grouping of code categories (Saunders et al., 2019).

Table 4: The initial grouping of code categories.

Number of the initial grouping of code categories	Description
0	The definition and characteristics of Cloud Computing
1	RQ1-The effect cloud computing has on traditional ICT industry
2	RQ2-Cloud computing IT budgets cost savings leads to innovation, enterprise advancement and job creation
3	RQ3-HR function use strategic foresight to plan for digital or 4IR skills requirement
4	RQ4-Implications of business operations offshoring
5	Cloud Computing Benefits
6	Cloud Computing Downsides
7	Methods and Intervention
8	Operating Environment, Regulatory frameworks, and Curriculum Landscape

All interview transcriptions were thoroughly read to understand the major and minor narratives contained in the data. The frequency of repetitions of specific phrases was used to identify themes. Data were coded to organise text portions into essential topics. The data was analysed based on the apparent and related issues (Denzin & Lincoln, 2018; Saunders & Lewis, 2018).

4.10.1 Methodology of Data Analysis

After collecting the data, the researcher analysed and summarised it in an understandable way. The ATLAS.ti qualitative research tool was used to code and analyse transcripts, field notes, create network diagrams, and visualise data to guarantee that important problems were investigated in depth (Hair et al., 2020). The researcher was able to use

the Data Analysis method to incorporate previously unplanned analyses in response to new discoveries. As a result, the practise of looking for new correlations in data that the research was not even originally meant to examine became more formalised. Data from the interviews was analysed using the steps below to conduct a thematic analysis of qualitative data (Saunders et al., 2019). Steps in the process of doing a thematic analysis:

a. Familiarization with data to obtain a deeper grasp of deeper meanings in accordance with the interpretivism philosophy used throughout the research
b. Create coding and analysis of the data codes
c. Look for patterns that emerge from the data's first coding.
d. Using Atlas.ti, review topics and build a thematic map of the analysis.
e. Continue to refine the nuances of each topic via examination.
f. Propose a preliminary solution as well as a proposal.

In the behavioural sciences, thematic analysis is regarded as a helpful and adaptable approach for qualitative research. This method allowed the researcher to look for common themes or patterns in a data collection that included a series of interviews, observations, and the documents that were analysed. Thematic analysis was used in this study to discover themes and patterns relevant to the research topic by categorising qualitative data (Saunders et al., 2019).

4.11 Ethics in Research

Prior to beginning data collection, the researcher acquired ethical approval from the Gordon Institute of Business Science (GIBS) Ethics Committee (see Appendix D). After the procedures had been described and they had been guaranteed of their anonymity, all research participants were asked to complete, approve, and sign a permission form (see Appendix E). All participants' identities were changed to pseudonyms before the findings were reported, preserving anonymity.

4.12 Data integrity and dependability

To be rigorous, qualitative research must be transparent, trustworthy, dependable, comparative, and reflective. While there may be methodological variances in qualitative research, establishing rigour and credibility is essential. A rigorous methodology will assure the legitimacy of the data collection and analysis processes (John W Creswell, 2015). Each interview was given enough time to ensure that participants understood the

questions and that the interviewer could confirm the significance of the comments. To guarantee the credibility of the data generated from interviews, the researcher was mindful of potential interviewer and answer bias and will conduct all the interviews to reduce the possibility of interviewer bias. In an additional effort to minimise interviewer bias, the interviewer was also mindful of tone changes and nonverbal behaviour when participants answered questions. The researcher bias was reduced through meticulous transcription of interviews and a systematic approach to the data analysis. The investigation findings were triangulated within the context of the literature study to confirm the meaning of the most prevalent constructs and themes that emerged from the data analysis (Saunders et al., 2019).

4.13 Quality controls

The quantitative data analysis part of the project used industry reports from 2015 through 2020. After gathering and analysing the qualitative data, the researcher collected phenomenological data and then applied the coding techniques to convert this qualitative data into numbers. As a result of coding, data were linked to and tagged with subjects, topics, and concepts, allowing them to be transformed, structured, and eventually categorized. Most qualitative research categories emerged from the analysis, necessitating human coding (Hair et al., 2020).

In this study, triangulation was the primary strategy for quality control and increasing credibility. This ensures the study's reliability and validity by utilizing a range of ways to gather data on the same issue, including diverse sorts of samples and data collection methods. The researcher will triangulate the information by collecting and analysing quantitative data before utilising the qualitative component of the design to compare, interrelate, and verify the results through interviews. The interpretation of study findings placed a greater focus on both research techniques. ATLAS.ti was employed as a qualitative research tool and content analysis instrument for quality control. To establish coded categories, analyse interview transcripts, gather literature reviews, and develop network diagrams, the researcher used the ATLAS.ti program for thematic content analysis. The researchers' goal was to find a common thread in the interviews (Creswell, 2015; Denzin & Lincoln, 2018; Saunders & Lewis, 2018).

4.13.1 Trustworthiness

The reliability of the research results in a qualitative research study is an essential component of the research's quality. Reliability, replicability, credibility, and validity are the characteristics they use to characterize trustworthiness. By preserving an audit record of the coding and categorisation method, dependability, based on the validity and dependability of the analysis and conclusions, has been strengthened. Validity relates to the extent to which the interpretations or decisions can be believed, whereas reliability refers to the amount to which the observations can be trusted. Quality control processes, standards, and criteria must be adopted from the very beginning of the study process. When control methods, standards, and measures are only considered after the process, the study cannot be redirected or influenced, and the reliability and validity are not improved. Thereby, validity and reliability were considered beginning with the unstructured interview schedule design and continuing through the interviews and analysis stages (Webb & Welsh, 2019). After each interview was validated and when themes were formed, ATLAS.ti data and related documents required to conduct the coding were backed up to Microsoft OneDrive and Apple cloud storage. Each of these cloud storages offers versioning capabilities, which assigns data restoration points with a unique file name that contains timestamps, which aided in the process audit trail. The cloud backup's versioning capabilities were employed to perform the coding, proving when each unique code was produced for the first time (Denzin & Lincoln, 2018).

4.13.2 Validity and reliability

Reliability refers to the consistency with which data collection and analysis procedures and analyses provide consistent findings. Validity is a criterion for determining if the findings are genuinely about what they claim to be. Topic choice, history, assessment, ethics, and uncertainty regarding causality and its direction are all factors that might jeopardize validity. During the study, these variables were rigorously controlled and monitored. The researcher tried not to be influenced by prejudice while selecting the delegates for the interviews. He did not try to flatter the interviewees during the interviews, as examples of steps made to avoid such compromising variables. Subject error, subject prejudice, researcher error, and observer bias are the main variables that might harm the research. These variables were managed by concentrating on the interview and coding stages. The participants were made comfortable with the interview procedure and allowed to think about the questions throughout the interview to reduce topic error and subject bias (Creswell, 2015; Denzin & Lincoln, 2018; Saunders & Lewis, 2018).

The coding was done in a systematic and auditable manner. To support the research quality, the researcher verified that there had been an audit record of the entire procedure. By commenting on every facet of the research, particular emphasis was made on reliability and authenticity. Qualitative research is by its very nature subjective, and the researcher's prejudice can influence it. As a result, throughout the interview schedule creation, the interview questions were reviewed for any discrimination features. To ensure that there was no bias across various interviewees, interview questions were exploratory and open-ended. The participants were allowed to explore the subject throughout the interview rather than be driven by the researcher's predetermined notions (Denzin & Lincoln, 2018; Saunders & Lewis, 2018).

4.13.3 Credibility

The primary technique for improving credibility in this study was triangulation. This guarantees the study's reliability and validity by using various techniques to collect data on the same topic, such as several types of samples and data gathering methods. The researcher was employed as a lens to assess trustworthiness, and he contributed personal biases to the data gathering and coding process. The researcher may have been prejudiced toward specific experiences in the ICT industry during the interviews and coding procedure. The researcher engaged in self-reflection and acknowledged any viewpoints or beliefs that may have tainted the research findings' trustworthiness to counteract this bias. During the interviews process and coding, the researcher did not guide the dialogue or coding away from any information that contradicted his point of view or the pattern detected during the interview (Creswell, 2015; Denzin & Lincoln, 2018; Saunders & Lewis, 2018).

4.13.4 Dependability

The sections above provide evidence of the procedures used during data collection and analysis. This data demonstrates how systematic processes were followed to ensure that the conditions of all the interviews remained comparable and that the coding process was traceable. The auditing that was preserved throughout the whole study process demonstrates the method's thoroughness.

4.13.5 Transferability

The degree to which discoveries may be transferred to different locations, situations, or people has been characterized as transferability. Thick descriptions can increase the transferability of qualitative research. Thick descriptions necessitate using the terminology found in the results chapter to capture the depth, perspective, emotions, and other factors that may be relevant to the point made by a participant during most of the interview. When citing participants in the findings chapter, the researcher provided accounts of sentiments and other backgrounds to increase transferability. The researcher hoped to keep the interview data as rich as possible by doing so. Thanks to the enhanced transferability, the reader can link familiar events with the context provided when the interview findings were presented (Denzin & Lincoln, 2018; Saunders & Lewis, 2018).

4.14 Limitations of Research

The study approach has limits, which are being described in further detail below. The qualitative research method is unstructured and discretionary. The technique aims to provide insights into a specific problem while gaining a deeper grasp of the underlying reasons. A small sample of participants is usually preferred due to the length of the interview. The qualitative research approach is illustrative and non-statistical; the results are frequently inconclusive and cannot be utilised to generate broad generalisations or provide a primary source for definite decision-making (John W Creswell, 2015). Qualitative research aims to provide detailed and illustrative data to understand the various aspects of the issue under examination. As a result, qualitative research focuses on studying and explaining the dynamics of social relationships, which cannot be quantified. Qualitative research looks at the world of meanings, intentions, ambitions, beliefs, attitudes, and values, which is connected to a greater space of interactions, events, and occurrences that can't be limited to the operationalization of factors (Queirós, Faria & Almeida, 2017).

Qualitative studies are challenging to carry out, primarily when employed to evaluate complicated interventions quickly. They necessitate meticulous planning to explain all research components such as the study sample for qualitative, timing, and data analysis strategy. It can be challenging to ensure the excellent quality of the project because the method must comply with its rigour standards. Ultimately, qualitative methods research is time and resource-intensive (Wisdom & Creswell, 2013). While precautions were made to ensure credibility and dependability, it is unavoidable that the reality would impact the study's success and conclusions that the target population participants are required for

the investigation to be successful. Those contacted to partake may lose interest, especially given the lockdowns mandated by the Covid-19 restrictions and mandate. Some individuals may be unwilling to engage because they had a poor experience or did not believe their expertise necessary.

The limits of a phenomenological research strategy are based primarily on interviews. First, the technique is predicated on participants' ability to describe their lived experiences effectively. As a result, the demographic of the study and the specific time range of data collection has a significant effect on the findings and conclusions. This means that to focus on a thorough account of lived experience, the study's scope may overlook influential variables that preceded the experience or concurrent aspects linked with the experience. Many phenomenological studies seek to improve data collection and processing validity and reliability by establishing a scholarly distance between the researcher and the researched (Webb & Welsh, 2019).

Putting aside personal knowledge and preconceptions is necessary to set aside our lived experience favouring the participants' points of view, which can be challenging. Researchers are frequently closely connected in the programs they examine. There are no uniform criteria for determining phenomenological research's legitimacy and reliability. The accuracy of the account of the phenomena is referred to as its credibility. The legality of the study is proven in part using evidence such as participant remarks or quotations from transcripts since comprehensive substantiation from participants gives an insider's perspective. The amount to which another researcher can follow the researcher's analytical conclusions is referred to as dependability. As a result, the researcher has kept a thorough record of the steps in the research process to offer a detailed audit trail describing the phases of data collection and analysis (Webb & Welsh, 2019).

The other operational limitations of the selected technique are the inability to get interviews and, owing to Covid-19, the difficulty in conducting face-to-face interviews, which introduces a new and unfamiliar dynamic. Another danger was not being able to obtain all industry information on time. The additional concern is that over 71% of individuals working in temporarily closed firms are anxious because they are unsure about their future jobs and unwilling to do interviews (BMIT SA, 2019).

4.14.1 Researcher bias

The researcher was employed as a technology professional in the ICT field at the time of the study. The researcher has also worked significantly in the cloud computing sector and has personal and practical knowledge of the technology. The researcher may have been prejudiced toward the ICT industry during the literature review, data collection, and analysis processes. The researcher controlled this bias by utilising the techniques offered by the literature. The researcher also accepts this as a weakness because it might have influenced the interpretation of the data and the outcomes (Saunders & Lewis, 2018; Denzin & Lincoln, 2018).

4.14.2 Researcher's interviewing skills

The researcher conducted the interviews himself and was not highly educated in interviewing techniques, which might have influenced the findings discovered after data analysis. Even though the researcher has over ten years of experience doing customer consultations professionally and has prepared for the interviews by watching video tutorials on how to conduct interviews, inefficiency in conducting interviews might have harmed the study results (Hair et al., 2020).

4.14.3 Participant bias

The study's title may have affected participants during the interviews, causing them to try to explain phenomena they do not have lived experience. This would have resulted in inaccurate data, thus jeopardizing the research's trustworthiness and reputation (Denzin & Lincoln, 2018; Saunders & Lewis, 2018).

4.14.4 Sampling bias

A total of 15 participants were interviewed. Only 14 people in South Africa's Gauteng area and one person in Botswana were questioned. There was no attempt to broaden the scope of the study to include more African countries. As a result, generalizability to all nations will be restricted. The use of purposeful and snowball sampling strategies may have limited the sectors that were sampled. Despite the researcher's efforts to include as many participants as possible from various industries, specific sectors were left out. As a result, generalizability across multiple sectors is restricted.

5. RESULTS

5.1 Introduction

The outcomes of the study questions offered in the third chapter are presented in this chapter. Because of the inductive character of the traditional qualitative content analysis technique, the chapter is presented in this manner. The interview questions were based on the semi-structured interview schedule, which was then linked to the overall research questions obtained from the literature review in the second chapter. The results were analysed utilising inductive technique to create codes that were then classified. The main themes that emerged were then utilised to describe the observations in this section. As shown in appendix C, the inductive method to data analysis yielded 319 unique codes over 15 interviews. This enabled for the recording and documentation of any emerging themes, even if they were unrelated to the study objectives. This method produced a macro picture of the topic under investigation. It also allowed for the emergence of topics that had not been examined or discovered during the literature review. Table five shows the themes that emerged because of the developing categories. The sections of this chapter that follow show how emergent themes were utilised to collect data for this study by connecting them to research questions.

Table 5: Codes were used to create categories, which were then linked to overarching themes.

Overarching Themes	Code Name
T0-1- Cloud computing has influenced the way people do things in a beneficial way.	0-01-Cloud makes life easier
	0-03-The Cloud has changed the way of doing things in a positive way
	0-09-Cloud help businesses to go to market quicker with new products
	0-11-Cloud helps businesses to focus more on their customer needs than on technology
	0-12-Consistency of cloud takes the worry away
	0-17-Cloud allows businesses to focus on their core business
	5-01-Agility benefit of cloud
	5-07-High Availability benefit of cloud
	5-09-Reliability benefit of cloud
	5-12-Cloud is good for entrepreneurs in adjacent industries
	5-17-On demand benefit of cloud

	0-11-Cloud helps businesses to focus more on their customer needs than on tech
T1-2-Cloud computing has given rise to new business models in the ICT sector.	1-01-Customers becoming cleverer in ICT sector due to cloud
	1-03-Customer's cloud adoption due to cloud hyperscalers in country presence
	1-04-Customers demanding new fit for purpose solutions due to cloud
	1-10-Increase in global competition for ICT business
	1-12-Increased cloud adoption due to Covid
	1-14-New business models in ICT sector due to cloud
	1-16-Positive change in traditional ICT business due to cloud
	1-18-Traditional ICT business dying due to cloud
	1-35-Traditional ICT loss of market share due to cloud
	1-49-Cloud has changed the ICT industry from body shopping to service oriented
	1-64-Cloud has changed ICT industry from being IT architecture focused to business
	1-65-Cloud is forcing downstream players to move up the technology value chain
T2-3-Specialization leads to business development and growth.	2-04-Entrepreneur benefit of cloud
	2-05-Fewer people required to do same job due to cloud
	2-06-Innovation benefit due to cloud
	2-13-Not easy to measure whether cloud savings lead to new jobs
	2-14-Not easy to quantify the number of jobs created by cloud
	2-20-Positive enterprise development for start-ups outside the cloud business/ICT industry
	2-21-70% of global employment is sitting at SMEs
	2-22-Cloud eliminated barriers to entry
	2-23-Digital skills specialisation leads to competitive advantage
	2-31-Partnering with Cloud OEMs waters down local ICT business value proposition
	2-35-Specialising helps local ICT firms with new business opportunities
	2-36-Specialising leads to enterprise development
T3-4-As a result of not training and upgrading oneself, one's skills become redundant.	3-01-Automation of repetitive jobs due to cloud
	3-04-Enrichment of skills because of cloud
	3-05-Evolution of skills because of cloud
	3-10-Using foresight to plan for future job requirements
	3-16-Not upskilling yourself makes one skill redundant
	3-21-Skills development has stalled due to Covid
	3-22-Retrenchments due to skills not being relevant anymore
	3-23-Cloud fosters continuous learning
T4-5-The adoption of cloud computing results in	4-6-Cloud adoption leads to job downsizing and retrenchments
	4-10-Cloud skills are offshored to places where labour and skills are cheaper

employment reductions and retrenchments.	4-16-Firms lacks appetite to develop cloud skills due to cost and time constraints
	4-18-Having cloud skills in country allows country to differentiate
	4-35-Negative side of offshoring all ICT functions
	4-41-Positive sides of shared ICT functions offshoring
	4-46-Lack of skills are the reason ZA don't have cloud centre of excellence
	4-51-South Africa has an advantage to be competitive in building offshoring capabilities

5.2 A description and inclusion criteria of the sample

The sample was made up of 15 people from a similar demographic. The participants' seniority, experience, and job function were used to obtain the sample. The sampling technique was convenient because the researcher had personal contacts with part of the target audience. These participants were from a variety of institutions and economic sectors, including ICT, government, banking, and finance. Fourteen of the participants were from South Africa's Gauteng area, and one from Botswana's Gaborone. The details of the interviews, as well as the reason for their inclusion in the sample, are listed in table six. The identities of the participants have been changed to protect the privacy of the participants.

Table 6: A description and inclusion criteria of the Participants.

Analysis Number	Name	Gender	Position	Industry	Location	Inclusion criteria
2	Participant 1	Male	Banking & Finance IT Head	Private	South Africa	An IT Director with a BCom in Information Systems and over 21 years of experience in ICT working for companies in a variety of industries including telecommunications, banking, and finance.
10	Participant 2	Male	ICT Industry Specialist	Agnostic	South Africa	A management expert and ICT industry commentator with extensive experience managing small and medium businesses in a range of industries. Activist in promoting the expansion of the ICT sector in developing economies by representing industry constituents on a national and international level.

14	Participant 3	Female	ICT HR Expert	Private	South Africa	Industrial psychologist with a master's degree in arts and sciences. Responsible for all aspects of human resources for ICT companies and other industries, as well as leading human resources departments.
7	Participant 4	Male	Government IT Head	Public	South Africa	An applications management senior manager with a diploma in project management and over 23 years of experience in ICT, including 19 years in the public sector and working with organisations in several industries, including insurance.
1	Participant 5	Male	ICT CIO	Private	South Africa	With a BSc in electrical engineering and over 21 years of experience as a CEO, CIO, CTO, and COO for ICT organisations, he is currently an ICT Managing Director.
13	Participant 6	Female	ICT HR Expert	Private	South Africa	A high-impact HR leader and executive with a master's degree in business leadership and more than 23 years of experience creating ICT enterprises as the leading cloud solutions providers in South Africa and the SADC region.
9	Participant 7	Male	ICT Head Specialist	Private	South Africa	With a BSc in computer science and 29 years of industry experience managing strategic business units in the information technology, public sector, retail, and financial services industries, he is a very astute business leader. He has a strong grasp of commercial decision-making, corporate strategy, stakeholder management, sales, marketing, and account management.
11	Participant 8	Male	ICT Industry Specialist	Agnostic	South Africa	A business executive with a master's degree in business leadership and 50 years of experience in the ICT industry leading strategic business units. He has a strong background in finance and accounting management.

15	Participant 9	Female	ICT HR Expert	Private	South Africa	With a BCom in industrial psychology and over 16 years of experience working in the ICT industry and a variety of industries, she is the head of transformation.
12	Participant 10	Female	ICT Consultant/business owner	Private	South Africa	With a master's degree in information systems and a doctorate in information systems, she is a business solution architect. Has almost 30 years of ICT sector leadership experience in numerous roles in several areas, including Central Europe, the Middle East, and Africa.
8	Participant 11	Male	ICT Consultant/business owner	Agnostic	South Africa	An executive director with a master's degree in business administration and 27 years of experience as a consultant in the ICT industry in both the public and private sectors.
6	Participant 12	Male	Banking & Finance CIO	Private	South Africa	An ICT director with a BSc in Computer Science and more than 16 years of experience as the CIO of a financial services organisation.
5	Participant 13	Male	ICT business owner	Agnostic	South Africa	With a commercial degree and over 25 years of business experience, a seasoned and highly knowledgeable technology executive. An ICT business owner who provides advice on business strategy, resilience, governance, and operational efficiency.
3	Participant 14	Male	ICT business owner	Agnostic	Botswana	A seasoned and highly experienced technology executive with a BSc in computer science and over 21 years of ICT knowledge. Through assessments and remedial action for regulatory compliance, an ICT business owner that provides technology and security services to clients to reduces their technology expenses.

4	Participant 15	Male	ICT business owner	Agnostic	South Africa	A seasoned and highly knowledgeable IT professional with an executive development qualification and over 16 years of business experience. An ICT entrepreneur and CEO who provides data, cloud, analytics, software, and hardware solutions to help our clients cut costs, enhance business efficiency, rationalise processes, and boost overall performance.

5.2.1 Participant's seniority, location, and Industry type

A total of 15 people were interviewed for this study. Only 14 persons in Gauteng, South Africa, and one person in Botswana were probed. The Covid pandemic hampered attempts to expand the study's scope to include other African countries. Participants came from a wide range of organisations and industries, including ICT, government, banking, and finance. Participants had to have held senior positions in the ICT industry, be ICT industry specialists, and be ICT business owners to meet the selection requirements. The distribution of participant location and industry type is depicted in Figures 10,11 and 12.

Figure 10: The seniority of the participant.

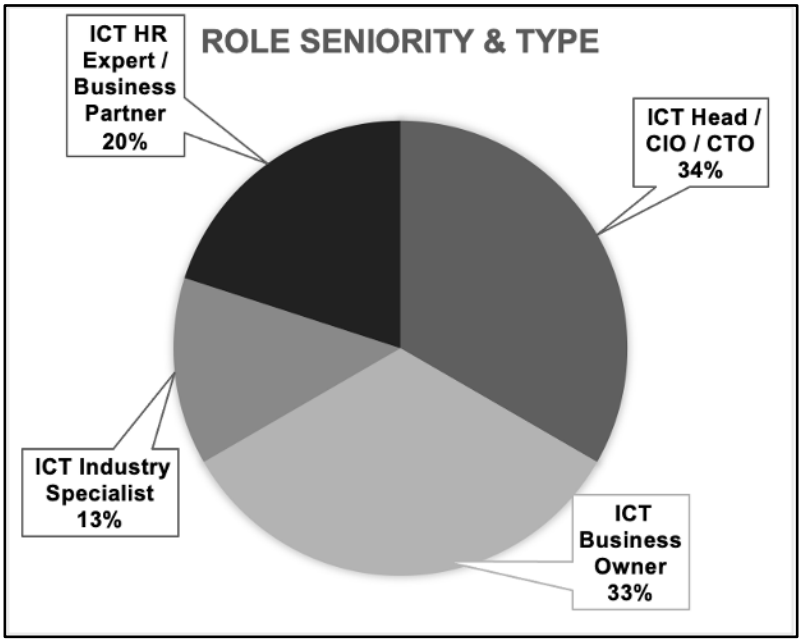


Figure 11: The location of the participant.

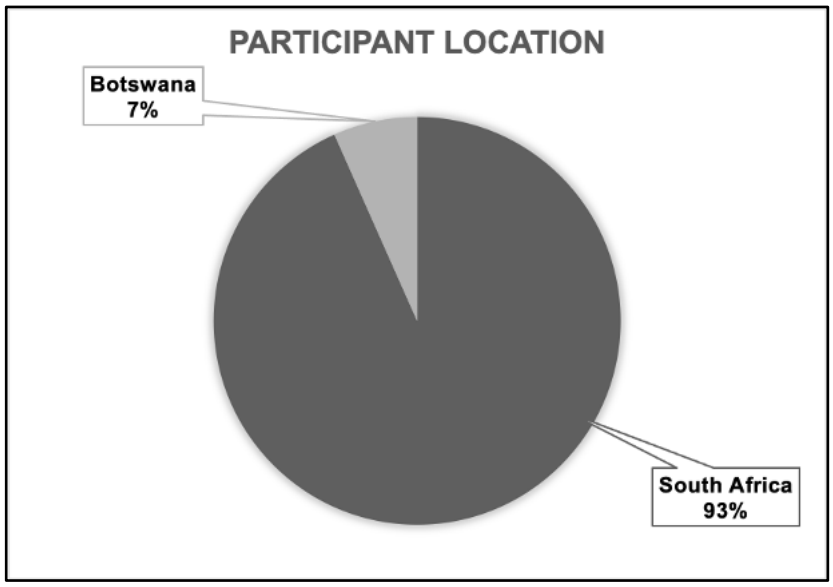
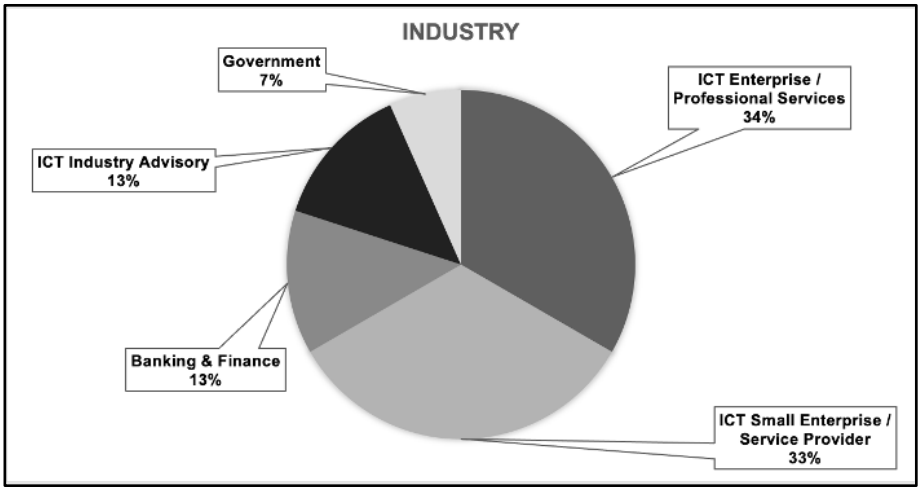


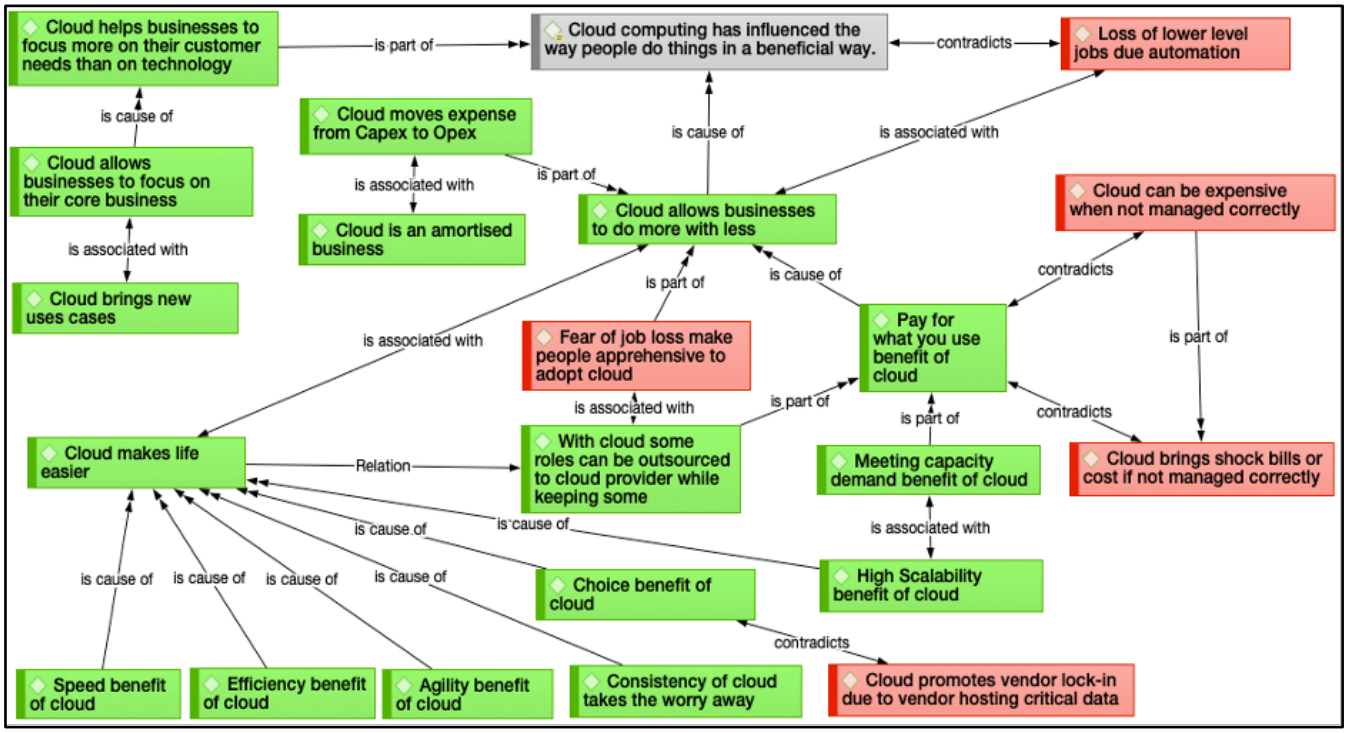
Figure 12: The participant industry type.



5.3 Cloud computing has influenced the way people do things in a beneficial way.

According to the individuals that were questioned, there are four elements to Cloud Computing: definition, characteristics, benefits, and downsides. Figure 13 shows the codes created during the interview analysis that summarise the concept of cloud computing from the participants' perspective, as well as the linkages that form a network between the codes.

Figure 13: The concept of cloud computing from the participants' perspective.



5.3.1 Cloud computing from the participants' perspective

Cloud computing is the pay-as-you-go delivery of on-demand IT services such software, storage, and computational resources to human language processing and machine learning, and even ordinary business applications, through the internet. Just about any service that does not need you to be present physically near your computer equipment may now be provided through the internet. Cloud computing is used by many services. Services that allow huge corporations to host all their data and run all their programmes on the web are examples, as are additional services such as Google services and online backup of your mobile phone images. Six of the respondents stated that cloud computing has benefited the way people and organisations do business. And how, rather than separate goods, cloud computing is becoming the default choice for ICT services to be delivered as a subscription model through the internet. A few participants mentioned that there are possible drawbacks to cloud computing, such as the fact that it might create additional expenses and risks for businesses that use it. In cloud computing, the location of the service, as well as many other aspects such as the hardware or operating system on which it runs, are mostly irrelevant to the user. Sections 5.3.2 and 5.3.3 below emphasise the respondent's opinions and comments:

5.3.2 Characteristics and benefits of cloud computing

It is no longer about where you are at work; it's about how rapidly you can move and adapt to changes. It has been increasingly obvious in recent years that the future of employment is remote working. Cloud computing facilitates the transition to remote work and increases remote employee productivity by allowing them to access centralised tools and applications from any device and from any place. Cloud computing-based collaboration also enables distant employees to collaborate closely on projects even when they are unable to meet face-to-face.

When asked about how has cloud change their way of work, Participant 1 said, *"… has changed things in a positive way, in the sense that, you know, you are now able to really work with teams across the globe, especially in big implementations or even in support projects, you know, whereby you no longer require a team to be centralized around with the server room is put it that way."*

Because all data is stored on the cloud, businesses may dynamically access and analyse it to make quicker, better, and more decentralised choices. Businesses may move at a faster pace when remote workers can handle their duties and interact successfully without having to go to the office every day. Cloud computing not only makes access simpler and faster, but it also aids in the launch of new company goods and strategies with the least amount of regulatory and financial risk. More significantly, it frees up your ICT staff to concentrate on their primary responsibilities rather than thinking about how to make the company's ICT infrastructure safer and more resilient.

When asked about what the most notable benefit is, they can attribute to cloud computing, Participant 5 commented, *"… it has given a lot of flexibility. It has made things a lot a lot more efficient, efficient, faster, more flexible, more dynamic. More options, opening close alignment with business. So, I think cloud has made life easier."*

Cloud computing enables businesses to swiftly scale in response to changing client demands. It is the cloud's flexibility that allows businesses to scale up or down based on their changing needs at any moment. Whether you need to permanently transfer most of your employees to a remote work paradigm, a cloud solution can help you make the change smoothly and with minimal downtime. Moving to the cloud is also more cost-effective for businesses since they only pay for the capacity they use at the time, rather

than putting up on-premises data centres, which may be difficult to scale down once established.

When asked about how has cloud computing contributed to IT operations, Participant 12 commented that cloud computing, *"… is making it easier to manage redundancy, failover, DR. Those types of tick the box things and allows us the more time to focus on what our customers want. And how do we bring new products to the market without having to worry about too much? How we made sure that the lights they aren't on the system stays learning capacity."*

Building the infrastructure to enable cloud computing presently accounts for more than a third of all ICT expenditure worldwide, according to IDC data. Meanwhile, as computer workloads shift to the cloud, whether through vendor-provided public cloud services or private clouds established by organisations themselves, traditional ICT expenditure continues to fall.

When asked about the cost of cloud computing versus traditional IT, Participant 8 confirmed cost saving benefits of cloud computing, *"Why put your money into huge investments, buying software for so much of money using 10% of it. Right? But as you do it in the cloud, you pay for what you use. Okay, you don't have to go for the big, big machines, only the major corporation and banks and insurance companies and one big mainframe, but you don't have to do that."*

Because they only pay for the resources they use, companies who utilise cloud services may move faster on projects and test new ideas without having to go through lengthy procurement processes or pay huge upfront costs. Cloud proponents usually tout the concept of organisational agility as a significant benefit. The ability to spin up new services faster than the conventional ICT acquisition should make it much easier to get new programs up and running. Furthermore, the cloud's flexibility makes it simple to scale up a new application fast if it proves to be exceptionally successful.

When asked about added benefits derived from cloud computing, Participant 14 confirming that cloud computing provides additional benefits, such as speed and agility, *"So there were advantages, of course, which we saw in terms of the ability to have the quickest turnaround to give a client access to services, somebody wants a financial management system in about three weeks or three and you can have it running."*

According to Gartner (2017) about a third of business ICT spending will be spent on hosting and cloud services by 2021, suggesting a rising reliance on third-party infrastructure, application, management, and security services. Cloud services will cost $260 billion globally, up from $219.6 billion last year. It's also expanding at a quicker pace than anticipated. However, it's unclear just how much of the demand comes from organisations looking to migrate to the cloud and how much comes from suppliers that have shifted away from selling traditional business programmes and towards selling profitable and predictable cloud subscriptions.

When asked about Cloud Computing, Participant 2 asked, *"But why would I want to go into Cloud computing? If I'm happy with what I've got? Well, the only reason is because I can get something better out of cloud computing at a better cost, lower cost with more efficiency. So, the pressure is on the decision maker within the enterprise, to move to producing more for less."*

5.3.3 The drawbacks of cloud computing

Cloud computing is not cheaper than traditional computing, even as renting is often not cheaper than buying over time. It would be much more frugal to provide computational services in-house if an application demands them on a consistent and predictable basis.

When asked about the negatives of cloud computing, Participant 13 highlighted on the potential runaway costs if the cloud is not effectively managed *"So most of the times big corporates, all of that allowed the developers to actually spin up and spin down. development environments, right. And we know what developers are good at very good at inventing, when not in my 50 ideas of IT experience. I have commissioned an awful lot of systems; I have decommissioned like a handful of systems. So, developers will spin an app that will never spin it down. So, they'll never go like under. So, all of a sudden, the CIO, I was sitting there with a bill, that doesn't quite make sense."*

Some firms may be wary about storing sensitive data in a service that is being used by rivals.

When asked on drawbacks of cloud computing Participant 12 confirmed, *''Yeah, disadvantages. It is, it can be expensive, if not done properly, if you don't*

understand what you're doing can be expensive. You can expose yourself to risk you can expose your data, expose your customers data, and open yourself up to, to, to, to be hacked, for example, so there's Yeah, you have to be careful with what you do."

If you transition to a software as a service model, you can end up using the same apps as a rival, making it difficult to establish a competitive advantage if that application is vital to your business.

When asked about some of the deterrents stalling cloud computing adoption, Participant 14 said, *''But no, that's not how it is the money basically just gets funnelled out that you can literally control anything else, the day you want your data back where you're going to host it. There'll be rules and policies that are set up in terms of we can give you your data in this format, and that format and not that format. And if you take your data back, then we stopped supporting 1234. It's already happening, those guys are going to cloud stack here to stick with Cloud. That's how it is."*

5.3.4 The description of Cloud Computing: Summary of Findings

The participants addressed how cloud computing has affected the way people do things in a positive way as part of the subject mentioned in section 5.3. In the past, traditional ICT limited individuals' talents and enterprises to a single location; now, cloud computing has dismantled such illusory barriers, allowing individuals and organisations to compete internationally. Because organisations buy computing as a service rather than purchasing actual servers, cloud computing tends to shift spending from capital to operational expense. This financing approach enables businesses to avoid the substantial increases in ICT spending that come with new capital projects. When seeking for extra money, using the cloud makes it easy. Other respondents stated that the initial migration expenses of cloud computing outweigh the long-term benefits generated by cloud computing. When it comes to employment on the client side, they're now attaining more productivity with fewer employees, and there's an erosion of business on the ICT vendor side due to poor margins from traditional hardware business. The Covid epidemic has accelerated cloud adoption, and firms are downsizing and laying off employees who are judged to be non-value adders because of working from home. However, the general theme is that cloud offers more advantages than disadvantages because employment losses are due to a lack of digital

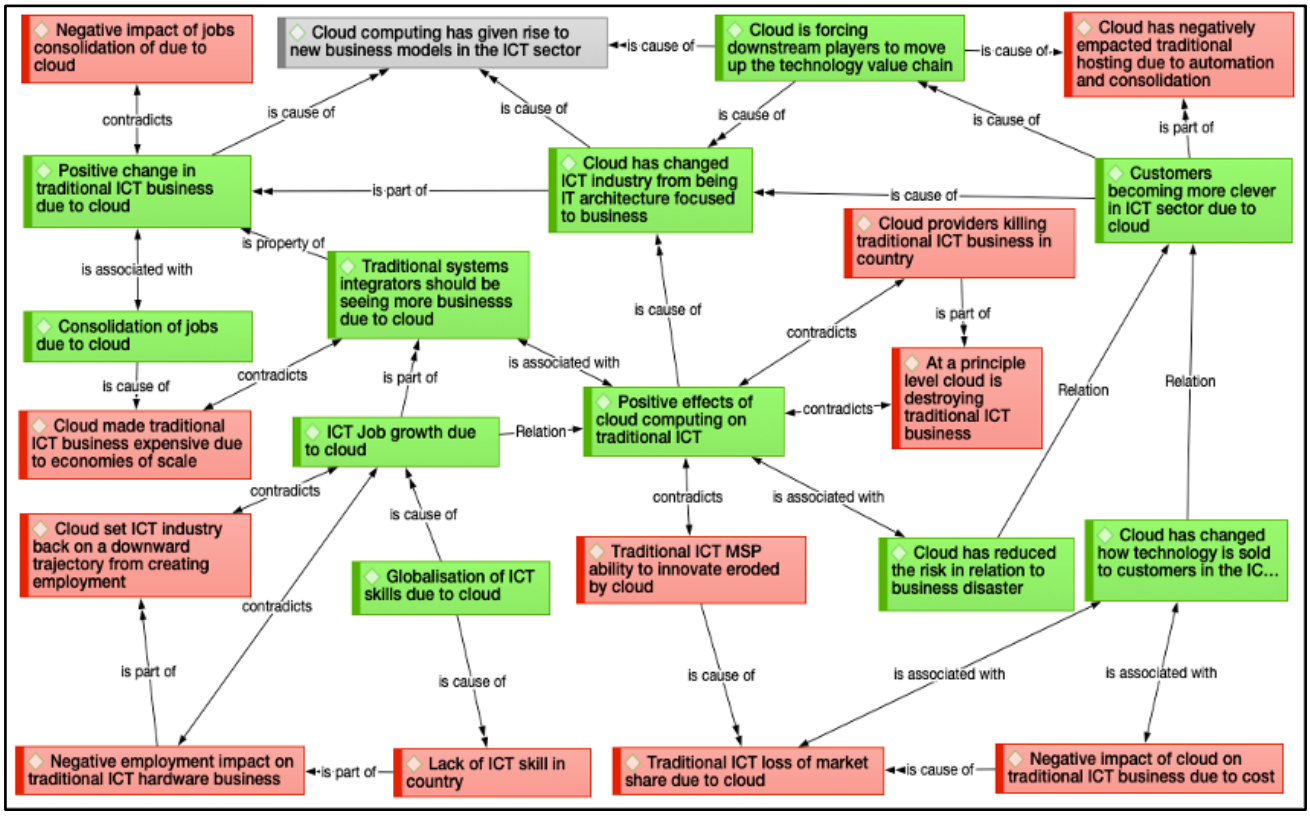
skills, not cloud computing. The results of the discussions on the impact of cloud computing on the current data centre and IT outsourced services businesses in South Africa will be outlined next.

5.4 First research question findings - What effect does cloud computing have on South Africa's existing data centre and IT outsourcing services business?

The traditional data centre and IT outsourcing services sector was expected to increase at CAGR of approximately 12% between 2015 and 2020, reaching 7.6 billion rands, based on statistical data from the literature study. The overall number of individuals working in the ICT industry dropped by 8.2 percent in 2019. The telecoms sector lost around 9% of its employment, while the postal business lost 7.1% and the broadcasting sector lost 7.3 percent. ICASA revealed that employment in the industry has decreased by 0.7 percent over the last five years. Telecommunications employment climbed by 2.2 percent, broadcasting employment by 1.8 percent, while postal service employment continued to decline by 5% in the same year. In 2020, the number of ICT employees declined by 0.3 percent, while job possibilities fell by 2.4 percent.

According to the participants that were interviewed, importing hardware or software, then wrapping installation, run and operate, and break fix services, is the traditional ICT business model in the ICT sector in South Africa, particularly for managed services companies. This conventional approach underpins more than 70% of the traditional ICT or managed services sector. These conventional suppliers do have pockets of software development, digital transformation, and business process reengineering activities, but their commercial economic value is only about 20-30 percent of their overall income. Under the selected themes, the results of the discussions about the implications of cloud computing on South Africa's existing data centre and IT outsourced services businesses will be explored. Figure 14 shows the codes created during the interview analysis that summarise the impact of cloud computing on the current data centre and IT outsourced services businesses in South Africa from the participants' perspective, as well as the links that connect the codes to build a network. The result of the discussions on cloud computing's influence on South Africa's current data centre and IT outsourced services industry will be presented next.

Figure 14: Cloud computing has given rise to new business models in the ICT sector.



5.4.1 The impact of cloud computing on the current data centre and IT outsourced services businesses in South Africa, from the perspective of the participants.

To improve flexibility and relieve pressure on financial investments, CIOs are progressively turning to cloud computing services. That is not to say that cloud computing is cheaper than keeping programmes in-house; for programs with a known and consistent need for computing power, it may be inexpensive to maintain in-house, at least in terms of capacity. To create a business case for transferring infrastructure to the cloud, you must first determine what your current ICT expenses are. There are several factors to consider, including the cost of operating data centres, network leased lines, physical gear, servers, and storage costs. Whether you want to lift and transfer existing apps to the cloud and re-host them unmodified, totally rebuild them for the cloud, or purchase an altogether new SaaS package, each choice will have distinct pricing consequences. People expenses, which are frequently second only to infrastructure costs in the cloud business case, as well as more abstract considerations like the advantage of being able to deliver new products and services faster, must be included. A business case about cloud computing

should include the drawbacks, such as the danger of being tied to a single provider for your ICT infrastructure.

When asked about what is driving cloud adoption Participant 5 commented, *"So firstly, in terms of the cloud journey, from a customer perspective, absolute no brainer. Typically, your cost base drops dramatically. I think everyone dips into it as a function of Office 365. Actually, no, they first step into the cloud or software as a service is usually some peripheral IT function, you know, something that legal wanted or HR wanted and stuff like that. Typically, things stupid things like survey monkey, pretty peripheral non-core. Well, then as time went on, that was probably about 10 years ago. Then about five years ago, six years ago, people started to say, okay, suddenly, all the collaboration applications, the potential existed in the cloud. And people started dabbling in things like Office 365. And then it went on to things like ERP systems, SAP HANA, and stuff like that. And as time has gone on, it's become bigger and bigger companies moved away from the enterprise domain into the production domain."*

When asked about how cloud has changed the face of the ICT industry, Participant 7 commented that, *"So wherever there is my benefit? Now? It forced me to be overthinking How do I continue having that person as a business client, if I can add business value to them, by utilizing the technology, the money doesn't come out to configuring the technology anymore. So that my, my prediction is that market is going to get smaller, and you're going to find more business consulting that will people in industry, architects, etc. But worrying about the architects of the business, as opposed to the architecture of the it landscape, because the ICT landscape is going to is slowly being sucked away from the local place."*

Although the industry is certainly developing at a quick pace, data on how businesses are embracing cloud services is difficult to come by. According to one study, approximately 12% of organisations regard themselves cloud first, and almost a third operate some type of workload in the cloud, though a quarter of enterprises claim they would never shift to on-demand. Not all cloud expenditure will be centralised by the CIO; cloud computing services are extremely straightforward to sign up for, so business leaders may begin utilising them and pay for them without having to notify the ICT department. This might

help organisations move more quickly, but it can also expose them to security concerns if they are not properly controlled.

Participant 14 when responding to the question whether cloud has changed how the customers procure IT services, said, *"I think the cost of service for the clientele it's a big benefit. Because heavy in partnership with Oracle is a classic example of deployed one or two solutions for a client where they needed a quick solution. And they never bought infrastructure. They never bought hardware. They never bought anything not even operating system. They didn't get license databases, zero licenses. They simply went into an amortization type of method, where they pay X amount monthly opposed to them paying for the solution over five years. It works out to possibly maybe half of or even a quarter of what there we're paying."*

In responding to the question whether cloud has eroded of added jobs, Participant 13 commented, "*And I think there will be a major impact in the amount of people that will be actually employed by the hardware companies."*

One of the most significant expenditures for local firms who were early adopters of cloud computing was the need to rebuild programmes to optimise them for the cloud, especially if the apps were sophisticated or bespoke. The Forrester research also showed that the skills needed for migration are challenging and costly to acquire, and that even when companies do locate the proper individuals, they risk having them poached by cloud computing suppliers with huge resources. One-third of respondents polled indicated that moving programmes increased their software database licence prices significantly. Most respondents were also concerned about the performance of important applications, with one-third citing this as a motivation for not transferring some essential applications.

When asked whether cloud computing has added or reduced the number of jobs in South Africa, Participant 2 remarked, *"I hate the word jobs, because I think in the 21st century, we are going to be less and less looking for a job, we are going to be more and more aware of the ability to create economic value. And that doesn't mean that somebody is going to give me a salary deposit at the end of the month, it means that I'm going to be trading my skills with other entities. Maybe in the form of employment, but maybe not maybe just in in the form of, you know, I have an ability*

to do something that provides value to somebody else, and they will give me economic value in some form or another."

When asked what about cloud computing has impacted job creation, Participant 15 judgement, *"So your network, virtualized solutions and yourself are virtualized solutions. And they come with a lot of cost, cost benefits, they come with a need to upskill you know, strong need to upskill so suddenly, there's a skill shortage, or there's a gap that that needs to be addressed. Cyber in its nature, there's a global shortage, as we all know, but even more so when you virtualize in certain products becomes even more specialized. So that's what we are finding, and we are currently trying to address that with excuse me, various interventions, you know, learning programs that we are trying to put together. But you know, the same from the customers is that we want more."*

These new positions in the ICT industry will be filled by a different type of person. New talents, an entrepreneurial mindset, flexibility, agility, and the capacity to swiftly acquire, unlearn, and relearn new abilities are all required. The first step in ensuring that we can meet the task is education. Learning new and more relevant digital skills is clearly necessary if we are to thrive in a society increasingly dominated by technology. The cloud, rather than destroying employment, is generating new and different ones. The objective is to provide the sector with the necessary skills to keep up with the changing world of work.

When asked what about cloud computing has impacted job creation, Participant 5 stated, *"So maybe if I were to pick a view, I'd say maybe there's even been about 10 to 20% job growth, okay? Because remember, new industries have already opened up, okay, the entire ecommerce explosion, it has created new opportunity for people, look at what's happening in the telecommunications environment, suddenly, we've all got more fibre, multiple communications channels, and the like. Someone's maintaining that someone supporting it. So, I would say jobs, I think jobs increased between 10 to 20%."*

When asked if they ever had to downsize or retrench employees due to cloud computing, Participant 8 said, *"Because that's the biggest job aid for the last few years. So, if*

you asked about unemployment. And if you think narrowly, our cloud is taking away the jobs I tend to say no, it creates employment. So, because it's Yeah. Do you like it or not?"

Cloud providers create and build centres of excellence in certain nations to formalise and guarantee service consistency. Oracle, for example, has a managed cloud services centre of excellence in Romania, while IBM operates one in Poland. So, what occurs in a local country is that conventional ICT company, which was built on importing software and hardware and then wrapping services around it, erodes. This is because cloud providers have entered the local market, and services that would previously have been handled by traditional managed service providers have been moved to centres of excellence in other countries.

When asked about how has cloud computing changed the ICT industry, Participant 15 mentioned, *"Yes. No, such as certainly, I think it's, you know, the economics of the cloud. I think, you know, guys, like almost shy'd away from the economic impact that it could have. And, and essentially, you know, I'm not sure where it's going. But I mean, from what one sees, so far, the hints, and the, you know, the headlines, and that kind of thing is that, you know, we are definitely heading in a situation where you've got these big conglomerates that are building, you know, these hubs across the world. You know, so you're finding that yeah, you're on Have a lot of opportunities for when new jobs being created in that instance, because they are praying in a few specialized skills, and they will probably require a certain amount of local based skills. And the rest, you know, is based in some other parts of the world. So, you know, in terms of contributing to specialized skill that can contribute to R&D in that region."*

When asked about how has cloud computing changed the ICT industry, Participant 14 mentioned, *"And the global hosting environment then meant that from an infrastructure perspective, we lost relevance, except in public sector and a few financial services sector and healthcare here and there, you still have quite a few clients actually delivering their solutions on hosted platforms. But that represents possibly 30% of whatever market we had at the time. Now, the other bit that sort of hit us hard from a business perspective was that we eventually lost the people*

that were service in those elements, But to us and to the rest of the markets. It's a big, big negative, because then we are not able to sell anything. So, from a scale perspective, we are losing out. And graduates that we had, I had a team of 18 people maintained, including me, I'm now left with three people in my office, the rest of left upset, basically, because I can't serve the market anymore."

5.4.2 Research Question 1: Summary of Findings

So, what occurs today is that the hyperscale providers expand into other regions, like as South Africa, and establish a data centre in Cape Town or Johannesburg. And then, but the deeper cloud, which is still controlled by that centre of excellence someplace. The researcher wanted to learn more about the influence it has on the local ICT sector, particularly from the eyes of small and medium businesses, such as systems integrators and managed service providers. What are the ramifications of such loss? Yes, we are aware that cloud providers have informed us that there would be spin-off employment, either in marketing or sales, in other sectors. Importing IT equipment, whether software or hardware, wrapping services around it, offering managed services, or providing break fix are all business models used by South African ICT managed services companies. That is the way Africa works. With the arrival of cloud in the country, that part of the work is no longer sustainable. The goal is to determine if the ICT sector has evolved as promised by cloud providers and to assess whether the South African ICT industry has grown or shrunk. The next topic will be whether the cost savings realised because of cloud computing translate into enterprise development and, as a result, financial returns that convert into job creation.

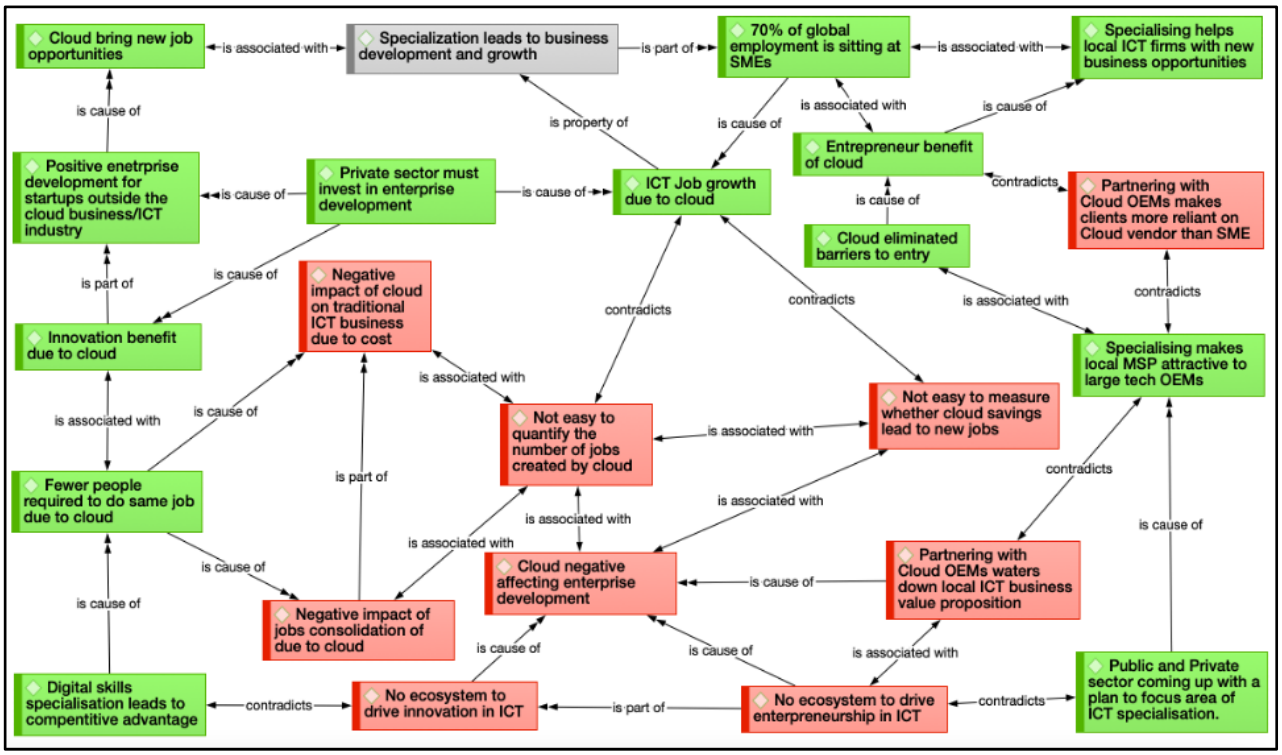
5.5 Second research question findings - Do these spare IT budgets due to cloud computing cost savings translate into technology innovation that allows enterprise advancement, which, as a result, yields financial returns that translate into job creation?

The participants that were interviewed further asserted that, Cloud computing is exploding across several businesses, particularly with the rise of remote working. Even though it is a time-consuming operation, the cloud brings significant financial benefits such as budget savings and greater workplace efficiency. In fact, moving to the cloud saves businesses an average of 15% on total ICT expenses. Cloud computing has proved to be a readymade strategy for organisations seeking to get insights from real-time data, improve

decision making, and capitalise on new possibilities. All in the name of disrupting and differentiating via accelerated innovation. Cloud computing has been dubbed the "new age innovation booster," since it is at the heart of system resilience, infrastructure modernisation, increased agility, and future-proof competitive advantage.

Figure 15 depicts the codes generated during the interview analysis that summarise whether specialisation contributes to business development and growth, as seen by the participants, as well as the linkages that connect the codes to form a network. The outcomes of talks regarding how cost savings realised because of cloud computing translate into enterprise development and, as a result, financial returns that translate into job creation will be addressed next.

Figure 15: Specialization leads to business development and growth.



5.5.1 Specialization leads to business development and growth.

To acquire access to fresh ideas, corporate venture investors are increasingly turning to open innovation start-up programmes. Big organisations are using corporate accelerators, a subtype of open Innovation start-up programmes, to connect with creative entrepreneurial enterprises in greater numbers than ever before. Corporate accelerators

are managed or sponsored by certain well-known companies. As part of a cluster, this programme provides firms with temporary access to mentorship, education, and company-specific resources. Collaborations between established firms and entrepreneurs are becoming more common in corporate strategy. These types of start-up collaboration models have emerged in the real world, supplementing the two most frequent engagement vehicles, corporate accelerators, and corporate venture capital. By collaborating with start-ups based on supplier connections through start-up contractor programmes, companies can obtain access to innovations that improve product competitiveness or process productivity.

When asked about the influence of cloud computing on the company and operating environment, Participant 15 observed, *"So I really think the whole ecosystem needs to be relooked at and government need to spend money and even private sector is very much party to that, they need to, you know, to put in the funds, because, you know, you look at how much money has been made in the region and how much has been ploughed back. And there's a huge deficit. And I think that's one of the cries from public sector to say, well, what a private sector, mostly JSE listed guys, that are making money in the region. But they're scared to reinvest, because, you know, this is political climate, which is uncertain. But you know, 10 years have gone by, and the climate has always been uncertain. So, the question, and we had an investment drive, you know, the President had a few years ago, when he got into office, the question must be asked to say from that investment drive, how many corporates have gone back and reploughed back for skills development and for, you know, for advancement of local conditions. And that's a huge gap, you know, that needs to be to be tackled, barring the corruption, of course, and then barring, you know, the governance issues that we had, which was also are at the forefront of some of our development deficiencies."*

When asked if the private and public sector are doing enough to drive enterprise development within the ICT industry, Participant 15 noted*, "The organisation I work for with so many people are qualified to bringing the IT stuff, competency centre for certain things yet. Like I talked about competency centres in in India and Poland and Philippines the works. We can have the competency centre here. So that's one of the things is part of what I said to the organisation I work for. That, you know, in*

the long run, we are a very cheap country, if you look at the rand dollar exchange rate, we are even cheaper than even India. So, you can bring stuff here, we are cheaper than Poland because of our rand dollar exchange. So, we have to, it can't be done overnight, right. So that that is the big issue. The issue is lack of skills in this country. lack of investment in this and you know, they should have incentives. You know, they took away the Section 12. Section 12J introduced by SARS in 2007/6. It says a lot of people don't want to invest in smaller companies, big corporations don't want to invest in small companies. The biggest employer worldwide is SMMEs. SMMEs are the biggest job creators, not the big corporations."

The advantages of a large ecosystem enable for speedier solution creation by allowing cross cooperation between numerous partners and independent software providers. New products and services may be swiftly constructed in the cloud using a Lego block paradigm, providing a low-risk approach for hyperscalers and third parties to profit from breakthrough technologies and tactics. Growing the core business and customer base while expanding portfolios has a lot of value generating possibilities.

When asked how has cloud computing changed the ICT industry in their opinion, and what are the primary pros and cons they can share, Participant 14 mentioned, "*For start-ups, really, there are massive opportunities, of course. The massive opportunities that we are seeing right now have shifted completely from your traditional ICT to more of what you call your blockchain technologies or blockchain driven technologies in which you actually now get into the development phase within the you innovate within the cloud; you don't innovate outside of the cloud. And the small businesses that we are seeing the guys who are developing your apps that you're seeing on the phone; those are the big start-ups that are making but they have to innovate to a level where they are actually servicing highly specific markets.*"

When asked about what the local ICT players can do to remain relevant, Participant 14 stated, "*And now it's actually pushing us to a point where now we are able to see that if we all try to specialize, we now become valuable, not as just a local partner, but as a global partner, because there is a shortage globally. So suddenly, it gives*

a company that would not have had an opportunity to play as a global skills provider in a particular segment"

When asked about how has cloud computing changed their way work, and whether there are notable opportunities worth mentioning, Participant 1 observed, "*From my view, I think cloud computing has definitely brought opportunities along. So, I can tell you now, I am actually having a catch up with my boss on Tuesday, and we were looking at my plan and focus areas for the second half of the year. And I put down learning, training, and certification as one of my key focus areas. And because we know that we are going to be embarking on this cloud journey, it's going to be about a two three-year training."*

When asked whether cloud computing has impacted job creation and enterprise development, within the ICT sector, Participant 5 stated, "*But then there's also an area that has started up. And let's call it Maverick IT. I think when we started our careers, you could still have the lone wolf programmer. Then it evolved to say no, when all the monolithic systems came in, like ERP, etc., that you weren't going to have that kind of lone wolf programmer. But we are here now and almost the wheel is turning again, and you're getting back to a stage where small micro teams, two, three men, even one-man teams, they can create an API framework. They can create, especially in terms of the presentation mode, as you pull out all the API sources, you can make up secondary products. So suddenly, you can create an application loaded into the cloud compute. All this compute up in the cloud, you can load it processing capability, all the state management capability, all that just point click point click so suddenly, a one man can do what is required a 10- or 20-man company to do."*

5.5.2 Research Question 2: Summary of Findings

Despite the unfavourable view of cloud-based job consolidation, Participant 9 stated, *"So typical example, we've seen that a person sitting in Dubai can really execute a job in South Africa, we don't necessarily need a headcount in South Africa, for us to fulfil that position."* Cloud computing has resulted in an increase in spinoff jobs, where individuals produce many applications, resulting in a proliferation of applications; some of these applications will thrive, while others will die. However, cloud computing has facilitated a great deal of innovation, which is why we now have the FinTech and technological evolutions. We've

witnessed the development of new companies in South Africa, as well as local telecoms corporations like MTN and Vodacom branching out into FinTech and insurance business.

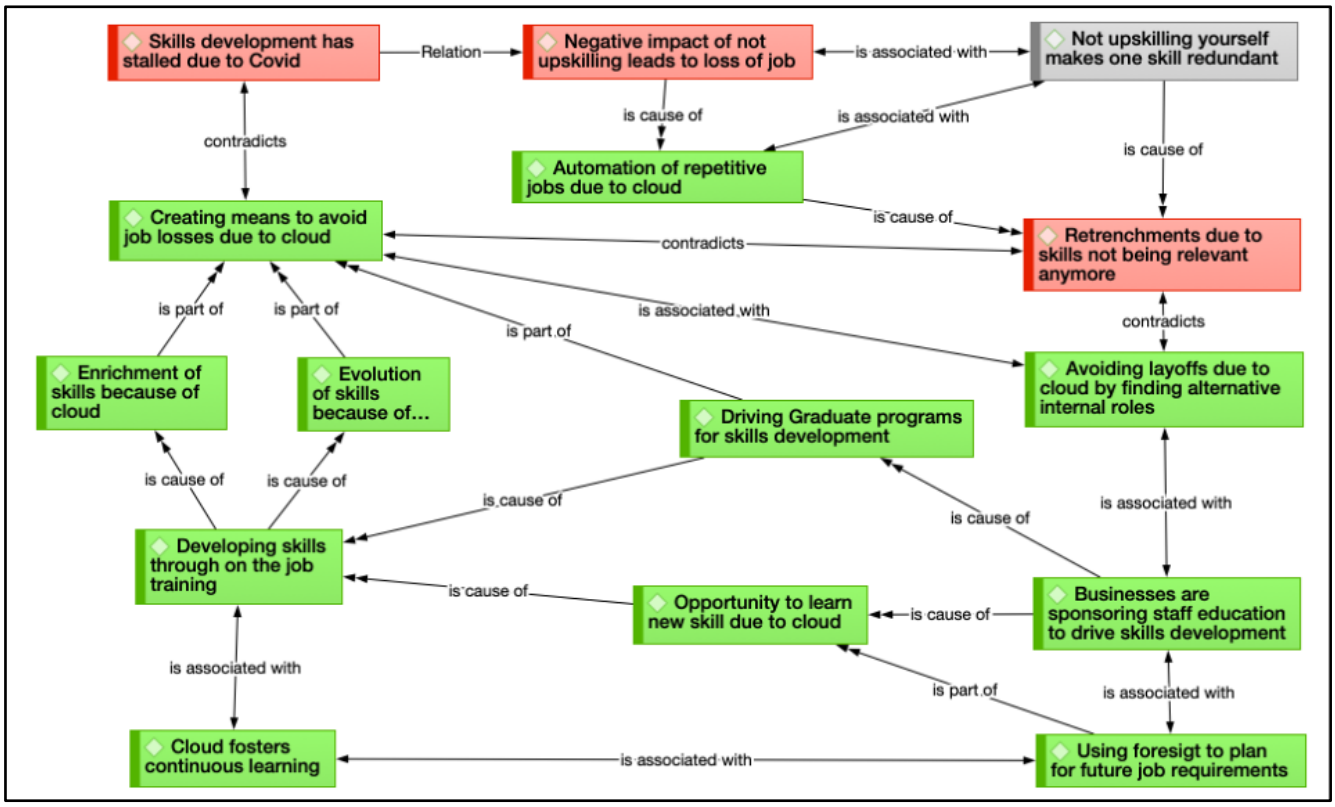
The following topic will be the result of discussions about whether the human resources department employs strategic foresight to plan for future employment requirements, as suggested by cloud computing.

5.6 Third research question findings - How does the human resource's function use strategic foresight to understand and plan for future jobs requirements due to cloud computing?

The participants that were interviewed further asserted that the industry is developing and evolving at a rapid pace, with significant social and crisis management consequences. Keeping up with the times demands not just a thorough understanding of systems and their intricacies, but also creative and collaborative thinking and action. Strategic foresight is a technique for creating practical views of alternative futures and possibilities. As a result of this strategy, organisations are better equipped to deal with possible dangers and seize new possibilities. Rather than predicting or forecasting the future, foresight allows us to search for patterns in the outer world and utilise those insights to create maps of the future landscape. With these well-informed future maps, we can put our current strategy to the test, produce game-changing innovations, and achieve revolutionary change.

Foresight is a method of gathering future knowledge and developing a medium-to-long-term vision that allows for today's decisions and mobilises community action. Figure 16 shows the codes created during the interview analysis, as well as the connections that links the codes to create a network and examines if one's skills become redundant because of not training and upgrading themselves, as perceived by the participants. The next topic will be the results of talks about whether the human resources department uses strategic foresight to plan for future employment requirements, as advocated by cloud computing.

Figure 16: As a result of not training and upgrading oneself, one's skills become redundant.



5.6.1 As a result of not training and upgrading oneself, one's skills become redundant.

Cloud computing, according to the respondents who were questioned, supports continuous learning, which is the process of continually accumulating new skills and information. This can take many different forms, from formal class work to informal social learning. It implies taking control of one's own fate and taking on new responsibilities. Continuous learning can occur in the workplace or on a personal level, such as through lifelong learning. Businesses must be imaginative, adaptive, and ever-changing to be competitive in today's global market. This depends on the workforce's competence and knowledge.

To innovate, try a new strategy, or do something new, you must learn. People must learn new abilities or get new information to see things in a new light and take the next step. When organisations do not support a continual learning process, innovation does not occur, methods do not change, and nothing new is done. Employees must have the ability

to push themselves to master new skills and generate new ideas. Learning must be adaptable, on-demand, and continual to achieve this degree of cutting-edge performance. Creating a learning culture inside a company is an efficient way to grow a business, boost performance and innovation, and improve work satisfaction and growth.

When asked whether some of the candidates that were earmarked for retrenchment were able to escape layoffs by taking on a different or new function inside the company, Participant 1 mentioned, "*I try to prevent from the perspective of ensuring that people don't lose jobs as part of, you know, implementing new, exciting, and trendy technologies. So, that is why I take it upon myself to actually make sure that I motivate them, what the benefits of the skill and the opportunities that are available to them, especially the younger generation.*"

When asked what their department's most pressing concerns are were, and if skills development was one of them, Participant 7 commented, "*And I speak to our interns, I speak to our junior or senior managers and say, guys, this year, what have you done, to pivot yourself to embrace this. So, we offer internal courses, and you know, just awareness to be able to understand the impact that all of these things bring. And the cloud is forcing us to be continuous learners, we do not have the luxury of stopping anymore because it's just elevating.*"

When asked about what the private can do in relation to the digital skills shortage, Participant 7 further commented that, "*There has to be a faithful purpose. What does industry want now? What will the industry want in 25 years' time, so for our industry, it's cloud ready, we know what the skills are, like that, that you must have when you leave, and you come with your piece of paper to get a job. Don't take shortcuts around.*"

When asked about how has the Covid pandemic affected, organisational skills development endeavours, Participant 12 commented, *"Yeah, so, skills development, to be honest, has been tough over the past year and a half, because of COVID. A lot of our skills development previously was done internally, where we would use existing people with skills to mentor people who wanted to get those skills, have workshops, training in house on different things. So that's actually*

hasn't happened on the past year and a half more largely, right. Right now, we're trying to get our team to do online courses."

When asked, what is the cost of one not upskilling themselves, Participant 12 mentioned,

"But I think after many years of this particular resource, you know, just delaying, delaying, and not really immersing themselves, it caught up with this particular resource that I have in mind, you know, that. Now, the ground shifted without a thorough knowledge of how this new modernised Application Management world you know is now operating. They were left behind, and they became very stagnant in terms of their skill, you know, and we saw that contract, not being renewed for him as a result, because he was not willing to jump into this new world and repurpose his skill. Yeah. And basically, you know, ensure that he's, you know, he's working to build himself up for the current world that, you know, that you're shifting into. So, with that example, you know, yeah, I can't really say, maybe a trend across, but I would probably, you know, say that it's probably something that is going to be a trend if it's not, because, yeah, it's just yeah, it's like the natural order of things."

5.6.2 Research Question 3: Summary of Findings

If you stay stagnant and do not improve your skills, you will suffer horribly from your redundant skillset. Cloud, on the other hand, is not an issue; rather, it is a matter of staying on top of the demand for new digital skills that cloud has created. There is a critical lack of digital skills, and the intriguing thing is that South Africa comes from a low-skilled background. As a result, we are witnessing an exacerbation of the problem. Because digital skills are a global phenomenon, not simply a local one. It's much worse in the cloud computing area, where over a million positions are now unfilled because the necessary skills are just not available. When a cloud computing specialist emerges in the local ICT industry today, the global marketplace instantly begins headhunting that individual, resulting in a tug of war between the local and global markets.

The problem for us in South Africa is that we are coming off the tail of a skills deficit in general, and now much more so, since digital skills are global, not regional. So now we're competing in a pool where we set aside space to nurture certain resources with specific digital abilities, and once they've gained those talents, they're immediately in demand on

a worldwide scale. What can be done is to return to the beginning and handle the problem from a macro–South African viewpoint; we must adopt a long-term strategy. The following discussion will focus on how cloud computing has changed the face of the ICT sector in South Africa because of ICT operations offshoring.

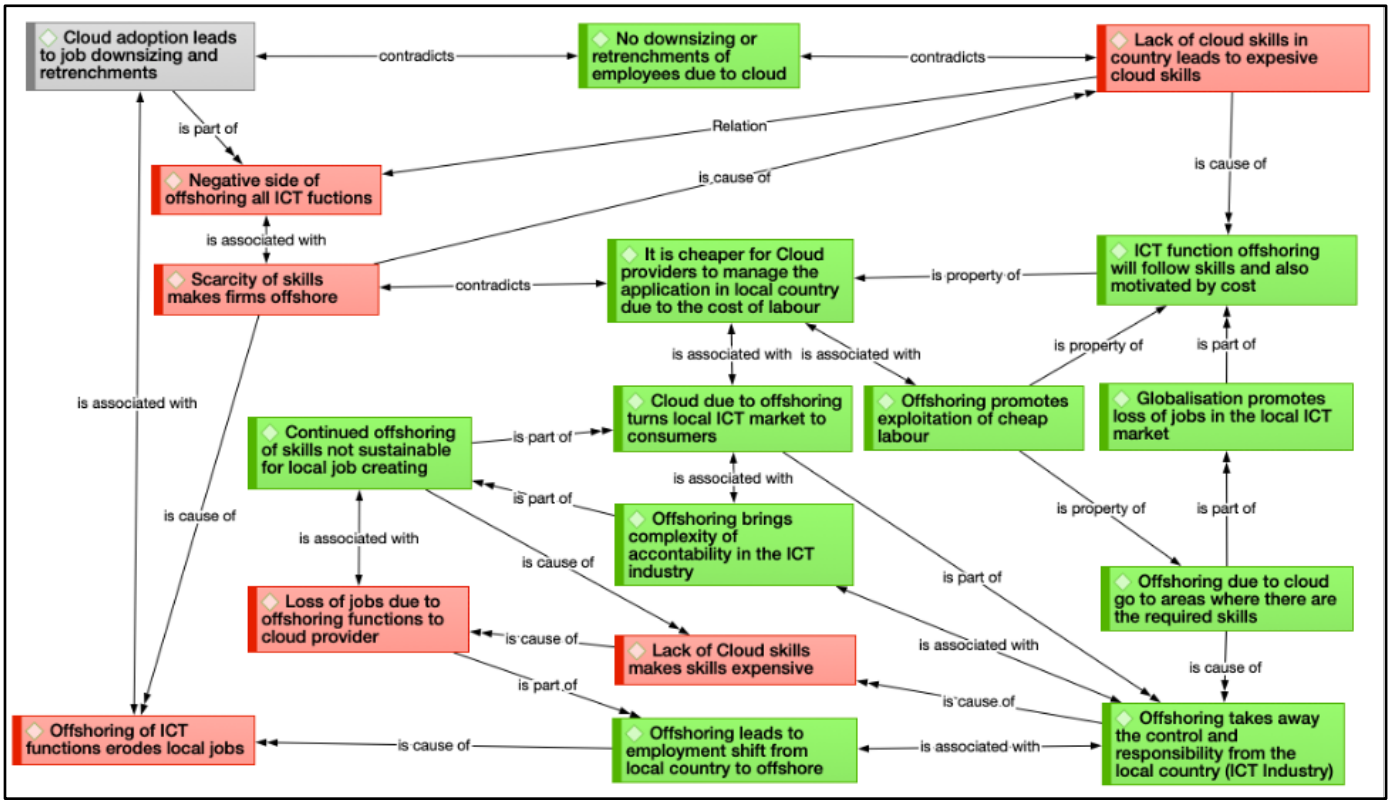
5.7 Fourth research question findings - How has cloud computing transformed the face of the ICT industry in South Africa due to ICT operations offshoring?

The individuals interviewed also acknowledged that the ICT sector is quickly developing and evolving because of cloud computing and its benefits, causing substantial regional social and economic difficulties, notably the country's unemployment crisis. The conventional ICT industry in South Africa is based on local managed services providers importing hardware and software and bundling implementation and maintenance services around it. The problem is that hyperscale cloud companies enter a local country and set up shop, offering cloud computing services. As part of their service fulfilment and assurance approach, cloud providers implemented an offshoring model for ICT activities.

The offshoring model enables cloud providers to offload ICT services to their centres of excellence, which are located outside of the local country. These cloud computing firms' offshoring strategy is primarily inspired by the availability of ICT skills at a reasonable cost. The business and services that would have been supplied by local traditional ICT managed services providers are now shifted to the hyperscale cloud providers' centres of excellence located outside of the local country.

Figure 17 depicts the codes generated during the interview analysis, which discusses whether the adoption of cloud computing results in employment reductions and retrenchments, as seen by the participants, as well as the links that bind the codes together to form a network. The next topic are the results of the discussion on how has cloud computing transformed the face of the ICT industry in South Africa due to ICT operations offshoring.

Figure 17: The adoption of cloud computing results in employment reductions and retrenchments.



5.7.1 The adoption of cloud computing results in employment reductions and retrenchments.

Although ICT offshoring, or the relocation of ICT operations abroad, has gained a new dynamic because of globalisation and lower labour costs, the respondents who were questioned went on to remark that this has aided the hyperscale cloud computing providers in relocating ICT services to places where the landscape is more favourable, particularly when it comes to the critical skills required to support cloud infrastructure and related customer assurance and fulfilment activities. That is why Eastern European nations like Poland and Serbia, etc. have a strong chance since they have a reliable telecommunications infrastructure and a high-quality education.

When asked whether cloud computing adoption erodes jobs and business opportunities in the local country, Participant 14 said, *"Guys will simply put up the application somewhere in India, or wherever it is, and the guys are hired for a dollar, against maybe what you paid for $10, they will $1 and then you lose out. So, for the most*

part, that has been how we've been affected. So, we've last seen a loss of a lot of loss of employment opportunities, we've also lost staff members, people are unemployed because of this. So, there were advantages, of course, which we saw in terms of the ability to have the quickest turnaround to give me a client access to services, somebody wants a financial management system in about three weeks or three shutdowns, you can have it running. But if you developed it in house, you'd have to be ready in six months. So those advantages in terms of being able to deploy quickly for a client versus the long time it takes for it to develop a solution. We know you weigh them against job losses, he just sorts of being balanced out so that those were the biggest challenges that we face, in terms of how it overall and overall, it affected our business without necessarily go into specifics."

To provide a centre of excellence, a cloud provider must locate their ICT operations centre in an environment that is conducive to the skills hub and service centre functioning. This centre of excellence must be supplied with electricity, appropriate and dependable telecommunications infrastructure, and labour at a reasonable cost, as well as the necessary skills to maintain this centre functioning.

When asked how cloud has impacted traditional ICT business models and the industry, Participant 7 brought to light, *"So if you look at SAP, for instance, their current strategy is rise with SAP, what is rise, it's taking the client-based solutions, on prem solutions, and is moving into the cloud. And they saying to the client, we will manage this for you. So, if I was, if I had a contract with company x, to manage the environment for the SAP has taken that away from me. So, wherever where's my benefit? Now? It forced me to pivot thinking How do I continue having that person as a client, that business will be a client, if I can add business value to them, by utilizing the technology, the money doesn't come out from configuring the technology anymore. So that is my prediction is that market is going to get smaller, and you're going to find more business consulting that will people in industry, architects, etc. But worrying about the architects of the business, as opposed to the architecture of the IT landscape, because the IT landscape is going to is slowly being sucked away from the local players."*

There are two types of employment disruption: job transition and job loss. People are afraid of both, and they are right to be. Technological change was responsible for almost

85 percent of the nearly 5 million employments lost in the United States during the previous decade.

When asked how has cloud computing impacted the industry, job creation and enterprise development, Participant 10 mentioned, "*I think it says actually involved a decrease in jobs in South Africa. For example, engagements I've had with AWS they have data centres in South Africa, so yes that's created jobs for people looking out to the infrastructure. The people who support the applications for South African customers tend to be in Europe rather than in South Africa. In my experience, the apart from the supporting the infrastructure, the AWS to say sales and support offices in South Africa are small compared to the rest of the world. From what I've seen.*"

5.7.2 Research Question 4: Summary of Findings

Firms in the South African ICT economic sectors have been affected by these changes. Indeed, IT offshoring to developing nations has risen in the previous decade. Hyperscale cloud providers have benefited from the lower labour costs in developing nations because of their involvement in the global IT offshoring sector. This feature has caused concern in local countries that employment would be transferred to the countries where these cloud providers' centres of excellence are based. Even though cloud computing is not the same as manufacturing, it shares several features that suggest cloud adoption will eliminate certain IT employment. Automation is cost-effective because it removes people from regular activities, lowering labour expenses and minimising variability in outcomes, as well as cutting overhead, mistakes, and downtime. The personnel who develop, maintains, and troubleshoots your data centre network, servers, and applications will be redundant as your data centre decreases. Workloads, security, and client contracts may all be managed with fewer employees.

5.8 Summary of Findings

The findings of the unstructured interview questions were provided in this chapter. These open-ended interview questions were created using the four research topics from chapter three. The goal was to see how cloud computing has affected the South African ICT sector because of outsourcing ICT functions. The concept, characteristics, benefits, and drawbacks of cloud computing were defined as four distinct aspects. Cloud computing has helped the way people and businesses do business, according to six of the respondents.

A few participants stated that cloud computing had potential downsides, such as the fact that it may result in increased costs and dangers for organisations that employ it. Over a five-year period, the impact of cloud computing on South Africa's existing data centre and IT outsourcing services businesses revealed that employment in the sector has reduced by 0.7 percent, the number of those employed in the ICT business has declined by 0.3 percent, and job opportunities have decreased by 2.4 percent.

Cloud computing has led in a surge in spinoff jobs, where individuals create many applications, resulting in a proliferation of applications; some of these applications will survive, while others will perish. One will suffer severely from your redundant skillset if you remain stationary and do not enhance your skills. Cloud, on the other hand, is not really a problem; it is indeed a question of keeping up with the demand for new digital capabilities that cloud has spawned. The fourth research topic investigated whether cloud computing adoption leads to job cuts and retrenchments. The findings indicated that these developments have impacted companies in the South African ICT economic sectors, and that hyperscale cloud providers have profited from cheaper labour costs in developing countries because of their engagement in the global IT offshoring industry. This feature has alarmed local counties, who fear that jobs would be moved to nations where these cloud companies' centres of excellence are located. The next chapter goes through these findings and provides framework that will help people comprehend how cloud computing has changed the face of the ICT sector in South Africa because of ICT operations offshoring.

6. DISCUSSION OF RESULTS

6.1 Introduction

This chapter delves into the research findings, which are based on an examination of how cloud computing has changed the existing data centre and IT outsourced services market in South Africa. The findings will be presented considering the literature study completed in Chapter Two, which was utilised to investigate the research questions posed in the third chapter. The literature review, in combination with the codes and categories defined in chapter five, is utilised to explain the study's findings. The research questions established in Chapter Three were utilised as an organising framework for the discussion in this chapter since the data analysis was conducted using traditional qualitative content analysis in a purely inductive manner. In this chapter, the themes found from the categories and codes in Chapter 5 will be examined in further depth in connection to each study topic.

Table 7: The development of themes and the mapping of categories in connection to the research questions.

The Phenomenon & Research questions	Categories	Overarching Themes
The concept of cloud computing from the participants' perspective.	The definition, characteristics, benefits, and downsides of Cloud Computing	T0-1-Cloud computing has influenced the way people do things in a beneficial way.
The first research question: What effect does cloud computing have on South Africa's existing data centre and IT outsourcing services business?	RQ1-The effect cloud computing has on traditional ICT industry	T1-2-Cloud computing has given rise to new business models in the ICT sector.

The second research question: Do these spare IT budgets due to cloud computing cost savings translate into technology innovation that allows enterprise advancement, which, as a result, yields financial returns that translate into job creation?	RQ2-Cloud computing IT budgets cost savings leads to innovation, enterprise advancement and job creation	T2-3-Specialization leads to business development and growth.
The third research question: How does the human resource's function use strategic foresight to understand and plan for future jobs requirements due to cloud computing?	RQ3-HR function use strategic foresight to plan for digital or 4IR skills requirement	T3-4-As a result of not training and upgrading oneself, one's skills become redundant.
The fourth research question: How has cloud computing transformed the face of the ICT industry in South Africa due to ICT operations offshoring?	RQ4-Implications of business operations offshoring	T4-5-The adoption of cloud computing results in employment reductions and retrenchments.

Table 7 depicts A matrix of consistency in relation to the development of themes and the mapping of categories in connection to the research questions, because of this process. The findings are compared and will be contributed to the body of literature on the impact of cloud computing on the South African ICT sector because of ICT function offshoring.

6.2 A discussion about the cloud computing phenomenon from the participants' perspectives

Starting with their definition of cloud computing, the interview analysis that summarises the idea of cloud computing from the participants' perspective is explored. The characteristics they described will be examined next, followed by a discussion of the benefits and drawbacks they highlighted.

6.2.1 Discussion of the participants definition of the phenomenon

According to the participants, companies may rent access to anything from software to storage from a cloud service provider rather than having their own computer equipment or data centres. Consequently, cloud services providers may be able to achieve significant economies of scale by offering the same services to a wide range of customers. This input will also be reviewed in this conversation so that the definition is clear for the remainder of the debate and any misunderstandings about cloud computing may be clarified. The concept of cloud computing, as defined by the participants, is the supply of on-demand computing services, ranging from software to computation power, generally through the internet and on a subscription basis. According to the industry leaders' diverse response, the literature's definition of cloud computing is unanimous, which aligns to Rittinghouse and Ransome's (2017) conclusion that the cloud computing system allows enterprises to employ third-party computer resources for their everyday ICT service demands. Cloud computing, according to DeStefano et al. (2020) in section 2.2.3, allows organisations to expand and adapt by shifting ICT adoption costs from fixed capital to operating expenditures.

Cloud computing has helped the way people and businesses do business, according to six of the respondents. A few participants stated that cloud computing had potential downsides, such as the fact that it may result in increased costs and dangers for organisations that employ it. The user is mainly unconcerned with the location of the service, as well as many other components such as the hardware or operating system on which it operates, in cloud computing. Given the increasing importance of information management in value generation and process support, the participants agree with Kathuria, Mann, Khuntia, Saldanha and Kauffmann, (2018) that establishing an integrated capacity with cloud computing is essential for organisational success in the evolving landscape of business competitiveness.

6.2.2 Discussion of the participants characteristics of the phenomenon

The participants agreed that to meet the expectations of customers or users, cloud computing must have at least the following characteristics, such as high availability and dependability to decrease the risk of infrastructure failure. Rapid elasticity allows for smooth scaling of computing resources on demand, as well as agility in distributing resources to clients quickly and charging them based on how much of the service they

use. This confirms assertion in section 2.2.4 that cloud computing features allow customers to request services and resources from cloud service providers without having to interact with them. At any time, a website may be viewed and used. It is cost-effective since the company no longer needs to build up its infrastructure. According to the literature discussed in Chapter 2, it gets charged depending on the amount of the resources it has used (Malik et al., 2018).

6.2.3 Discussion of the participants benefits of the phenomenon

Some of the benefits of using cloud computing services, according to the participants, are that businesses may circumvent the upfront expenses and complication of establishing and maintaining their own IT architecture by just paying exactly what they need, when they need it. Some of the panellists also mentioned that, as a result of offering the same services to a large number of clients, cloud computing service providers benefit from considerable economies of scale, which translates to cost savings for their consumers (DeStefano et al., (2020). The review of literature also supports the idea that cloud computing offers a great deal of freedom. It has made everything much more efficient, efficient, quicker, more adaptable, more dynamic. It has given them more alternatives, opened up closer alignment with business, and made their lives simpler (Kathuria et al., 2018).

6.2.4 Discussion of the participants drawbacks of the phenomenon

A few participants stated that cloud computing had downsides, such as the fact that it may result in increased costs and dangers for organisations that employ it. Cloud computing may not always be cheaper than traditional computing, just as renting is just not cheaper than buying over time. It may be more cost-effective to provide computational services in-house if an application demands them on a consistent and predictable basis. Other respondents said that the early costs of cloud computing migration outweigh the long-term benefits of cloud computing. The participants' perspective corroborates the problems raised in the literature, namely that, while cloud computing services bring significant benefits to consumers and companies, some challenges severely impact public faith in cloud computing and cloud computing competitiveness. Concerns regarding data security and privacy, as well as the loss of control over data, arise because of the public's lack of faith in cloud computing services. At the same time, competition concerns hinder the growth of the cloud computing industry since they risk creating a digital monopoly,

preventing new local cloud service providers from entering the market (Mohlameane & Ruxwana, 2020).

6.3 Overall discussion on the cloud computing phenomenon

Most of the participants said that cloud computing had had a beneficial impact on how people do things. Traditional ICT used to confine people's skills and businesses to a particular place; however, cloud computing has destroyed these artificial borders, allowing people and businesses to compete globally. Cloud computing tends to shift expenditure from capital to operational expense since organisations buy computing as a service rather than acquiring physical servers. This kind of financing allows companies to avoid the large increases in ICT spending that occur with new capital projects. When looking for extra cash, the cloud makes it simple (Vithayathil, 2018). Other respondents said that the early costs of cloud computing migration outweigh the long-term benefits of cloud computing. Since of the Covid pandemic, companies are reducing and firing off workers who are considered non-value adders because they work from home. However, the main theme is that cloud computing has more benefits than drawbacks since job losses are caused by a lack of digital skills rather than cloud computing (Gillwald & Moyo, 2014). The first research question is: What impact can cloud computing have on the existing data centre and IT outsourced services businesses in South Africa?

6.4 Discussion of research question 1: What effect does cloud computing have on South Africa's existing data centre and IT outsourcing services business?

The first study question sought to ascertain the impact of cloud computing on South Africa's existing data centre and IT outsourced services businesses. Because phenomenology is the study of lived experience rather than the meaning of concepts, words, or texts, the selected research technique allowed the researcher to grasp the respondents' rich, deep, hidden, lived experience and unpack the research subject in depth. The research method also enabled the study's findings to be applicable to the general population and provided answers to the research questions (Van Manen, 2017).

The strategic component of information technology outsourcing (ITO) is extensively recognised in the literature. To begin with, in terms of the firm's limitations, the choice to outsource IT services and assets is considered as particularly strategic. ITO is a method of utilising an organization's capabilities and resources. ITO also enables businesses to

focus on their core competencies while depending on external partners for activities in which they lack the necessary competence. Furthermore, depending on the strategic motivation driving an outsourcing endeavour, such as increased information systems services, efficiency advantages, innovation, or agility, ITO can aid firms in meeting their strategic objectives (Karimi-Alaghehband & Rivard, 2019). ICT companies offer services to their customers through a variety of business models to optimise income while addressing ICT infrastructure scalability, reliable connection, and security. To address such issues, businesses contact data centre service providers and lease space in their colocation data centres. Organisations also anticipate that these service providers will augment their ICT capabilities and manage their ICT infrastructure at colocation facilities (Bano, Qureshi, Rais, Tufail & Qayyum, 2019).

6.4.1 Cloud computing has given rise to new business models in the ICT sector.

The discussion of this research topic begins with the identified theme of how cloud computing has given rise to new business models in the ICT industry, to offer context for a better understanding of revenues from the traditional IT services market in South Africa. Both the conventional data centre and IT outsourcing services industries are founded on economic theories, which serve as the theoretical framework for this research study.

As stated by the secondary data providers, the traditional data centre and IT outsourcing services market was predicted to grow at a CAGR of 12 percent between 2015 and 2020, reaching 7.6 billion rands. However, opposed to the projected growth, the industry translated to an 8% decrease in the overall number of individuals working in the ICT business in 2019. The telecommunications industry shed around 9% of its workforce, while the postal industry shed 7.1 percent and the television industry shed 7.3 percent. ICASA also stated that overall employment in the industry fell by 0.7 percent over the five-year period. In 2020, the number of employees in the ICT industry decreased by 0.3 percent, while job possibilities dropped by 2.4 percent. According to the respondents, the conventional ICT business model in South Africa's ICT sector, notably for managed services firms, includes importing hardware or software, then bundling installation, run and operate, and break fix services. More than 70% of the traditional ICT or managed services business is based on this old method. Although these conventional suppliers have pockets of software development, digital transformation, and business process reengineering

operations, their commercial economic worth is only approximately 20-30% of their entire income, as opposed to 70% from data centre and outsourcing business.

Other software manufacturers' (OSM) current approach incorporates technology lift and shift efforts in partnership with hyperscale cloud providers. This entails migrating client-based in-house ICT solutions to the cloud. Customers are promised that they would oversee the complete technology migration effort for them. So, what does this mean for conventional ICT service providers? If they had a contract with company x to manage the environment, the cloud computing provider and OSM have snatched that business away from the local provider. So, where does this shifting business style assist local service providers? Traditional service providers are suddenly being compelled to change their ways of thinking. How will they keep company x as a client, implying that business will only be a customer if the conventional or local service provider can offer business value to them by utilising technology with an alternative business model? (Nath & Goswami, 2018).

Table 8: Forecasted estimates of South African IT industry forecast industry.

Unit: $billion	2019	2020	2021	2022
Total Market Size	6,83	5,53	6,02	6,75
Hardware Sales	2,09	1,50	1,61	1,76
Software Sales	1,86	1,34	1,42	1,58
Services Sales	2,86	2,68	2,99	3,40

Note: Table credit (Data from Fitch Solution Industry Report South African IT Forecast 17 May 2021)

Today's traditional ICT industry does no longer revolve primarily on configuring hardware or software. As a result, the majority of participants forecast that the South African ICT market will contract, as evidenced by the declining forecasted hardware and software sales revenues between 2019 and 2022 on Table 8 from the United States Department of Commerce (2021).

6.5 Discussion of research question 2: Do these spare IT budgets due to cloud computing cost savings translate into technology innovation that allows enterprise advancement, which could yield financial returns that translate into job creation?

According to the interviewees, cloud computing is booming across numerous organisations, notably with the increase of remote working. Even though it is time consuming procedure, the cloud has significant financial advantages, including budget savings and better workplace efficiency. Migrating to the cloud saves organisations an average of 15 percent on average on total ICT costs. Cloud computing has proven to be a primed solution for businesses looking to get insights from real-time data, better decision making, and capitalise on new opportunities. Everything is done in the interest of disrupting and differentiating through faster innovation. Because it lies at the centre of system resilience, infrastructure modernization, greater agility, and future-proof competitive advantage, cloud computing has been nicknamed the innovation booster.

Most participants agreed that cloud computing had a favourable impact on enterprise development for start-ups inside and outside of the ICT industry and in adjacent and unrelated sectors. There has been debate over whether cloud computing has benefited the ICT industry. According to the participants, cloud computing has resulted in a competency evolution, which means that while the total number of employees in the sector remains roughly the same, for example, if previously there were 10 people responsible for specific operational business functions, today roughly only eight of them will focus on these activities. Because it now only needs two of them to focus on operational tasks, while the other eight are now more focused on tactical and strategic concerns that ensure ICT is more closely linked with the business (Mkansi & Landman, 2021).

Despite the negative perception of cloud-based job consolidation, several participants highlighted that cloud computing removes the expense of hosting server hardware while also shortening the distance between consumers and technology. This implies that a position that previously required a person to be based in each region can now be performed by someone sitting in another location. Organizations nowadays, for example, in South Africa, do not always require a headcount to fill that role (Roberts, Gordon, Struwig, Bohler-Muller & Gastrov, 2021). The other group of participants agreed that cloud

computing savings translate into technological innovation and have resulted in an increase in spinoff jobs, where individuals produce many applications, resulting in a proliferation of applications; some of these applications will thrive and result in enterprise development, yielding financial returns that translate into job creation. Furthermore, cloud computing has enabled significant innovation, which is why we now have FinTech and technical evolutions. We have seen the growth of new enterprises in South Africa, as well as local telecommunications giants such as MTN and Vodacom expanding into FinTech and insurance (Gantz & Minton, 2012).

Thus, specialisation is the foundation of competitiveness in global commerce; the other participants agreed that specialisation is a manner that the South African ICT industry, in collaboration with the government, may use as a competitive strategy. South Africa must concentrate on the specific area of the ICT sector for which it wants to be renowned, and then concentrate on growing that competence to obtain a higher degree of efficiency. Many countries, for example, specialise in manufacturing commodities and services indigenous to their region of the world and trading them for other goods and services. The participants asserted that the more specialised you become, the fewer competitors you face. You do not have to be all over the place, a jack of all trades, because once you specialise, you become more and more valuable and, you may be surprised, you become even more attractive to provide your specialised skills globally (Zhao et al., 2018).

This approach can be seen in countries that have chosen to specialise, such as Japan, which focuses on automotive and electronic equipment, China, which produces and sells more manufacturing goods than almost any country on earth, and India, whose major exports include petroleum products, jewellery, drug formulations, Information, and technology services, as well as business process outsourcing. The remark is made that specialisation leads to company development and growth, as evidenced by literature, and witnessed by participants, and that the outcomes will convert into enterprise development, industry expansion, and job creation in the long term. Economies that specialise in the production of products or services have a competitive edge. A corporation or nation with comparative advantage may provide an item or services at the lowest possible marginal cost and opportunity cost than another firm or country. When a country's economy is able to specialise in production for example the South African ICT industry specialising in a

specific technology function, it is more likely to gain from world trade (Nath & Goswami, 2018).

6.6 Discussion of research question 3: How does the human resource's function use strategic foresight to understand and plan for future jobs requirements due to cloud computing?

Cloud computing, according to the respondents, promotes continuous learning, which is the process of continually learning new skills and knowledge. This can take many different forms, including formal individual and organisational learning as well as casual social learning. It implies taking control of one's own fate and taking on new responsibilities. Continuous learning can occur in the workplace or on a personal level, such as through lifelong learning. Businesses must be imaginative, adaptive, and constantly changing to be competitive in today's global environment. This depends on the workforce's competence and knowledge. To innovate, try a new strategy, or do something new, you must learn. To see things in a new light and take the next step, people must learn new skills or obtain new information. When organisations do not support a continual learning process, innovation does not occur, methods do not change, and nothing new is done. Individuals, countries, and organisations should be willing to push themselves to acquire new skills and explore new abilities and ideas (Mkansi & Landman, 2021).

The individuals who were interviewed also stated that the South African ICT business is rapidly increasing and evolving, with substantial social and crisis management implications. Keeping up with the times necessitates not just a deep grasp of systems and their complexities, but also innovative and collaborative thinking and action. The government and corporations may use strategic foresight to generate realistic visions of different futures and possibilities, allowing them to plan accordingly. If one does not continue to learn new talents, their abilities will deteriorate. However, as most respondents stated, cloud is not a concern; rather, remaining current with industry digital skills needs is. There is a severe skills deficit, and the odd aspect is that South Africa has a history of poor educational outcomes. Because digital skills are a worldwide phenomenon, not simply a South African one (Gantz & Minton, 2012).

The ICT skills survey conducted by the JCSE-IITPSA in 2021 revealed that the ICT sector in South Africa appeared to have responded to the issues caused by the COVID-19

outbreak and related lockdowns. Organisations, on the other hand, continue to struggle to fill tens of thousands of roles, resulting in significant digital skills shortages. Over 200 ICT professionals have been questioned since the outbreak to examine how the pandemic and lockdown have affected their working conditions, as well as the supply and demand for ICT skills in their organisations (Schofield & Dwolatzky, 2021). The worldwide 4IR skills crisis, which is now expected to be over a million unfilled positions, exacerbates the country's skills shortfall. As a result of this plan, the industry will be better positioned to deal with future hazards and grab new prospects. Rather than predicting or forecasting the future, foresight will help South African ICT sector to discover patterns in the outer world and employ those insights to develop maps of the future environment. With these well-informed future maps, the government will be able to develop a well-informed strategy that can be tested, as well as aid industry in understanding and planning for future required skills, as commanded by cloud computing, in the medium-to-long term (Gantz & Minton, 2012).

6.7 Discussion of research question 4: How has cloud computing transformed the face of the ICT industry in South Africa due to ICT operations offshoring?

This study topic attempted to get insight into the selected overall issue, which asked whether cloud computing adoption leads to job losses and retrenchments. The goal was to learn how cloud computing has changed the face of the ICT sector in South Africa because of ICT operations offshoring. The research findings were compared to the literature covered in chapter two in the discussion. According to the research, Africa already has a high unemployment rate, as well as a lack of infrastructure and inadequate equipment to support the critical skills in demand in the 4IR. Subcontracting, also known as outsourcing, is the process of getting input from a third-party vendor who may be based in the same location as the subcontracting company or in a different part of the world (Forte & Ribeiro, 2020). Vertical specialisation, international segmentation, and outsourcing are all terms used in the literature to describe offshoring, and it is here that the word is emphasised (Forte & Ribeiro, 2020). Offshoring is generally motivated by cost savings, according to empirical research, and this is especially true in the manufacturing business, where offshoring has been found to hurt lower-skilled or regular positions. The fundamental distinction between high and low technology sectors, on the other hand, is

the sorts of offshored labour functions and the resulting domestic job losses (Bramucci, Cirillo, Evangelista & Guarascio, 2021).

Offshoring's negative effects on employment are concentrated among professionals and craftspeople in high-tech industries. As a result, it aims to improve the company's competitiveness in its markets. When job losses among manual labourers in low-tech industries were monitored, a mirror-like pattern formed (Bramucci et al., 2021). Whether through outsourcing or foreign direct investment, shifting activity from one nation to another produces changes in the labour market from the start. Furthermore, the widespread belief that new technology, foreign competition, and output offshoring are to blame for structural changes in the labour market, notably in manufacturing, where a considerable number of jobs were lost in the United States between 2000 and 2010, is incorrect (Forte & Ribeiro, 2020).

Because of cloud computing and its benefits, the ICT sector is rapidly increasing and evolving, producing significant regional social and economic challenges, including the country's unemployment crisis, according to those questioned. Local managed services companies import hardware and software and bundle implementation and maintenance services around it, which is how the traditional ICT business in South Africa works. The issue is that hyperscale cloud corporations set up shop in a local nation and provide cloud computing services. Cloud providers are using an offshoring model for ICT processes as part of their service fulfilment and assurance strategy. Cloud providers can offload ICT services to their centres of excellence situated outside of their country of operation using the offshoring concept. The availability of low-cost ICT expertise is the driving force behind these cloud computing companies' offshoring strategy. Local traditional ICT managed services providers' business and services are now migrated to hyperscale cloud providers' centres of excellence situated outside of the local nation (Nath & Goswami, 2018).

These developments, according to the participants, have had an impact on enterprises in the South African ICT economic sectors. Indeed, in the preceding decade, IT offshoring to underdeveloped countries has increased. Because of their presence in the global IT offshoring sector, hyperscale cloud providers have profited from cheaper labour costs in emerging countries. Local governments are concerned that jobs will be relocated to the nations where these cloud providers' centres of excellence are located because of this

business model. Even though cloud computing is not the same as manufacturing, it has certain characteristics that indicate cloud adoption will destroy some IT jobs. Automation saves money by removing humans from routine tasks, lowering labour costs, and reducing unpredictability in outcomes, as well as reducing overhead, errors, and downtime. As your data centre shrinks, the staff who build, manage, and debug your network, servers, and applications will become redundant. With fewer staff, workloads, security, and client contracts can all be controlled (Agrawal et al., 2019).

From the participants' perspective, cloud computing has revolutionised the face of the ICT sector in South Africa because of ICT operations offshoring. Instead of killing jobs, cloud computing is creating new and varied vocations that will be filled by a new type of worker. It's essential to have new skills, an entrepreneurial attitude, flexibility, agility, and the ability to quickly learn, unlearn, and relearn new skills. Education is the first step in guaranteeing that the South African ICT industry can meet the challenge. If we are to survive in a world increasingly controlled by technology, we must learn new and more relevant digital skills. The idea is to equip ourselves with the skills we need to adapt to changes in the workplace. Both the organisation and the person are involved in the development of skills (Schofield & Dwolatzky, 2021). According to secondary data suppliers, one part of the ICT business lost roughly 9% of its workers, while the other lost 7.1 percent. Overall employment in the industry declined by 0.7 percent over the five-year period, according to ICASA. In 2020, the number of ICT personnel will have reduced by 0.3 percent, while job opportunities will have decreased by 2.4 percent (ICASA, 2021).

According to the respondents, the present approach of other software manufacturers (OSM) includes technology lift and shift activities in collaboration with hyperscale cloud providers. Migrating client-based in-house ICT systems to the cloud is part of this process. What this means for traditional ICT service providers is that they are now under pressure to adapt their methods of thinking. The fact that cloud computing has made access to innovative and cutting-edge IT solutions so accessible for end users was another noteworthy finding. Unlike the prior business model, which required customers to get hardware before installing and using a business programme. Furthermore, the debate has shifted and is now at a higher level. Customers want a service provider to deliver creative solutions that empower them, as opposed to dialogues confined to hardware and software

in the ICT sector. Finally, the purpose of IT transformation projects is to improve the competitiveness of the company (Joshi & Omkarnath, 2020).

Other participants predicted that the sector would move from job seekers to economic value creators. That does not imply that I will get paid at the end of the month; rather, it implies that the new sort of worker will be selling their services with other organisations. This can be in the form of a contractual type of work, but it might also just be in the form of the capacity to do something that adds value to someone else's life, and they will compensate the individual in some way. Some of the participants claim that the reason they aren't investing as much in hyperscale cloud computing partnerships is because cloud providers force a one-sided relationship, which results in local players lowering their value proposition in the market and becoming more reliant on cloud providers. According to the participants' analysis, their relationship with cloud providers is likewise short-term oriented, because the cloud provider ends up giving the client greater autonomy and ownership while reducing dependency on partners (Ding & Li, 2018).

6.8 Conclusions of the Discussion section

This shift indicates that, in order for the South African ICT sector to flourish, and for local ICT players to be profitable and competitive, they will have to move up the value chain and come up with new ways to give commercial value rather than just technology transformation activities (Zhao et al., 2018). The following chapter will cover the conclusion, which contains suggestions, interventions to the South African ICT operating environment, regulatory frameworks, and education curriculum, as well as the terrain for future research.

7. CONCLUSIONS AND RECOMMENDATIONS

7.1 Introduction

The study's objective was to look at how cloud computing has changed the face of the ICT sector in South Africa because of ICT operations outsourcing, as experienced by ICT leaders, industry experts, and small and medium business owners in the context of the South African ICT industry. The first chapter stated that cloud computing represents a substantial shift in how ICT services are planned, developed, scaled, maintained, and paid. Businesses can employ third-party computer resources for their day-to-day information communication technology (ICT) service needs using the cloud computing paradigm. The purpose of cloud computing is to provide all of the capability of existing ICT services while also enabling previously unthinkable new capabilities, all while significantly decreasing the upfront computing expenses that prevent many businesses from embracing cutting-edge ICT services (Rittinghouse & Ransome, 2017).

Cloud computing, according to Gillwald and Moyo (2014), has the potential to boost economic development by considerably cutting costs and boosting efficiency. Some of the benefits of cloud computing may be enjoyed straight away in the small and medium company (SME) and government sectors. Small companies may now employ cloud computing to gain access to ground-breaking ICT solutions that were previously only available to major organisations, boosting entrepreneurship and innovation. The study achieved its goals and added to a deeper, more nuanced knowledge of cloud computing as a phenomenon and how it has transformed the face of the South African ICT business because of ICT operations as a phenomenon perceived by the target audience.

Furthermore, the research has revealed insights on the industry's specific difficulties, such as the digital skills shortage, ICT regulatory frameworks, and an education curriculum that is meeting its intended purpose. The research's result will be provided in this final chapter. The principal conclusions will be stated first, followed by the Implications for management and stakeholders. The research limitations will also be examined, and recommendations for future research.

7.2 Principal conclusions

7.2.1 Research question 1: What effect does cloud computing have on South Africa's existing data centre and IT outsourcing services business?

The goal was to determine if the ICT sector has evolved as promised by cloud providers and to assess whether the South African ICT industry has grown or shrunk. Cloud computing is a key driver of South Africa's digital transformation. It is a novel way to delivering information technology services that is built on a flexible and on-demand business model. Cloud service providers are companies that provide these computing services, and cloud computing services are often paid based on use, similar to how utility services are invoiced (Bayramusta & Nasir, 2016; Schofield & Dwolatzky, 2021). As a result, hyperscale providers are expanding into new locations, such as South Africa, and establishing data centres in Cape Town and Johannesburg. Then there is the deeper cloud, which is still under the jurisdiction of that centre of excellence somewhere. The researcher sought to know more about how it affects the local ICT sector, especially from the perspective of small and medium firms like systems integrators and managed service providers. What are the consequences of such a loss? Yes, we are aware that cloud providers have told us that there would be spin-off jobs in other industries, either in marketing or sales. Importing IT equipment, whether software or hardware, wrapping services around it, offering managed services, or providing break fix are all business models used by South African ICT managed services companies. That is the way South African ICT industry works. With the arrival of cloud in the country, that part of the work is no longer sustainable for the local players.

7.2.2 Research question 2: Do these spare IT budgets due to cloud computing cost savings translate into technology innovation that allows enterprise advancement, which could yield financial returns that translate into job creation?

Despite the negative perception of cloud-based job consolidation, it has resulted in a surge in spinoff jobs, in which individuals create a huge number of applications, resulting in a proliferation of applications; some of these applications will survive, while others will fail. Cloud computing, on the other hand, has fostered a lot of innovation, which is why we now have FinTech and technical advancements. In South Africa, we have seen the emergence of new businesses, as well as local telecommunications majors like MTN and Vodacom

venturing out into FinTech and insurance. Organizations across the world, including South Africa, are progressively using cloud computing services. Companies utilise them, according to the literature, because they give efficient and cost-effective solutions. Cloud computing provides businesses with useful tools to help them function more efficiently and improve their ICT (Mosweu et al., 2019).

7.2.3 Research question 3: How does the human resource's function use strategic foresight to understand and plan for future jobs requirements due to cloud computing?

Despite substantial research into the link between technology and the changing labour environment, concerns about the arrival of automation and its impact on the labour market are growing. In the 4IR era, the focus of study has been on jobs that are most likely to be disrupted by automation. There has been very little, if any, research on the South African ICT industry's readiness to meet present and future demand demands, as well as the skill sets of the labour force that support market and technical changes (Mkansi & Landman, 2021). You will suffer badly from your redundant skillset if you remain stationary and do not develop your talents. Cloud, on the other hand, is a not a problem; it is a question of keeping up with the demand for new digital capabilities that cloud has spawned. There is a significant shortage of digital skills, and what is more interesting is that South Africa has a low-skilled population. As a result, we are witnessing a worsening of the situation. Because digital skills are a global, not just a local, phenomena. It is even worse in the cloud computing field, where over a million roles are now vacant due to a lack of requisite skills. When a cloud computing expert emerges in the local ICT business today, the worldwide marketplace immediately begins after him or her, resulting in a tug of war between the local and global markets. The issue for us in South Africa is that we are coming off the back of a general skills shortage, which is now exacerbated by the fact that digital skills are global, not regional. So now we are competing in a pool where we set aside space to foster resources with certain digital skills, and once they have honed those skills, they are in high demand on a global basis. What can be done is to go back to the beginning and approach the problem from a macro–South African perspective; a long-term plan is required.

7.2.4 Research question 4: How has cloud computing transformed the face of the ICT industry in South Africa due to ICT operations offshoring?

Because of the rapid growth of cloud computing, stakeholders must rethink how they approach skill development. For example, cloud computing has advanced to the point where, rather than putting programmes on specific equipment, it now uses containers, a new type of technology that allows applications to be distributed over any infrastructure. Individuals with the capacity to develop and deploy such technologies are in high demand, and South African companies and multinational enterprises routinely seek them out. The usage of cloud computing services poses legal and regulatory challenges across the world, particularly in terms of data security and privacy. Problems have been expressed regarding whether South Africa's ICT legislation and regulatory frameworks are adequate to address the country's growing cloud computing regulatory concerns. As a result, a study is needed to see how applicable existing legal frameworks are to cloud computing, as well as the issues that come with it (Schofield & Dwolatzky, 2021; Mohlameane & Ruxwana, 2020).

These developments have had an impact on businesses in the South African ICT sector. Indeed, in the preceding decade, IT offshoring to underdeveloped countries has increased. Because of their presence in the global IT offshoring sector, hyperscale cloud providers have profited from cheaper labour costs in emerging countries. This feature has alarmed local governments, who fear that jobs would be relocated to nations where these cloud companies' centres of excellence are located. Even though cloud computing and manufacturing are not the same, they have several characteristics that imply cloud adoption will remove certain IT jobs. Automation saves money by removing humans from routine tasks, lowering labour costs, and reducing unpredictability in outcomes, as well as reducing overhead, errors, and downtime. As your data centre shrinks, the staff who build, manage, and debug your network, servers, and applications will become redundant. With fewer staff, workloads, security, and client contracts can all be controlled.

7.3 Implications for management and stakeholders

7.3.1 Implications for management

The single most major hurdle to cloud adoption, and the single most significant barrier that customers encounter when it comes to cloud adoption, is the single most significant barrier

that consumers experience when it comes to cloud adoption. Depending on the customer's stage in the cloud journey. IT security, on the other hand, appears to be the most serious issue in general. However, a multi-cloud strategy's digital IT skill, data sovereignty, and complexity should not be neglected. The ultimate purpose of IT transformation projects is to improve the competitiveness of the company. When compared to traditional ICT company, however, if the customer's objective is just to eliminate hardware and virtualize everything in the cloud, the cloud computing strategy may be rather costly.

Businesses want to accept cloud computing as a disruptive technology, but they don't want their jobs to be disrupted. However, you can't truly disrupt technology without also changing an organization's operational model and workflow. The findings also revealed that cloud computing's initial migration costs surpass the long-term advantages it generates. Since of the Covid pandemic, companies are reducing and cutting off workers who are considered non-value adders because they work from home. However, the overarching theme is that cloud computing has more benefits than drawbacks since job losses are caused by a lack of digital skills rather than cloud computing. A different sort of worker will occupy these new roles in the ICT business. New skills, an entrepreneurial attitude, flexibility, agility, and the ability to quickly learn, unlearn, and relearn new skills are all necessary.

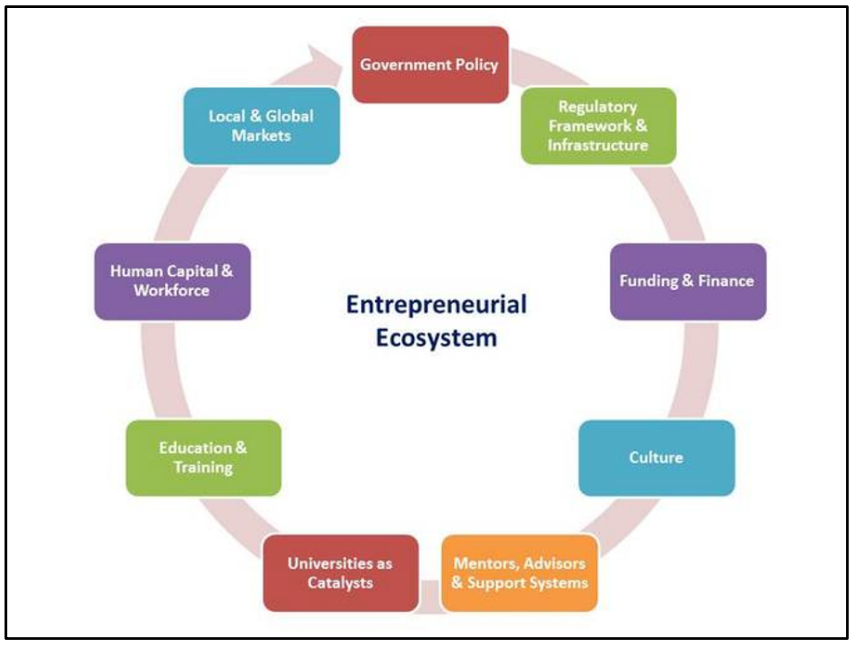
Education is the first step in ensuring that we are competent of completing the assignment. If we are to survive in a world increasingly controlled by technology, we must learn new and more relevant digital skills. Rather of killing jobs, the cloud is creating new and diverse ones. The goal is to provide the industry with the skills it needs to stay up with the changing world of work. South Africa also need a set of leaders with the savvy and courage to bring about the necessary changes. Executives with a global perspective, ethics, creativity, communication, and execution abilities are all required. To acquire access to fresh ideas, corporate venture investors are increasingly turning to open innovation start-up programmes. Big organisations are using corporate accelerators, a subtype of open Innovation start-up programmes, to connect with creative entrepreneurial enterprises in greater numbers than ever before. In corporate strategy, collaborations between established corporations and entrepreneurs are becoming increasingly widespread. In addition to the two most common engagement vehicles, corporate accelerators and

corporate venture funding, several sorts of start-up partnership models have developed in the real world. Through start-up contractor programmes, companies can obtain access to innovations that improve product competitiveness or process productivity by collaborating with start-ups based on supplier connections. By facilitating cross-collaboration between various partners and independent software suppliers, the benefits of a big ecosystem allow for faster solution generation. New goods and services may be quickly built on the cloud using a Lego block model, allowing hyperscalers and third parties to profit from cutting-edge technologies and methods with minimal risk. Growing the main business and client base while diversifying portfolios may provide a lot of value.

7.3.2 Framework of promoting the development of entrepreneurial ecosystems

The encouragement of competition, entrepreneurship, and innovation can help the South African ICT industry achieve increased economic growth. This policy will also foster entrepreneurship, which will help to minimise unemployment, particularly among young. According to several of the participants, a crucial result from this research was that employment development did not come from huge corporations, but from tiny, independently held firms. It was suggested that government policy should rely on indirect rather than direct techniques, with a larger emphasis on small businesses' participation.

Figure 18: Entrepreneurial Ecosystem Mazzarol 2014



Source: (Mazzarol, 2014)

7.3.3 Implications for government and ICT industry stakeholders

Although ICT offshoring, or the migration of ICT activities to another country, has gained a new dynamic as labour costs have decreased and cloud computing has advanced dramatically. This has aided hyperscale cloud computing providers in relocating ICT services to places where the atmosphere is more favourable, particularly in respect to the necessary skills required to support cloud infrastructure and related customer assurance and fulfilment activities. That is why Eastern European nations like Poland and Serbia have a decent chance since they have a robust telecommunications infrastructure and a high education. To provide a centre of excellence, a cloud provider must locate their ICT operations centre in an environment that is conducive to the skills hub and service centre's functioning. This centre of excellence must be supplied with electricity, enough and dependable telecommunications infrastructure, and the necessary skills to maintain this centre running. Specialisation is thus the foundation of global competitiveness, and it is a manner that the South African ICT industry, in collaboration with the government, may use as a competitive strategy. South Africa must concentrate on the specific area of the ICT sector for which it wants to be renowned, and then work to expand that expertise to increase efficiency. Many nations, for example, specialise in manufacturing commodities and services unique to their region of the globe, which they then exchange for other goods and services. Industry and government must recognise that the more specialised you become, the fewer competitors you will face. You do not need to be all over the place, a jack of all trades, because once you specialise, you will become increasingly valuable and, you may be surprised, even more attractive to provide your specialised skills globally.

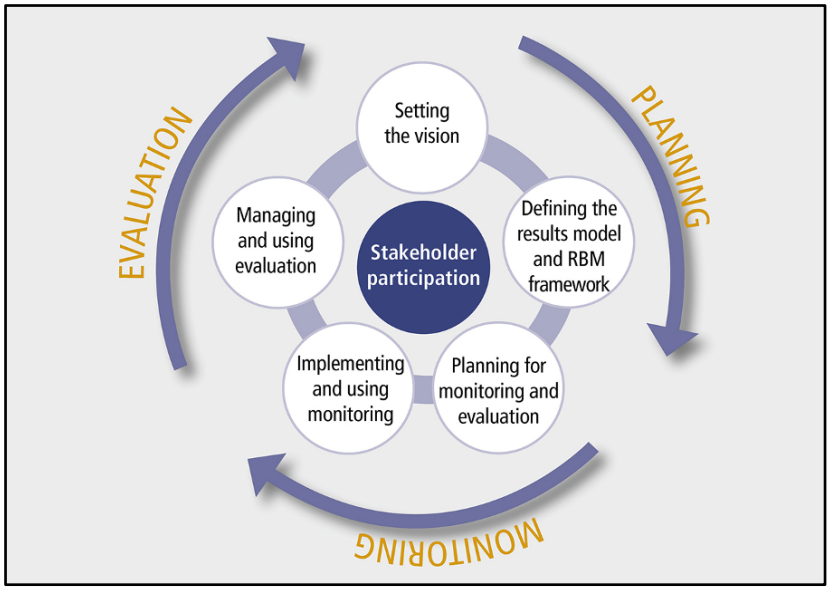
This approach can be seen in countries that have chosen to specialise, such as Japan, which focuses on automotive and electronic equipment, China, which manufactures and sells more manufacturing goods than any other country on the planet, and India, which exports petroleum products, jewellery, drug formulations, IT services, and business process outsourcing. The conclusion is reached that specialisation adds to business development and growth, as evidenced by literature, and observed by participants, and that the consequences will, in the long run, translate into enterprise development, industry expansion, and job creation. To formalise and assure service consistency, cloud providers establish and develop centres of excellence in certain countries. For instance, Oracle maintains a managed cloud services centre of excellence in Romania, while IBM has one in Poland. As a result, the traditional ICT firm, which was established on importing software

and hardware and then wrapping services around it, erodes in a local nation. This is due to the entry of cloud providers into the local market, and services previously handled by traditional managed service providers have been relocated to centres of excellence in other countries. A cloud provider must situate their ICT operations centre in an environment that is suitable to the skills hub and service centre functioning to offer a centre of excellence. This centre of excellence will require energy, sufficient and reliable telecommunications infrastructure, and reasonably priced labour, as well as the essential skills to keep it running.

7.3.4 Proposed Monitoring and Evaluation framework

This paradigm change is based on five principles: developing country ownership, alignment with partner country objectives and local systems, donor action harmonisation, management for results, and reciprocal responsibility. However, assessments on the application of assistance effectiveness principles suggest that focusing on concrete results and determining how to quantify them remains a struggle. Creating a culture of learning from evaluations and regularly incorporating assessment recommendations into future programming is likely the most challenging of all.

Figure 19: Monitoring and Evaluation framework



Source: (GFA Consulting Group, n.d.)

7.4 The research limitations

The ability to generalize is limited because this was an exploratory qualitative research study. In Section 4.14, the restriction in terms of technique was explored. Three other general constraints, however, have been recognised and will be described further down.

- Because of the Covid-19 epidemic and lockdowns, online interviews were done utilising video conferencing services (Microsoft Teams, Google Meet or Zoom) for the 15 participants.
- Due to the structure of the interviews, the researcher could get insights and learn from the individuals by interviewing through observation (Park & Park, 2016).
- Because only 14 people from South Africa and one from Botswana were questioned, geographical bias might have impacted the results.

7.5 Suggestions for future research recommendations for future research

According to the conclusions of the study, various existing ICT policies and regulatory legislation have an influence on cloud computing. The survey also indicated that South Africa's Department of Public Enterprise has reasonable policies with excellent goals for enterprise growth. However, the lack of comprehensive and effective monitoring and evaluation systems is the reason why these policies look ineffective. The government should implement key performance indicators aimed at enterprise growth and carefully monitor it, according to the proposal in connection to monitoring and evaluation. Considering the benefits and challenges of cloud computing, this article makes the following proposal that require further research for the ICT sector in South Africa:

7.5.1 Training and Development

- One way to solve the digital skills problem is to include technology studies as part of the elementary school curriculum for the country and the ICT sector to cope with the expansion of cloud computing.
- To recruit and retain qualified people, the sector should not only expand capacity, but also push 4IR skills training, provide competitive compensation, and classify digital competences as scarce talents.
- Continuous training may help enhance awareness of cloud computing services and their influence on outmoded ICT business models, since it was discovered that there is a need to create local and knowledge in high technology, notably software development.

7.5.2 Laws affecting the industry

- The literature-based analysis indicated that South African ICT industry regulation was insufficient for talent monitoring and assessment, as well as company development within the sector.
- As a result, it is suggested that the ICT Legislation be changed to allow for more thorough monitoring and assessment.
- Specialisation is the foundation of competitiveness in global commerce; the other participants agreed that specialisation is a manner that the South African ICT industry, in collaboration with the government, may use as a competitive strategy.
- South Africa must concentrate on the specific area of the ICT sector for which it wants to be renowned, and then concentrate on growing that competence to obtain a higher degree of efficiency.

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9. APPENDIX A: CONSISTENCY MATRIX

RESEARCH QUESTIONS	SECTIONS IN LITERATURE REVIEW	DATA COLLECTION TOOLS	ANALYSIS TECHNIQUE
The Phenomenon: The concept of cloud computing from the participants' perspective.	•(Malik, Wani & Rashid, 2018). •(Bayramusta & Nasir, 2016) •(DeStefano, Kneller & Timmis, 2020) •(Gasiorowski-Denis, 2015) •(T. Mosweu, Luthuli & O. Mosweu, 2019) •(Kathuria, Mann, Khuntia, Saldanha and Kauffmann, 2018) •(Marston, Li, Bandyopadhyay, Zhang & Ghalsas, 2011) •(Rittinghouse & Ransome, 2017) •(phoenixNAP, 2018) •(Microsoft Azure, 2021) •(Gillwald & Moyo, 2014) •(Drahokoupil & Fabo, 2018) •(Vithayathil, 2018)	**Secondary data sources:** • Literature & Document Review • Popular Sources	•Phenomenological analysis •Qualitative design •Thematic narration and discussion •Thematic content analysis
Research question 1: What effect does cloud computing have on South Africa's existing data centre and IT outsourcing services business?	•(Karimi-Alaghehband & Rivard, 2019) •(Statistics South Africa [StatsSA], 2017) •(Bano, Qureshi, Rais, Tufail & Qayyum, 2019) •(Jacobs, Nielson and Parle 2016) •(Joshi & Omkarnath, 2020) •(Jacobs, 2018) •(Ding & Li, 2018) •Mohlameane & Ruxwana, 2020) •(Moyo, 2020) •Schofield & Dwolatzky, 2021) •(Rodrik, 2006)	**Primary & Secondary data sources:** • Interviews Guide • ATLAS.ti • Otter.AI • Video conferencing platforms (Zoom, Microsoft Teams, or Google Meet) • Nesstar on StatsSA webpage • Microsoft Excel	•Descriptive statistics •Regression Analysis •Quantitative data analysis •Phenomenological analysis •Qualitative design •Thematic narration and discussion •Thematic content analysis

Research question 2: Do these spare IT budgets due to cloud computing cost savings translate into technology innovation that allows enterprise advancement, which, as a result, yields financial returns that translate into job creation?	•(Zhao, Song & Li, 2018) •(StatsSA, 2015) •ICASA, 2020) •(ICASA, 2021) •(Schofield and Dwolatzky 2019) •(Battistini, Hacklin & Baschera, 2013) •(Pinkow & Iversen, 2020) •(Schofield & Dwolatzky, 2021) •(phoenixNAP, 2018) •(Nunes & Abreu, 2020)	**Primary Data Sources:** • Interviews Guide • ATLAS.ti • Otter.AI • Video conferencing platforms (Zoom, Microsoft Teams, or Google Meet)	•Phenomenological analysis •Qualitative design •Thematic narration and discussion •Thematic content analysis
Research question 3: How does the human resource's function use strategic foresight to understand and plan for future jobs requirements due to cloud computing?	•(Nath & Goswami, 2018) •(Mkansi & Landman, 2021) •(Roberts, Gordon, Struwig, Bohler-Muller & Gastrov, 2021) •(Schofield & Dwolatzky, 2021) •(WEF, 2020) •(South African Police Service, 2021) •(Peter, 2019)	**Primary Data Sources:** • Interviews Guide • ATLAS.ti • Otter.AI • Video conferencing platforms (Zoom, Microsoft Teams, or Google Meet)	•Phenomenological analysis •Qualitative design •Thematic narration and discussion •Thematic content analysis
Research question 4: How has cloud computing transformed the face of the ICT industry in South Africa due to ICT operations offshoring?	•(Forte & Ribeiro, 2020) •(Bramucci, Cirillo, Evangelista & Guarascio, 2021) •(Drahokoupil & Fabo, 2018) •(Martínez-mora & Lucas, 2019) •(Agrawal, Taylor, Agrawal & Seshadri, 2019). •(Hummels, Munch & Xiang, 2018)	**Primary Data Sources:** • Interviews Guide • ATLAS.ti • Otter.AI • Video conferencing platforms (Zoom, Microsoft Teams, or Google Meet)	•Phenomenological analysis •Qualitative design •Thematic narration and discussion •Thematic content analysis

10. APPENDIX B: INTERVIEW SCHEDULE

REVIEW OF THE RESEARCH

The impact of cloud computing on the South African Information and Communications Technology (ICT) sector as a result of offshoring the ICT functions.

The study's aim was limited to:

(i) Understanding what effect cloud computing has on South Africa's existing data centre and ICT outsourcing services business.

(ii) Assessing whether the freed-up ICT budgets because of cloud computing cost savings translate into technological innovation that enables company growth and results in job creation.

(iii) Identifying whether the Human Resources function use strategic foresight to understand and plan for future jobs as advocated by cloud computing; and,

(iv) Determining how cloud computing has transformed the face of the ICT industry in South Africa due to ICT operations offshoring.

CONVERSATION GUIDE QUESTIONS

1. How many years and months have you worked in the ICT field?
2. What is your highest academic qualification?
3. How has cloud computing changed your work, and what are the primary advantages and disadvantages you can share?
4. How has cloud computing changed the ICT industry in your opinion, and what are the primary pros and cons you can share?
5. What about cloud computing has impacted job creation?
6. Did you ever had to downsize or retrench employees during that time?
7. How many of the retrenchment candidates were able to escape layoffs by taking on a different/new function inside the company?
8. What are your department's most pressing concerns?
9. What influence do these problems have on your company's operations?
10. Is there a shortage of digital ICT skills or issues in your company?
11. What steps is your company taking to overcome the digital ICT skills gap?

11. APPENDIX C: LIST OF CODES GROUPED INTO CATEGORIES

Code Category Groups	Code Name
The definition and characteristics of Cloud Computing	0-01-Cloud makes life easier
	0-02-Cloud deployment options provide control
	0-03-The Cloud has changed the way of doing things in a positive way
	0-04-With cloud some roles can be outsourced to cloud provider while keeping some
	0-05-Cloud is an amortised business
	0-06-Cloud moves expense from Capex to Opex
	0-07-Cloud requires that one to expense technology investment in the same year opposed to traditional amortisation.
	0-08-Cloud changes hardware roles to software roles
	0-09-Cloud help businesses to go to market quicker with new products
	0-10-Cloud helps businesses to drive product development
	0-11-Cloud helps businesses to focus more on their customer needs than on tech
	0-12-Consistency of cloud takes the worry away
	0-13-Cloud brings new uses cases
	0-14-Sharing of resources benefit of cloud
	0-15-Cloud computing is disruptive
	0-16-Cloud computing is revolutionary
	0-17-Cloud allows businesses to focus on their core business
	0-18-Cloud allows businesses to do more with less
	0-19-Cloud is means to end
Cloud Computing Benefits	5-01-Agility benefit of cloud
	5-02-Choice benefit of cloud
	5-03-Diversity benefit of cloud
	5-04-Dynamic benefit of cloud
	5-05-Efficiency benefit of cloud
	5-06-Flexibility benefit of cloud
	5-07-High Availability benefit of cloud
	5-08-High Scalability benefit of cloud
	5-09-Reliability benefit of cloud
	5-10-Security benefits of Cloud
	5-11-Speed benefit of cloud
	5-12-Cloud is good for entrepreneurs in adjacent industries
	5-13-Consistency benefit of the cloud service
	5-14-Seamless benefit of cloud
	5-15-Elasticity benefit of cloud computing
	5-16-Meeting capacity demand benefit of cloud

	5-17-On demand benefit of cloud
	5-18-Pay for what you use benefit of cloud
Cloud Computing Downsides	6-01-Loss of lower-level jobs due automation
	6-02-Fear of loss of power from older generation
	6-03-Fear of the unknown stalling cloud adoption
	6-04-ICT leadership resistance to change on cloud
	6-05-New leadership challenge introduced by cloud
	6-06-New Management challenge introduced by cloud
	6-07-Resistance to learn new skills from older employees
	6-08-Cloud promotes vendor lock-in due to vendor hosting critical data
	6-09-Cloud brings shock bills or cost if not managed correctly
	6-10-Cloud model is unpredictable when it comes to usage and billing
	6-11-Cloud can be expensive when not managed correctly
	6-12-Fear of job loss make people apprehensive to adopt cloud
RQ1-The effect cloud computing has on traditional ICT industry	1-01-Customers becoming cleverer in ICT sector due to cloud
	1-02-Customers becoming more cost sensitive in ICT sector due to cloud
	1-03-Customer's cloud adoption due to cloud hyperscalers in country presence
	1-04-Customers demanding new fit for purpose solutions due to cloud
	1-05-Customers outsourcing ICT infrastructure due to cloud
	1-06-Customer's security concerns due to out of country cloud
	1-07-Globalisation of ICT skills due to cloud
	1-08-ICT Industry players
	1-09-ICT Job growth due to cloud
	1-10-Increase in global competition for ICT business
	1-11-Increase in global competition for ICT skills
	1-12-Increased cloud adoption due to Covid
	1-13-Lack of ICT skill in country
	1-14-New business models in ICT sector due to cloud
	1-15-New skills in ICT sector due to cloud
	1-16-Positive change in traditional ICT business due to cloud
	1-17-Positive effects of cloud computing on traditional ICT
	1-18-Traditional ICT business dying due to cloud
	1-19-Cloud hybrid model allows skills transfer between client and vendor
	1-20-There is a cloud skills gap in country
	1-21-Traditional ICT business did not promote skills transfer
	1-22-Traditional ICT business somewhat made customer dependant on vendor
	1-23-At a principal level cloud is destroying traditional ICT business
	1-24-Cloud made traditional ICT business expensive due to economies of scale
	1-25-Cloud opened new opportunities and way of work

	1-26-Cloud providers killing traditional ICT business in country
	1-27-Cloud set ICT industry back on a downward trajectory from creating employment
	1-28-Cloud speed benefit leads to traditional ICT business not being competitive
	1-29-Lack of innovation negatively impacts ICT industry
	1-30-Lack of planning negatively impacts ICT industry
	1-31-Less IT graduates absorbed into industry due to cloud
	1-32-Negative impact of cloud on traditional ICT business due to cost
	1-33-Traditional hosting business lost relevance in the private sector
	1-34-Traditional hosting business remained relevant in the public sector
	1-35-Traditional ICT loss of market share due to cloud
	1-36-Traditional ICT loss of market share due to offshoring
	1-37-Traditional ICT MSP ability to innovate eroded by cloud
	1-38-Traditional managed hosting business eroded by cloud
	1-39-Cloud OEMs partnership is one sided as vendors drive control and ownership
	1-40-ICT Industry losing revenue due to changed ownership structures
	1-41-Local ICT MSPs become prey to large global MSPs due to global competition
	1-42-Local ICT MSPs swallowed by large OEMs to build market traction in local country
	1-43-Loss of jobs due to mergers and acquisitions due to cloud and high global competition
	1-44-Public and Private sector coming up with a plan to focus area of ICT specialisation.
	1-45-Negative employment impact on traditional ICT hardware business
	1-46-Traditional systems integrators should be seeing more business due to cloud
	1-47-South Africa is immature in cloud
	1-48-The immaturity of ZA in cloud is the reason for the skills shortage
	1-49-Cloud has changed the ICT industry from body shopping to service oriented
	1-50-Cloud has negatively impacted traditional hosting due to automation and consolidation
	1-51-Consolidation of ICT assets due to cloud
	1-52-Cross utilisation use of cloud benefit
	1-53-Efficient utilisation of ICT assets benefits of cloud
	1-54-It is still business as usual for ICT services in public sector
	1-55-Modernisation of equipment, business application and processes due to cloud
	1-56-No change in public sector in relation to cloud adoption
	1-57-Cloud brought complexity of accountability in the ICT industry
	1-58-Cloud has brought security exposure in ICT
	1-59-Cloud has reduced the risk in relation to business disaster

	1-60-Cloud is an enabler for transitioning into the evolution of traditional ICT
	1-61-Cloud takes away the control and responsibility from the owner/customer (ICT Industry)
	1-62-Cloud empowers ICT consultants in how they take innovation to customers
	1-63-Cloud has changed how technology is sold to customers in the ICT industry
	1-64-Cloud has changed ICT industry from being IT architecture focused to business
	1-65-Cloud is forcing downstream players to move up the technology value chain
	1-66-Cloud redefining ICT roles into business consultants
	1-67-Large cloud OEM taking the services business also from the local players
	1-68-Africa ICT industry lacks infrastructure
	1-69-Cloud turned ICT tech into a utility-based billing model
	1-70-The digital age is turning the work force from being job focused but more to value providers/exchangers
	1-71-Cloud providers have economies of scale and can invest much in security than traditional ICT
RQ2-Cloud computing IT budgets cost savings leads to innovation, enterprise advancement and job creation	2-01-Consolidation of jobs due to cloud
	2-02-Cost benefits of Cloud
	2-03-Drop in skills benefit of cloud
	2-04-Entrepreneur benefit of cloud
	2-05-Fewer people required to do same job due to cloud
	2-06-Innovation benefit due to cloud
	2-07-New job creation due to cloud
	2-08-New roles created because of cloud
	2-09-Competition increase for skills due to cloud
	2-10-Having skills inhouse makes Cloud SaaS not cost competitive
	2-11-Not easy to compare number new jobs vs old jobs
	2-12-Not easy to measure whether cloud saves jobs
	2-13-Not easy to measure whether cloud savings lead to new jobs
	2-14-Not easy to quantify the number of jobs created by cloud
	2-15-Traditional ICT cheaper when compared to Cloud SaaS
	2-16-Cloud bring new job opportunities
	2-17-A challenge of balancing job losses versus creation due to offshoring
	2-18-Cloud negative affecting enterprise development
	2-19-Lack of centre of excellence in country leads to loss off opportunities
	2-20-Positive enterprise development for start-ups outside the cloud business/ICT industry
	2-21-70% of global employment is sitting at SMEs
	2-22-Cloud eliminated barriers to entry
	2-23-Digital skills specialisation leads to competitive advantage

	2-24-Global Cyber skills shortage brings opportunity for local
	2-25-No ecosystem to drive entrepreneurship in ICT
	2-26-No ecosystem to drive innovation in ICT
	2-27-Partnering with Cloud OEMs forces SMEs to be dependent on Vendor
	2-28-Partnering with Cloud OEMs is short term for local SMEs
	2-29-Partnering with Cloud OEMs makes clients more dependent on Cloud vendor than SME
	2-30-Partnering with Cloud OEMs makes clients more reliant on Cloud vendor than SME
	2-31-Partnering with Cloud OEMs waters down local ICT business value proposition
	2-32-Private must invest in skills development
	2-33-Private sector must invest in enterprise development
	2-34-Specialisation leads to differentiation
	2-35-Specialising helps local ICT firms with new business opportunities
	2-36-Specialising leads to enterprise development
	2-37-There isn't an enabling environment now for SME ICT players to come in and compete in south Africa
	2-38-Using data and information as means to enterprise development
	2-39-Lack of funding negatively affects enterprise development
	2-40-Managing the Cloud also brings job opportunities
	2-41-Using innovative funding methods to drive enterprise development (Crowd funding i.e.)
	2-42-Layoffs due to cloud forcing firms to change their business models
	2-43-SMEs not paid in time contributes to negative enterprise development and job creation
	2-44-South African should promote vendor capital - Section 12J
	2-45-There will be an increase in jobs to match the local cloud adoption
RQ3-HR function use strategic foresight to plan for digital or 4IR skills requirement	3-01-Automation of repetitive jobs due to cloud
	3-02-Competition increase for jobs due to cloud
	3-03-Competition increase for skills due to cloud
	3-04-Enrichment of skills because of cloud
	3-05-Evolution of skills because of cloud
	3-06-Job complexity increase due to cloud
	3-07-Training for new skills change due to cloud
	3-08-Training for new skills easy
	3-09-Opportunity to learn new skill due to cloud
	3-10-Using foresight to plan for future job requirements
	3-11-Developing skills through on-the-job training
	3-12-Developing skills through professional certification training
	3-13-Digital skills are a global phenomenon not only for south Africa
	3-14-Driving Graduate programs for skills development
	3-15-Negative impact of not upskilling leads to loss of job

	3-16-Not upskilling yourself makes one skill redundant
	3-17-New roles created by cloud should also take peoples aspirations into account
	3-18-Businesses are sponsoring staff education to drive skills development
	3-19-Businesses as CSI training society on digital skills to the ICT skills issue
	3-20-Businesses as CSI training society on digital skills to address unemployment
	3-21-Skills development has stalled due to Covid
	3-22-Retrenchments due to skills not being relevant anymore
	3-23-Cloud fosters continuous learning
	3-24-Few students studying tech qualifications at varsity
	3-25-There is a skills gap in ICT due to kids dropping mathematics
RQ4-Implications of business operations offshoring	4-1-Local country ICT Loss of revenue due to cloud
	4-2-No downsizing or retrenchments of employees due to cloud
	4-3-No increase in number jobs due to cloud
	4-4-Repurposing of employees due to cloud
	4-5-Avoiding layoffs due to cloud by finding alternative internal roles
	4-6-Cloud adoption leads to job downsizing and retrenchments
	4-7-Cloud SaaS model erodes positions due to giving them away to vendor
	4-8-Cloud SaaS model promotes vendor lock-in due to IP belong to vendor
	4-9-Cloud SaaS model the vendor fully takes over your entire application delivery and support
	4-10-Cloud skills are offshored to places where labour and skills are cheaper
	4-11-Cloud skills gap makes firms quick to offshore
	4-12-Cloud vendor ability to augment skills requirements
	4-13-Continued offshoring of skills not sustainable for local job creating
	4-14-Cost of Cloud skills makes firms quick to offshore
	4-15-Creating means to avoid job losses due to cloud
	4-16-Firms lacks appetite to develop cloud skills due to cost and time constraints
	4-17-Having cloud skills in country makes country attractive to cloud providers
	4-18-Having cloud skills in country allows country to differentiate
	4-19-High local labour rates leads to offshoring of cloud skills
	4-20-Lack of cloud skills in country leads to expensive cloud skills
	4-21-Lack of Cloud skills makes skills expensive
	4-22-Lack of cloud/ICT skills in country negative for skills hub creation
	4-23-Lack of inhouse cloud skills creates a challenge
	4-24-Loss of jobs due to offshoring functions to cloud provider
	4-25-SaaS Cloud service model erodes jobs

	4-26-SaaS model advances technology at the cost of people's jobs
	4-27-SaaS model outsources jobs to cloud provider
	4-28-Scarcity of skills makes firm offshore
	4-29-Cloud due to offshoring turns local ICT market to consumers
	4-30-Less IT graduates absorbed into industry due to offshoring
	4-31-Local country ICT skills will promote centre of excellence creation
	4-32-Local country labour cost will promote centre of excellence creation
	4-33-Local ICT business can't compete due to no economies of scale
	4-34-Negative impact of jobs consolidation of due to cloud
	4-35-Negative side of offshoring all ICT functions
	4-36-Offshoring due to cloud leads to loss of employment
	4-37-Offshoring leads to employment shift from local country to offshore
	4-38-Offshoring of ICT functions erodes local jobs
	4-39-Offshoring of ICT functions kills traditional ICT business
	4-40-Offshoring promotes exploitation of cheap labour
	4-41-Positive sides of shared ICT functions offshoring
	4-42-Globalisation promotes loss of jobs in the local ICT market
	4-43-Specialising makes local MSP attractive to large tech OEMs
	4-44-ICT function offshoring will follow skills and motivated by cost
	4-45-CIOs using offshoring to augment the digital skills gap
	4-46-Lack of skills are the reason ZA don't have cloud centre of excellence
	4-47-Loss of jobs due to cloud
	4-48-Offshoring brings complexity of accountability in the ICT industry
	4-49-Offshoring due to cloud go to areas where there are the required skills
	4-50-Offshoring takes away the control and responsibility from the local country (ICT Industry)
	4-51-South Africa has an advantage to be competitive in building offshoring capabilities
	4-52-Cloud/Offshoring not responsible for loss of jobs in local country
	4-53-South Africa has a capacity to build competency centres
	4-54-It is cheaper for Cloud providers to manage the application in local country due to the cost of labour
Operating Environment, Regulatory frameworks, and Curriculum Landscape	8-1-Change in education curriculum
	8-2-Current education curriculum not fit for purpose
	8-3-Government is locked into a significant level of job protection
	8-4-Government must intervene ICT skills development
	8-5-Government must not get involved in ICT business
	8-6-ICT industry must fix itself
	8-7-Primary and Secondary education curriculum must be changed
	8-8-Unions involved in job protection
	8-9-Unions limiting ICT industry growth

	8-10-Unions negatively affecting job growth
	8-11-Unions stalling job creation
	8-12-Government slow to fix cloud skills gap
	8-13-At a policy and principal level intervention is required
	8-14-Cloud promotes profits over social side of doing business
	8-15-Goverment must create policy to promote local employment development
	8-16-Goverment must create policy to promote local enterprise development
	8-17-Goverment must create policy to promote local skills development
	8-18-Government must promote digital economy
	8-19-Lack of enabling policy creates challenges in the ICT sector
	8-20-New policy to make sure that certain market is created within the economy is needed
	8-21-New technologies like cloud benefits should outweigh the disadvantages
	8-22-Problem not only skills gap but also policy implementation
	8-23-Using data protection laws to promote enterprise development
	8-24-Using data protection laws to promote job creation
	8-25-Current education system is rigid and ancient
	8-26-Goverment must come up with policies promoting private business funding in ICT enterprise and skills development
	8-27-Goverment must create an ICT specialisation policy and drive implementation and monitoring of
	8-28-Goverment policy to drive digital skills ecosystem
	8-29-Government must partner with private sector to drive growth in ICT sector
	8-30-Government needs to review the ESD and BBBEE policies
	8-31-Lack of strategic foresight between ICT Industry and Government slowing growth
	8-32-Current education not developing the worker of the future
	8-33-Current education not producing work ready candidates
	8-34-Current education system not aligned with business
	8-35-Current education system not producing candidates with digital skills from day one
	8-36-Data residency rules makes cloud model prohibitive
	8-37-Government should take guide from business when it comes to drafting the curriculum
	8-38-One needs to be connected to the elite in South Africa to have a successful business
	8-39-South Africa not conducive for starting a business
	8-40-South African people not studying the right education
	8-41-Unions need to help with career development
	8-42-Banks should be mandated to support SME funding

	8-43-Businesses working with Government on graduate programmes in addressing the unemployment issue of ZA
	8-44-Not easy to do business in south Africa
	8-45-Quality of education contributes to unemployment
	8-46-SARS can be used as a lever to drive SME development
	8-47-Goverment must review and come up with a security/data protection and ICT policy
	8-48-Public and Private sector partnership for digitals skills development
	8-49-Goverment must review and come up with a security/data protection and ICT policy
	8-50-Goverment should implement, monitor, and evaluate policies aimed at enterprise and skills development
	8-51-Government must policies that protect South Africa from cybercrime due to data etc.
	8-52-South Africa is not a highly educated country, and this contributes to unemployment
	8-53-The negative of hosting data in a cloud out of country which law would preside over cybercrime
	8-54-Private and Public sector must come together to address the unemployment issue
	8-55-South African education system producing graduates with abilities
	8-56-The education system is at the root of whether people can adapt to change
	8-57-Private sector partner with government/education to drive ICT skills at foundational level
	8-58-Section 12J can be leveraged for enterprise development
Methods & Intervention	7-1-Better SLA requirements by customers due to cloud
	7-2-ICT to business alignment due to cloud
	7-3-Cloud adoption push back due to mindset
	7-4-Cloud calls for a business operating model change
	7-5-Cloud calls for a mindset shift
	7-6-Descrimination contributes to high unemployment
	7-7-Most CIOs are accountants than ICT or technologist (profits first)
	7-8-No access to experience contributes to unemployment
	7-9-Not having access to opportunities contributes to high unemployment
	7-10-The adoption of cloud is influenced by where the customer is on the ICT lifecycle
	7-11-The legacy of Bantu education contributes to high unemployment
	7-12-Cloud is not managed correctly can expose one to risk - Data breach/security etc
	7-13-Cost management is key in cloud
	7-14-One needs to understand Cloud before embarking on the transformation journey
	7-15-Resistance to change in ICT industry leading to lack of skills
	7-16-With cloud one must have visibility of hosted ICT assets
	7-17-Private sector sees graduate skills development as a grudge spend

	7-18-Cloud brings data breach concerns due to data hosted out of country

12. APPENDIX D: ETHICAL CLEARANCE

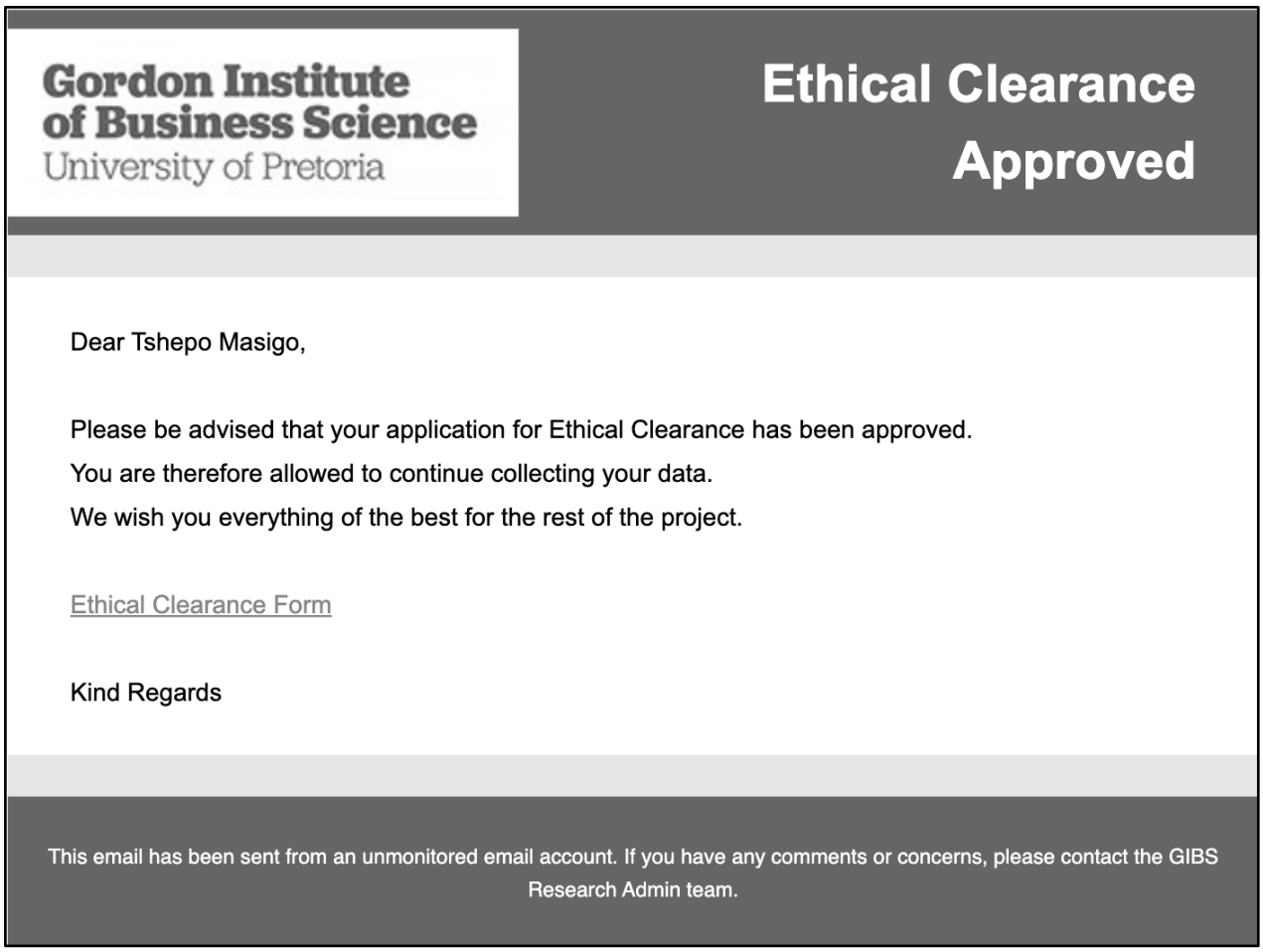

Figure 20: Screenshot of an ethical clearance email

13. APPENDIX E: SIGNED AND APPROVED INTERVIEW CONSENT FORMS

Gordon Institute
of Business Science
University of Pretoria

INFORMED CONSENT LETTER

I am currently a student at the University of Pretoria's Gordon Institute of Business Science, where I am undertaking my research as part of my MBA requirements. I am conducting research on the impact of cloud computing and how it has transformed the landscape of South Africa's Information and Communications Technology (ICT) sector because of offshoring ICT functions. According to the literature, the cloud computing paradigm frees up ICT expenditure by allowing organizations to migrate their legacy ICT systems to the Cloud, gaining additional benefits such as ease of innovation, operational efficiency, and flexibility.

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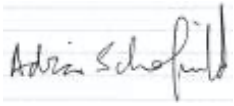
Researcher: Tshepo Masigo
Email: 20803142@mygibs.co.za
Phone: +27 82 998 2288

Research Supervisor: Dr Michele Ruiters
Email: ruitersm@gibs.co.za
Phone: +27 72 303 6399

Name of participant: ADRIAN SCHOFIELD

Signature of participant:  (Signed electronically)

Date: 3 AUGUST 2021

Signature of researcher: Tshepo Masigo

Date: 3 AUGUST 2021

Gordon Institute
of Business Science
University of Pretoria

INFORMED CONSENT LETTER

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Phone: +27 82 998 2288

Research Supervisor: Dr Michele Ruiters
Email: ruitersm@gibs.co.za
Phone: +27 72 303 6399

Name of participant: Johnny Gounden

Signature of participant: M Gounden

Date: 08 August 2021

Signature of researcher: Tshepo Masigo

Date: 08 August 2021

Gordon Institute
of Business Science
University of Pretoria

INFORMED CONSENT LETTER

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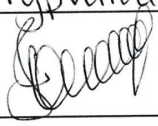
Phone: +27 82 998 2288

Research Supervisor: Dr Michele Ruiters
Email: ruitersm@gibs.co.za
Phone: +27 72 303 6399

Name of participant: Tryphina Maitin

Signature of participant: 

Date: 11 August 2021

Signature of researcher: Tshepo Masigo

Date: 11 August 2021

Gordon Institute
of Business Science
University of Pretoria

INFORMED CONSENT LETTER

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Phone: +27 82 998 2288

Research Supervisor: Dr Michele Ruiters
Email: ruitersm@gibs.co.za
Phone: +27 72 303 6399

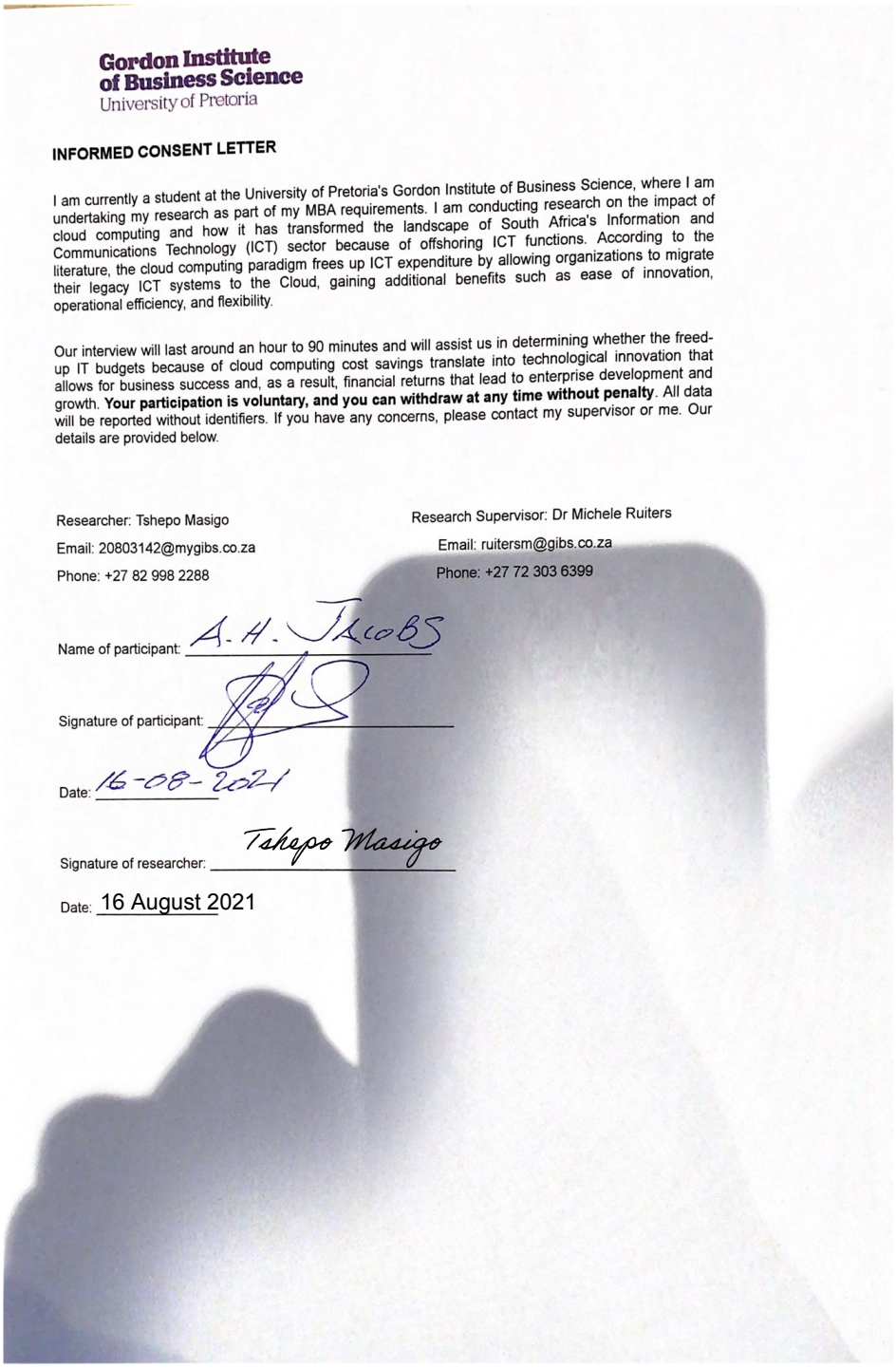
Name of participant: Dumisani Mzamo

Signature of participant: 

Date: 11/08/2021

Signature of researcher: Tshepo Masigo

Date: 14 August 2021



Gordon Institute
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Email: 20803142@mygibs.co.za
Phone: +27 82 998 2288

Research Supervisor: Dr Michele Ruiters
Email: ruitersm@gibs.co.za
Phone: +27 72 303 6399

Name of participant: A. H. Jacobs

Signature of participant:

Date: 16-08-2021

Signature of researcher: Tshepo Masigo

Date: 16 August 2021

Gordon Institute
of Business Science
University of Pretoria

INFORMED CONSENT LETTER

I am currently a student at the University of Pretoria's Gordon Institute of Business Science, where I am undertaking my research as part of my MBA requirements. I am conducting research on the impact of cloud computing and how it has transformed the landscape of South Africa's Information and Communications Technology (ICT) sector because of offshoring ICT functions. According to the literature, the cloud computing paradigm frees up ICT expenditure by allowing organizations to migrate their legacy ICT systems to the Cloud, gaining additional benefits such as ease of innovation, operational efficiency, and flexibility.

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Phone: +27 82 998 2288

Research Supervisor: Dr Michele Ruiters
Email: ruitersm@gibs.co.za
Phone: +27 72 303 6399

Name of participant: Desmond T. Somthunzi

Signature of participant: 

Date: 2021-08-18

Signature of researcher: Tshepo Masigo

Date: 18 August 2021

Gordon Institute
of Business Science
University of Pretoria

INFORMED CONSENT LETTER

I am currently a student at the University of Pretoria's Gordon Institute of Business Science, where I am undertaking my research as part of my MBA requirements. I am conducting research on the impact of cloud computing and how it has transformed the landscape of South Africa's Information and Communications Technology (ICT) sector because of offshoring ICT functions. According to the literature, the cloud computing paradigm frees up ICT expenditure by allowing organizations to migrate their legacy ICT systems to the Cloud, gaining additional benefits such as ease of innovation, operational efficiency, and flexibility.

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Email: 20803142@mygibs.co.za
Phone: +27 82 998 2288

Research Supervisor: Dr Michele Ruiters
Email: ruitersm@gibs.co.za
Phone: +27 72 303 6399

Name of participant: Pule Moiloa

Signature of participant: _____

Date: 2021-08-23

Signature of researcher: Tshepo Masigo

Date: 23 August 2021

Gordon Institute
of Business Science
University of Pretoria

INFORMED CONSENT LETTER

I am currently a student at the University of Pretoria's Gordon Institute of Business Science, where I am undertaking my research as part of my MBA requirements. I am conducting research on the impact of cloud computing and how it has transformed the landscape of South Africa's Information and Communications Technology (ICT) sector because of offshoring ICT functions. According to the literature, the cloud computing paradigm frees up ICT expenditure by allowing organizations to migrate their legacy ICT systems to the Cloud, gaining additional benefits such as ease of innovation, operational efficiency, and flexibility.

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Phone: +27 82 998 2288

Research Supervisor: Dr Michele Ruiters
Email: ruitersm@gibs.co.za
Phone: +27 72 303 6399

Name of participant: CATHY PICKERING

Signature of participant: C L Py

Date: 17/8/2021

Signature of researcher: Tshepo Masigo

Date: 25 August 2021

Gordon Institute
of Business Science
University of Pretoria

INFORMED CONSENT LETTER

I am currently a student at the University of Pretoria's Gordon Institute of Business Science, where I am undertaking my research as part of my MBA requirements. I am conducting research on the impact of cloud computing and how it has transformed the landscape of South Africa's Information and Communications Technology (ICT) sector because of offshoring ICT functions. According to the literature, the cloud computing paradigm frees up ICT expenditure by allowing organizations to migrate their legacy ICT systems to the Cloud, gaining additional benefits such as ease of innovation, operational efficiency, and flexibility.

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Phone: +27 82 998 2288

Research Supervisor: Dr Michele Ruiters
Email: ruitersm@gibs.co.za
Phone: +27 72 303 6399

Name of participant: Ndazi Nokoane

Signature of participant: Ndazi Nokoane

Date: 24 August 2021

Signature of researcher: Tshepo Masigo

Date: 1 September 2021

Gordon Institute
of Business Science
University of Pretoria

INFORMED CONSENT LETTER

I am currently a student at the University of Pretoria's Gordon Institute of Business Science, where I am undertaking my research as part of my MBA requirements. I am conducting research on the impact of cloud computing and how it has transformed the landscape of South Africa's Information and Communications Technology (ICT) sector because of offshoring ICT functions. According to the literature, the cloud computing paradigm frees up ICT expenditure by allowing organizations to migrate their legacy ICT systems to the Cloud, gaining additional benefits such as ease of innovation, operational efficiency, and flexibility.

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Phone: +27 82 998 2288

Research Supervisor: Dr Michele Ruiters
Email: ruitersm@gibs.co.za
Phone: +27 72 303 6399

Name of participant: Yasvanth Singh

Signature of participant: 

Date: 01 September 2021

Signature of researcher: Tshepo Masigo

Date: 01 September 2021

Gordon Institute
of Business Science
University of Pretoria

INFORMED CONSENT LETTER

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Phone: +27 82 998 2288

Research Supervisor: Dr Michele Ruiters
Email: ruitersm@gibs.co.za
Phone: +27 72 303 6399

Name of participant: QUEEN Mokonoto.

Signature of participant: _____

Date: 17/08/2021

Signature of researcher: Tshepo Masigo

Date: 01 September 2021

Gordon Institute
of Business Science
University of Pretoria

INFORMED CONSENT LETTER

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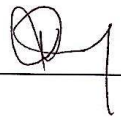
Phone: +27 82 998 2288

Research Supervisor: Dr Michele Ruiters
Email: ruitersm@gibs.co.za
Phone: +27 72 303 6399

Name of participant: MOSES MOLOI

Signature of participant: 

Date: 17/09/2021

Signature of researcher: Tshepo Masigo

Date: 17 September 2021

Gordon Institute of Business Science
University of Pretoria

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Phone: +27 82 998 2288

Research Supervisor: Dr Michele Ruiters
Email: ruitersm@gibs.co.za
Phone: +27 72 303 6399

Name of participant: DH Ferreira

Signature of participant: 

Date: 31/08/2021

Signature of researcher: Tshepo Masigo

Date: 20 September 2021

Gordon Institute of Business Science
University of Pretoria

Informed consent letter:

I am currently a student at the University of Pretoria's Gordon Institute of Business Science and completing my research in partial fulfilment of an MBA. I am conducting research on Cloud computing's employment impact on the South African Information and Communications Technology (ICT) sector as a result of offshoring ICT operations. The cloud computing model frees up IT expenditure by allowing businesses to move their legacy IT systems to the Cloud.

Our interview will last around an hour and will assist us in determining whether the freed-up IT budgets as a consequence of cloud computing cost savings translate into technological innovation that allows for business success and, as a result, financial returns that lead to job creation. **Your participation is voluntary, and you can withdraw at any time without penalty**. All data will be reported without identifiers. If you have any concerns, please contact my supervisor or me. Our details are provided below.

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Email: 20803142@mygibs.co.za
Phone: +27 82 998 2288

Research Supervisor: Dr Michele Ruiters
Email: ruitersm@gibs.co.za
Phone: +27 11 771 4000

Signature of participant: _____

Date: 20/09/2021

Signature of researcher: Tshepo Masigo

Date: 21 September 2021

Gordon Institute
of Business Science
University of Pretoria

INFORMED CONSENT LETTER

I am currently a student at the University of Pretoria's Gordon Institute of Business Science, where I am undertaking my research as part of my MBA requirements. I am conducting research on the impact of cloud computing and how it has transformed the landscape of South Africa's Information and Communications Technology (ICT) sector because of offshoring ICT functions. According to the literature, the cloud computing paradigm frees up ICT expenditure by allowing organizations to migrate their legacy ICT systems to the Cloud, gaining additional benefits such as ease of innovation, operational efficiency, and flexibility.

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Phone: +27 82 998 2288

Research Supervisor: Dr Michele Ruiters
Email: ruitersm@gibs.co.za
Phone: +27 72 303 6399

Name of participant: ____Kiruben Pillay_____

Signature of participant: _____  _____

Date: __23 August 2021_____

Signature of researcher: _____Tshepo Masigo_____

Date: 23 August 2021