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Leadership and the adoption of cloud computing for enterprises in Johannesburg

by

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A research proposal submitted to the Faculty of Commerce, Law and Management, University of the Witwatersrand, in partial fulfilment of the requirements for the degree of Master of Management in the field of Digital Business

Johannesburg, 2022

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ABSTRACT

Cloud computing is extensively adopted by many enterprises globally. South African enterprises have resisted the shift to cloud computing adoption despite there being extensive potential for organisations. The contribution of this study was to examine the factors that influence leadership to adopt cloud computing as part of digital transformation strategy for their enterprises in Johannesburg, Gauteng Province, South Africa. The qualitative general research design was used to investigate the perceptions leaders have about cloud computing which translates into slow adoption of cloud computing. The data was collected through interviews from participants holding leadership positions in their respective organisations. The findings were analysed and discussed using an inductive thematic analysis approach to identify and code emergent themes within the data. The findings indicated that multiple factors influence leadership to adopt cloud computing for their enterprises. Understanding the cloud computing concept includes the drivers and barriers halting the adoption, the characteristics and traits of the leader, and the organisational factors contributing to the prospect of embracing cloud adoption. Despite the significant benefits of cloud, adoption in Johannesburg enterprises experiences challenges and the enterprise leaders still have reservations in fully adopting cloud for their organisations due to both macro and micro limitations.

Keywords

Cloud Computing; Cloud Adoption; Leadership; Organisational Culture; Innovation; Enterprise; TOE Model

DECLARATION

I, Palesa Irene Lephoto, declare that this research report is my own work except as indicated in the references and acknowledgements. It is submitted in partial fulfilment of the requirements for the degree of Master of Management in the field of Digital Business at the University of the Witwatersrand, Johannesburg. It has not been submitted before for any degree or examination in this or any other university.

Name: Palesa Lephoto Signature: *PI Lephoto*

Signed at: Midrand

On the 27th day of February 2023

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DEDICATION

I dedicate this research report to my sister, Mpuse Lephoto: your immense support throughout this programme for the last two years is highly esteemed. You were my source of strength, and I cannot imagine how this journey would have been without you nor would I ever want to imagine. Thank you for loving my son as your own, may God continue richly blessing you.

I also dedicate this to my son, Leruo Lephoto. The fear of failing you kept me going despite the bumpy road health-wise. With this study I pray it encourages you that one day you can surpass and produce your own PhD thesis.

To my entire family, you are a true blessing, your contribution towards the adult I've become is treasured.

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I am also incredibly grateful to my cohort members who have turned into my sisters, Ms Mariam Manamela and Ms Semodi Monareng. All I know is I'm extremely fortunate to have such loving sisters with whom I share the same goals, from mentoring, co-supervising to dragging me out of the bed to finish this research paper. Thank you for imparting to me so much knowledge to be successful in this study and life in general.

It would be remiss of me not to mention Vodacom SA for financing my studies; continue changing the South African dream to become reality.

Lastly, to my family - your belief in me motivated me during this study and kept me in high spirits.

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LIST OF ACRONYMS

4IR	4th Industrial Revolution
CIO	Chief Infromation Officer
CTO	Chief Technology Officer
HCI	Hyperconverged Infrastructure
IaaS	Infrastructure as a Service
ICT	Information and Communication Technology
IT	Information Technology
NIST	National Institute of Standards and Technology
PaaS	Platform as a Service
SaaS	Software as a Service
SLA	Service Level Agreement
TOE	Technology, Organisation, and Environmental

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CHAPTER ONE: INTRODUCTION

1.1 STATEMENT OF PURPOSE

The purpose of this qualitative study is to better understand the factors that influence leaders to adopt cloud computing as part of the digital transformation strategy for enterprises in Johannesburg, Gauteng Province in South Africa.

1.2 BACKGROUND OF THE STUDY

Cloud adoption provides benefits for enterprise that include paying for resources that are required, on-demand capacity, and reduction of IT operational expenses (Pakath, 2015). Cloud computing is defined as a way of delivering IT resources through a shared pool of computing resources and storage, flexible and scalable to accommodate growth over the network (Heng et al., 2012). Leaders are the drivers for this adoption by providing support to their enterprise to become more aligned with a high level of customer expectations by delivering both quality and value of products and services produced (Hayward, 2016). Adoption of cloud computing has become a fast-growing international trend with statistics from Eurostat (Eurostats, 2021) indicating that 41% percent of European Union enterprise used cloud computing in 2021, an increase from five years previously with Sweden and Finland leading at 75% respectively. These statistics vary between countries but there is a noticeable golden thread of enterprise that are considering this technology. This high adoption rate is influenced by the involvement of leadership in shaping the digital strategy of the enterprise and realizing cost savings while increasing value by delivering on customers' expectations.

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There has been a significant increase internationally in adoption of cloud computing, and several African states have been following suit, such as Kenya and Nigeria at 48% and 36% respectively (Njenga et al., 2019). Despite these digital transformation shifts, South Africa has been lagging. The third annual enterprise cloud index report released by Nutanix (Nutanix, 2021) indicated that the majority of South African enterprise leaders still prefer deploying their IT resources using Hyperconverged infrastructure (HCI) in their data centres with 57% of enterprise fully deployed and 30% in the pipeline for the next two years. These statistics suggest that there is a different perception from leadership about cloud adoption in most South African enterprise. The motivation of this study is to investigate the factors that influence leadership in adoptiing new technologies to transform their enterprise and achieve the required efficiency and organisational needs.

1.3 RESEARCH PROBLEM

The Fourth Industrial Revolution (4IR) has introduced new technologies that enterprise can take advantage of to improve the operations of the business and become 21st century organisations. Cloud computing is one of the technologies introduced by 4IR which facilitates the evolution of the information technology and business models for delivering IT resources. Leadership contributes the major part in transforming the enterprise to achieve its strategic objectives as well as influencing the implementation of digital transformation strategy. According to (Sainger, 2018), the success of digital transformation depends on the leader's vision and decision-making to drive the growth of the organisation.

South African enterprises resist the shift to cloud computing deployment and still prefer to implement their IT solutions through hyperconverged infrastructure (Nutanix, 2021). This means the adoption of cloud computing is not being favoured by the enterprise leaders for the deployment of IT infrastructure.

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This study sought to understand the factors that influence the adoption of cloud computing by leaders in selected enterprise in Johannesburg.

1.4 RESEARCH QUESTIONS

This study aimed to answer the following questions:

1. What are the business drivers of cloud computing?
2. What are the barriers faced by leaders that are causing a slow cloud computing adoption rate in enterprise?
3. What are the dimensions of leadership that influence cloud computing adoption?
4. What factors of enterprise influence the adoption of cloud computing?

1.5 RATIONALE

With regard to the adoption of cloud computing, the traditional leadership and thinking will need to shift to a more agile approach that is synergised and is quickly able to adapt and collaborate with various counterparts (Hayward, 2016). There is a recognizable gap between leaders in South African enterprise compared to international businesses, as regards the openness to adopt the new technologies and the shifts in the future of work. This study examined the business drivers of cloud computing, and why enterprises adopt cloud computing. Furthermore, barriers faced by leaders impact on the cloud computing adoption rate in enterprise. The study explored the dimensions and leadership styles that influence leaders to adopt cloud technology. In addition, the organisational factors that can improve the adoption of cloud computing within enterprises to ensure positive return on investment were examined.

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The objective of this study was to increase the body of knowledge by exploring factors that impact on the culture of change within enteprises, the openness of leaders to new innovation technologies that could drive enterprises forward as well as the adoption appetite of cloud computing technologies.

1.6 DELIMITATIONS OF THE STUDY

This study highlighted the factors that persuade leaders in adopting cloud computing for their enterprise. The research scope was limited to enterprise based only Johannesburg, South Africa.

1.7 DEFINITION OF TERMS

- *Cloud Computing* is a pool of computing infrastructure capable of hosting a large quantum of data, highly scalable, and allows the users to bill for consumption (Lee, 2021).
- *Data Centre* is a physical facility that enterprise use to house their infrastructure resources (Avgerinou et al., 2017).
- *Digital Transformation* refers to the adoption of disruptive technologies to create value and increase the productivity of the enterprises including social welfare (Ebert & Duarte, 2018).
- *Hyperconverged Infrastructure* is a complete product whereby the compute resources, storage and network functions are accommodated into a single unit (Azeem & Sharma, 2017).
- *Infrastructure as a Service* is a cloud computing deployment model where the service provider allocates the compute resources and storage and the customer is responsible for software applications and licenses (Lee, 2021).
- *Platform as a Service* is a cloud deployment model where the service provider allocates the compute resources, storage, as well as

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associated licenses, and the customer takes care of the application (Lee, 2021).

- *Software as a Service* is a cloud deployment model where the service provider provides the end-to-end software managing the entire technology stack (Lee, 2021).

1.8 ASSUMPTIONS

It was assumed for purposes of the research that the unit of analysis would be IT senior leaders who fulfill the strategic role in an enterprise rather than the tactical role.

The leaders participating in this study all had a background in technology although they also fulfilled a range of other roles in their respective organisations.

1.9 CHAPTER OUTLINE

Chapter one provided the introduction to the study including the statement of purpose, the background of the study, and the research problem that the study seeks answers to. It further explained the delimitation of the study which narrowed it to the South African city of Johannesburg based in Gauteng Province as the selected place to conduct the research. The rationale behind the study was explained.

Chapter two probed different literature and theories by multiple authors to investigate the slow adoption rate of cloud computing in South African enterprises. The conceptual model was formulated providing guidance on how and what data should be collected to answer the research question.

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Chapter 3 introduced the research method to be followed for the study. Qualitative research method was used and data was collected through interviews. The interviews were conducted through online channels and exponential discriminative snowball sampling method was used to select the participants.

Chapter 4 discussed a complete view of the findings obtained from the various participants of this study. The data was collected through one-on-one interviews and analysis through the inductive thematic analysis. Key themes emerged from the data, and these were discussed in accordance with each proposition of the study.

Chapter 5 discussed the findings of the research, based on information obtained from participants during the one-on-one interviews. These findings were further linked to the literature review previously discussed in this study.

Lastly chapter 6 concludes the study and discusses the recommendations that will present opportunities to enterprise leaders and increase the adoption of cloud computing within their respective organisations.

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CHAPTER TWO: LITERATURE REVIEW AND THEORETICAL FRAMEWORK

2.1 INTRODUCTION

This section examines the theories that are available to the research study including the views from various academic writers. Different themes are covered, such as understanding cloud and its impact on enterprise covered in the first section to give the theory and drivers relating to cloud computing. The section further discusses the inhibitors encountered by leaders seeking to adopt cloud computing. The second section covers the study of leadership, discussing the theories as well as the traits of transformational leadership. The final section examines the main enterprise factors that influence the adoption of cloud. The section then concludes with the analytical framework from both theoretical and conceptual perspectives which the research is meant to answer.

2.2 DEFINITION OF TOPIC OR BACKGROUND DISCUSSION

The background of the topic is centred around understanding factors that influence leaders of enterprise to adopt cloud technologies available in the market so as to increase the efficiency of the organisation. The study focuses on the cloud computing technology adoption which has not increased as rapidly as anticipated in the South African market.

2.3 UNDERSTANDING CLOUD COMPUTING

This section explains cloud computing and its impact on enterprise in relation to the theory of cloud; its drivers of adoption as well as barriers inhibiting leaders in adopting cloud computing for their enterprise.

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2.3.1 Cloud computing defined

Numerours writers defines cloud computing as a paradigm for delivering computing services through the internet and paying for usage based on the resource capacity required (Toosi et al., 2014). This is the technology introduced by 4IR and is still in the early stages. Traditionally computing services would be delivered over the physical hardware server with a fixed capacity to consume and which was hosted at the data centres. This model required an upfront investment with no room to expand the capacity of the existing investment based on demand. Cloud computing introduced the advantages of switching from a capital expenditure model (CAPEX) to the operating expenditure (OPEX) model by introducing the flexibility of paying for the on-demand capacity required. There are six characteristics of the cloud computing model that makes it better than delivering the compute services the traditional way. The unique characteristics as defined by (Rajaraman, 2014) are as follows:

- Infrastructure investment is made by the provider who also maintains it. This defers the risks of infrastructure refresh after the warranty expires.
- The infrastructure provided is shared by multiple customers. The customer is allocated the pool of computing resources ring-fenced for them to utilise.
- The computing services required are provided based on the demand.
- The computing services provides elasticity and scalability to accommodate potential growth.
- The customer only pays for the computing resources they consume.
- The quality of infrastructure provided is the responsibility of the provider and provision is managed through Service Level Agreements (SLAs).

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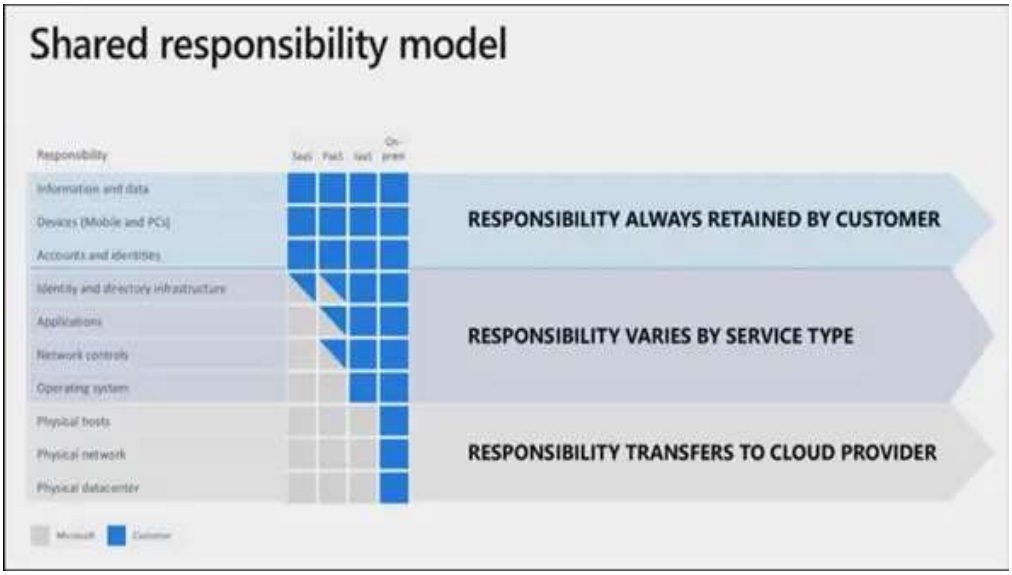

Figure 0-1: Shared Responsibility in the Cloud (Microsoft, 2022)

2.3.2 Service Models of cloud computing

According to NIST, cloud computing can be offered in three service models, namely Software as a Service (SaaS), Infrastructure as a Service (IaaS), and Platform as a Service (PaaS), each satisfying the unique enterprise requirements (Mell & Grance, 2011).

The Software as a Service

SaaS is the most used and adopted cloud computing services model around the world. It is being defined as ‘an application or service that is deployed from a centralized data centre across a network, providing access and use on a recurring fee basis, where users normally rent the applications/services from a central provider (Seethamraju, 2015). This service is provided on a per license basis where enterprise do not need to invest in the application infrastructure to operate but rather rent the service and pay for the license subscription. SaaS can provide cost reduction and improve the quality of the existing operation in enterprise, including the significantly low cost of

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innovation (Loukis et al., 2019). SaaS is purely outsourced and reduces the risk of enterprise managing and maintaining the infrastructure underlay of the application. This constitutes the most advantageous option over the other service models.

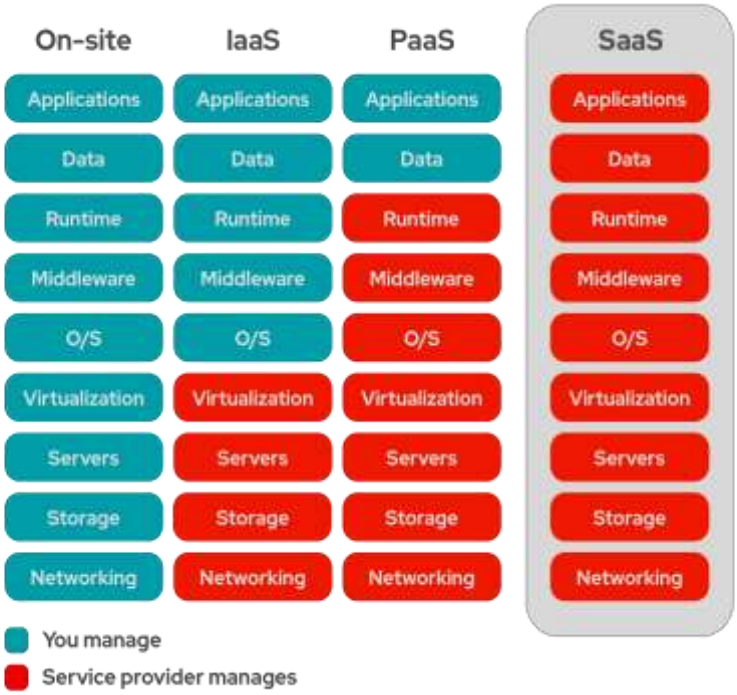

Figure 0-2: The SaaS Model (RedHat, 2019)

The Platform as a Service (PaaS)

The PaaS cloud computing service model provides enterprise with the capability to deploy, develop and administer the services without the need to manage underlying infrastructure, operating system, and middleware (Ardagna et al., 2012). The service provider is responsible for installing, updating and managing the infrastructure up to the operating system and the enterprise responsibility is to bring their application and start developing.

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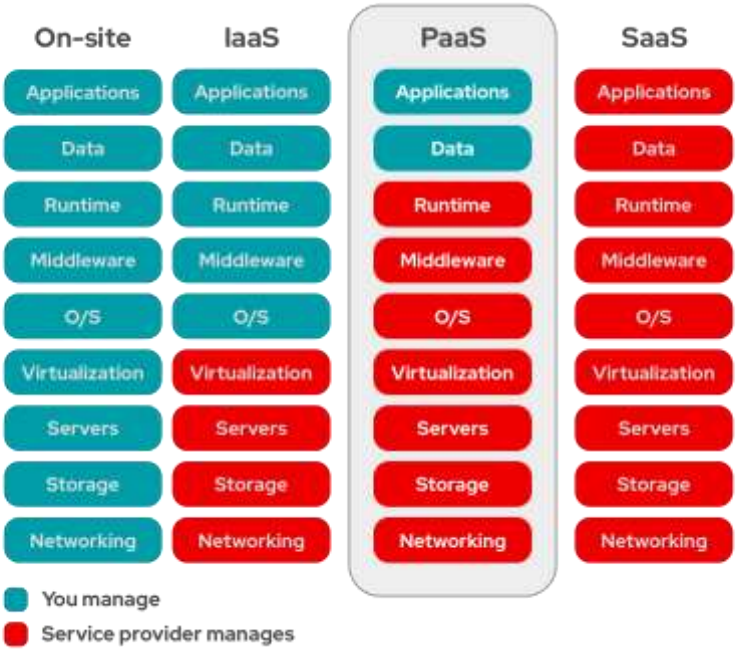

Figure 0-3: The Paas Model (RedHat, 2019)

The Infrastructure as a Service (IaaS)

IaaS is the most comprehensive cloud computing service model whereby the service provider provisions the computing resources, storage requirements and networking, and the customer implements and runs software that they require for application development including the operating systems (Diaby & Rad, 2017). The responsibility of the infrastructure is outsourced to the service provider; meanwhile the enterprise take the responsibility for all the software, management, and maintenance thereof. The service is billed per resources utilized including the networking to successfully run the applications.

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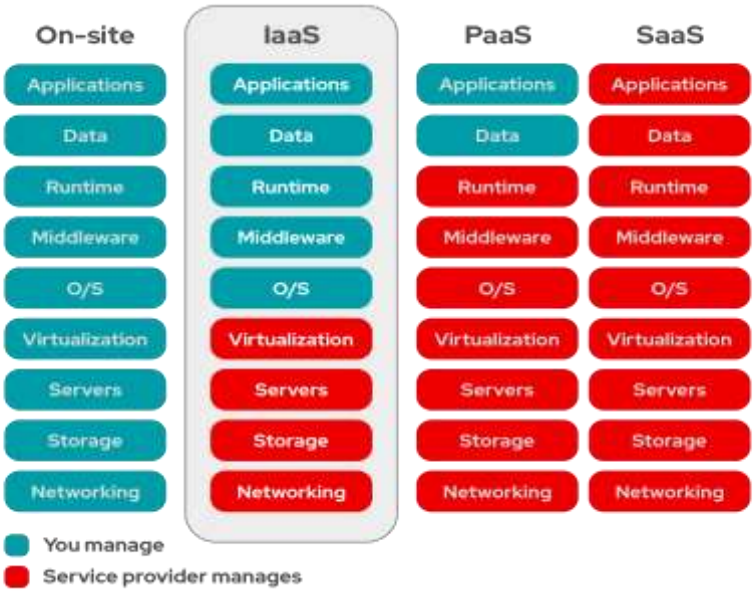

Figure 0-4: The IaaS model (RedHat, 2019)

2.3.3 Cloud computing deployment models

Different options exist for deploying cloud computing. According to (Zheng et al., 2020) the most critical decision the enterprise need to make as part of cloud adoption is to choose whether to build it in-house (private cloud) or outsource it (public cloud). Four deployment types are available that leadership can choose from, depending on the enterprise strategy:

1. Private cloud: The deployment model that ensures exclusivity of use of computing environment by a single enterprise (Hsu et al., 2014).
2. Public cloud: Provides the ability for enterprise to build their services on the systems that are hosted and managed outside their limit (Malhotra & Jain, 2013).
3. Community cloud: This model presents the cloud computing service to a group of customers with common concerns, such as security (Khoda Parast et al., 2022).

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4. Hybrid cloud: The incorporated deployment model that includes two or more cloud deployments such as integrating public cloud and public cloud to support the enterprise operations (Velde et al., 2021).

2.3.4 Factors of cloud computing

The advantages that come with cloud computing technologies are regarded as extremely useful in driving enterprise to save costs in the long term; on-demand capacity and easy access to the data at any given time (Amron et al., 2017). The introduction of this technology has come with valuable features that benefit the enterprise that adopt it. (Tweneboah-Koduah et al., 2014) highlights below the features that have made this technology compelling:

i. No CAPEX investment: The service is consumption-based, and the customers pay for the resources they have used.
ii. Low operating costs: The computing resources are based on demand and the customers can de-allocate the resources when they are not needed and only allocate them when the demand is high. This ensures that cost savings are realised.
iii. High scalability: The compute resources can accommodate the application according to the demand at the time to meet the users' needs.
iv. Easy access: Cloud computing services are available through the internet which makes it easy for users to access them at any time and wherever they are to ensure business continuity.

2.3.5 Drivers of cloud adoption for enterprises

The alignment of business strategy and the computer-based system is critical to the success of every enterprise to achieve a competitive advantage in the market (Ives et al., 1993). This commences with the digital transformation strategy that the enterprise embarks on. The digital

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transformation is defined as being a process that aims to improve an entity by triggering significant changes to its properties through combinations of information, computing, communication, and connectivity technologies (Vial, 2019). Cloud computing affords enterprise the innovative technology that can assist them in fulfilling their business requirements (Hill et al., 2012). Drivers of cloud adoption are influenced by a variety of factors; for example, the study conducted by Aleksandre (Asatiani, 2015) identified 43 factors in total ranging from change management to more cloud-specific benefits as well as innovation and opportunities. Amongst these were the more prominent factors listed below:

i. Cost advantage: Cloud computing provides significant benefits for enterprise due to pay-per-use model that reduces costs significantly (Alshamaila et al., 2013).
ii. Trialability: The product development may happen during the trial phase of new technology that may result in positive benefits to the enterprise objective (Alshamaila et al., 2013).
iii. Innovation opportunities: Cloud computing makes the innovation strategy easier without businesses being challenged by infrastructure procurement that might delay the implementation (Yang et al., 2017), allowing the ability to outsource the infrastructure services.
iv. Scalability: The enterprise can scale up and down the computing resources based on the demand; this factor allows for cost savings and improvements to the overall performance (Nkhoma et al., 2013).
v. Strategic flexibility and adaptability: Enabling the enterprise to react faster to achieve the objectives at the time and promoting the drive to operational efficiency (Nkhoma et al., 2013).
vi. Mobility: Easy access to the data using different devices at any time (Muhammad, 2015).
vii. High availability: Availability of cloud resources in multiple locations to maintain customer confidence and adhere to the Service Level

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Agreement, thereby preventing revenue loss and penalties (Mesbahi et al., 2018).

Proposition 1.1

The cloud computing technology has compelling features to influence the positive adoption of cloud within enterprise.

2.3.7 Barriers to cloud adoption for enterprises

Despite the benefits of cloud adoption highlighted above, there are various inhibitors that impede enterprise to adopt cloud computing. However, some challenges and risks are associated with cloud adoption which may impact on the overall adoption (Ogunlolu & Rajanen, 2019). With all things that relate to the cloud, security is still the major concern across enterprise due to infrastructure features falling outside their control (McGeogh & Donnellan, 2013). Moreover, the scalability and pay-per-use model results in the emergence of cost unpredictability due to the on-demand resources that are required to increase operational efficiency (Delimitrou & Kozyrakis, 2016).

The move of IT assets to the cloud also requires the relevant expertise within the enterprise, and therefore skills assessment needs to be mapped to align to the cloud model as well as change management for good execution (Tweneboah-Koduah et al., 2014).

Operating on the cloud requires strong data security and this is the major concern for enterprises. Though cloud has received much attention in recent years, data security is still an issue affecting the growth of cloud adoption (Soofi & Khan, 2014). Moreover, data location is crucial to ensure that enterprises adhere to the regulations and governance that pertain to each country. According to (Muhammad, 2015), maintaining the data in a closed ecosystem such as an on-premise data centre is easy and tends to become more challenging in the cloud in order to adhere to various regulations.

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Organisations will consider adopting new technologies to achieve maximum productivity and efficiency on how tasks are currently executed. Unfortunately not all such applications are successful due to inadequate readiness of the supporting technologies (Godoe & Johansen, 2012). The technology context is a critical determinant of cloud adoption, therefore assessments of both technology readiness as well as human resources to operate the services on the cloud is of importance (Alhammadi et al., 2015). Broadband network is a central service for successful cloud deployment (Mujinga & Chipangura, 2011) and the countries that lack network connectivity are at a disadvantage.

Proposition 1.2

There are factors that impede the ability of enterprise to buy-in to cloud computing which are deemed as the major concern by the leadership.

2.4 LEADERSHIP THEORIES

This section examines the dimensions of leadership in influencing cloud adoption.

2.4.1 Leadership defined

According to (Ayub et al., 2014), leadership is about setting the direction and alignment of people and the organisation to achieve the a desired goal. Furthermore, they note that leadership is expected to undertake responsibility for the task and assume the responsibility of driving the organisation to success. (Chemers, 2014) defines leadership as a social influence process whereby an individual can provide support and assistance in attaining a common goal. While various theories exist regarding the functions of leadership, (Ford et al., 2021) summarizes the four generic functions that constitute leadership as described below:

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1. *Visioning* is characterized as creating the vision and purpose including the strategy to achieve that purpose and has the ability to augment and alter as new information arises which may impact the purpose.
2. *Structuring* is characterized by ensuring that sufficient resources are readily available to implement the success of the purpose and generate the potential solutions to the problems.
3. *Social Integration* is characterized by promoting collaboration among people and supporting their development.
4. *Monitoring* is characterized by keeping abreast with what is happening in the broader context which might influence the enterprise in achieving its purpose.

2.4.2 Theories of Leadership

The author (MaloŞ, 2012) believes that the various types of theories can influence the organisation positively in performance, and furthermore, that leaders that are not familiar with the theories are less likely to influence the organisation to attain high performance, as well as being able to lead others effectively. Leadership theories explain the processes and concepts of leadership. There are eight main leadership theories as discussed below:

1. “Great Man” Theories: This theory assumes that the leadership is innate and leaders are born not made (MaloŞ, 2012). The “great man” phrase was used due to the reason that leadership was traditionally considered a predominantly male quality.
2. Trait Theories: This theory suggests that personality traits of the individual determine the leader’s effectiveness (Colbert et al., 2012).
3. Contingency Theories: This theory posits that no leadership style is one-size-fits-all (Vidal et al., 2017). The style of leadership is determined by the environment and the situation.
4. Situational Theories: This theory believe in leaders taking decisions based on the circumstances of the situation (Thompson & Glasø,

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2015). This introduces the different types of leadership style namely democratic and authoritarian leadership. Democratic leadership encourages the group members to share ideas and become part of the decision-making while authoritarian leadership refers to the leader-follower relationship where the leader takes care of decisions without inputs from the followers.

5. Behavioural Theories: This theory argues that leaders are made through teaching and observation, and not born (MaloŞ, 2012).
6. Participative Theories: This theory refers to the leadership style where the inputs of group members are taken into consideration. This ensures that the people feel committed to feel relevant and a part of the decision-making of the organisation (MaloŞ, 2012).
7. Transactional Theories: This theory refers to the reciprocal relationship between the leader and the follower where performance is rewarded accordingly (Lai, 2011).This leadership is mostly used in organisations where success is greatly rewarded and failure is reprimanded.
8. Transformational Theories: This theory refers to the leaders who are open-minded, always seeking new ways and ideas to grow the organisation (Korejan & Shahbazi, 2016). These leaders are focused on the performance of the organisation, and they inspire the people to see the importance of the task at hand.

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2.4.3 Transformational Leadership

The new style of leadership is mostly concerned with producing a high level of customer satisfaction delivering the quality and value for the services produced to retain a great customer perception of the organisation (Hayward, 2016). Transformation is required to achieve the above value creation and leaders who lead through influence. (Chaturvedi et al., 2019) defines transformational leadership as the leadership that inspires their employees to have greater achievements and focuses on the employee's needs. Moreover, is positively associated with both individual and organisational success and is regarded as a highly effective leadership model.

Transformational leaders employ effective influencing tactics such as rational persuasion tactics to reach the desired goals (Curtis & Lee, 2013). Leaders employing rational persuasion tactics prefer factual evidence to influence their followers including having logical arguments rather than working with intuition (Chaturvedi et al., 2019). Transformational leadership influences the positive performance of the organisation through innovation and learning (García-Morales et al., 2012). Moreover, transformational leadership has a strong impact on influencing organisational learning as well as the culture of innovation, which makes it acceptable to adapt to new technology changes (Sattayaraksa & Boon-itt, 2017). The transformational leadership is the motor and transmitter increasing the best organisational performance by promoting innovation culture within the enterprise (García-Morales et al., 2012).

Tranformation leadership influences the innovation and performance of the organisation positively (Noruzy et al., 2013). Leadership ensures the successful implementation of change and leaves the recipients of the change satisfied. As explained by (Sadeghi & Pihie, 2012), transformational leadership comprises four dimensions:

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- Idealised influence: leaders paying attention to the needs of subordinates and avoiding personalised interest (Korejan & Shahbazi, 2016).
- Inspirational motivation: Instilling the spirit of teamwork by providing a clear vision to be followed by subordinates (Long et al., 2014).
- Intellectual simulation: Stimulating the ability and creativity of the subordinates to address the current situation (Korejan & Shahbazi, 2016).
- Personal consideration: Acknowledges the subordinates by providing useful criticism and feedback and providing learning opportunities (Allameh et al., 2012).

Proposition 2

The leadership skill competencies including the characteristics will have a strong influence on the adoption of cloud computing technology.

2.5 CLOUD ADOPTION AND ENTERPRISE

A range of factors can influence the enterprise to consider adopting the cloud (Alkhater et al., 2018). There are challenges facing today's organisations ranging from markets, sectors in which they operate, as well as geographies. These challenges are mostly a consequence of the hike in technological innovation and capacity (Hayward, 2016). The openness to innovation by the enterprise plays a significant role in new technology adoption (Alshamaila et al., 2013). Likewise, the experience and skills that the enterprise has in using the technology has similar influence in the adoption of cloud.

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2.5.1 Organisational Culture

The culture of enterprise plays an important role in improving the cloud adoption rate (Alkhater et al., 2018). Moreover, this study reveals that culture influences the organisation positively for adoption of cloud. Schein (2010) describes culture as the accumulated shared learning for an organisation that addresses the problems of external adaption and internal integration and which influence the way the organisation perceives, feels and respond to the problems. The culture is informed by the thinking of individuals, which informs their attitudes which influences how they behave and which then will have an impact on the adoption rate.

2.5.2 Learning Organisation

Kieser (2017) describes learning organisation as a process that enable the organisation to improve performance by adapting well to changing processes and business models, and furthermore he explains learning organisation as the way in which different knowledge concepts are understood and viewed within the organisation. (Darwin, 2017) observes that for any organisation to survive in the present global society, learning becomes the key to success, and further notes that to remain relevant and thrive, organisations must learn fast and embrace the emerging technologies. According to (Nylén & Holmström, 2015), for the organisations to derive the benefits of digital innovations, both internal and external new skills need to be acquired , in turn promoting continuous learning within for the success of the organisation.

2.5.3 Change Management

Embracing change is critical for the successful implementation of new technologies. The adoption of new technologies needs to follow the rational process (Mero et al., 2020) to yield effective implementation. (By, 2005)

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defines change management as renewing organisational structure, direction and capabilities continually to serve the organisation's evolving needs. Utilizing ICT presents new challenges to the receipients, requiring users to learn and embrace new skills (Oyelude & Oladele, 2014). The proper change management process is to be followed for the success of technology adoption in the organisation.

Proposition 3

For the enterprise to fully adopt cloud, there are central factors that the business needs to embrace as part of the overall organisational strategy.

2.6 ANALYTICAL FRAMEWORK

2.6.1 Theoretical Framework – TOE Framework

Multiple research theories exist in the adoption of cloud computing and the Technological – Organisational – Environmental Framework (TOE) (Chiu et al., 2017) framework is the most used. TOE is a research framework from an organisational level for application (Piaralal et al., 2015) that proposes the three factors that impact on the acceptance of technology innovation in an organisation.

1. Technological factors: Cloud computing characteristics that might exert an impact in the decision to the adoption of cloud by enterprise. The technological context speaks to both internal and external technologies existing within the organisation (Cruz-Jesus et al., 2019).
2. Organisational factors: This relates to the leadership role in accepting the new technology for the enterprise. The organisational context elucidates the scope of the business, the culture, the top management support as well as the quality of human resources (Awa & Ojiabo, 2016).

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3. Environmental factors: The environment that might influence the enterprise to adopt the cloud. The environmental context consists of the organisational competitors, the industry in which it operates, the government regulations as well as the suppliers (Cruz-Jesus et al., 2019).

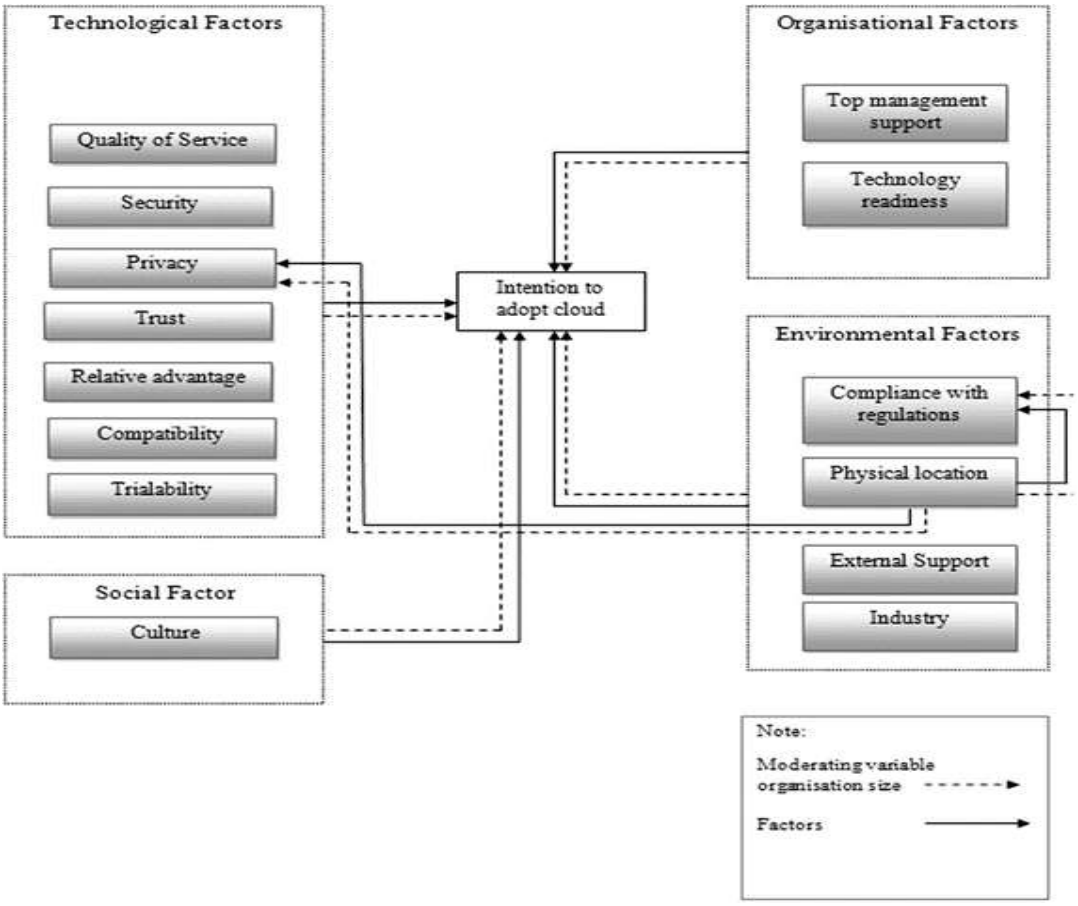

Figure 0-5: TOE Framework (Alkhater et al., 2018)

2.6.2 Conceptual Framework

Based on the literature review of various theories, the research model discussed in Figure 2-6 below provided the basis for data collection. The components form part of the conceptual framework that influences the leadership of enterprises to adopt cloud strategy as part of their IT infrastructure deployment.

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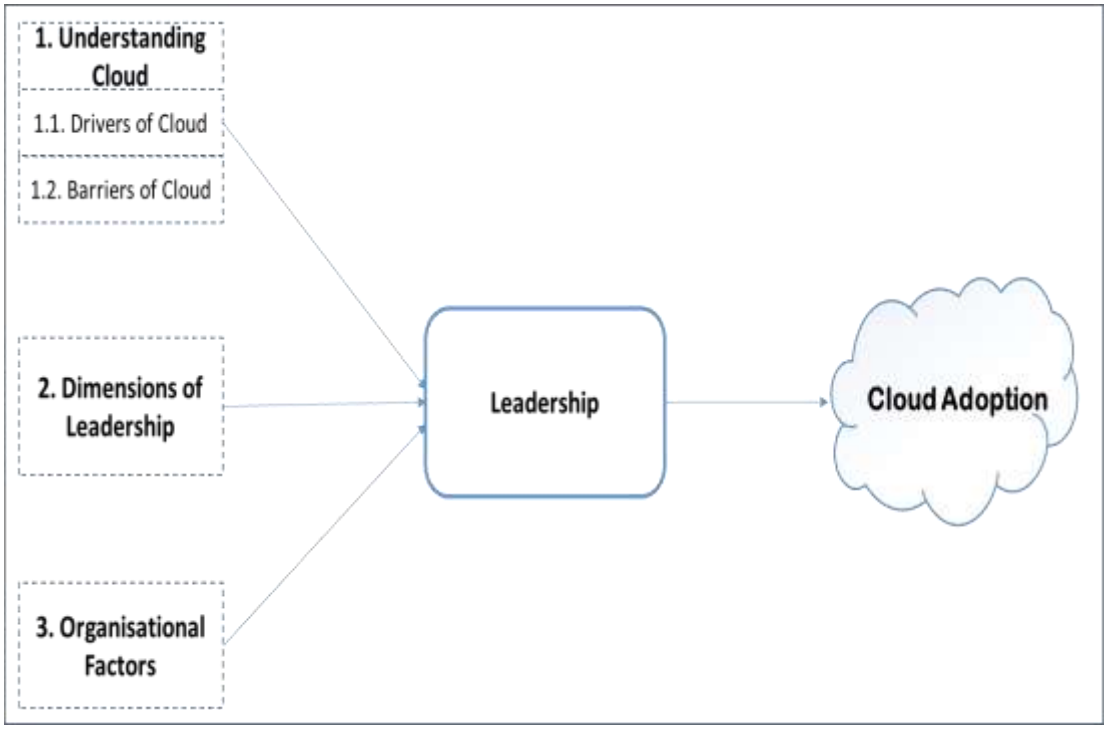

Figure 0-6: Leadership-Cloud Adoption Framework (Source: Author)

1. Understanding of Cloud

The leadership knowledge of cloud computing and its related factors shapes the perception they have around cloud adoption, taking cognisance of the ways in which cloud computing can increase the efficiency of the enterprise by creating value and addressing the business pain points. These business needs become the drivers for leadership opting for cloud deployment rather than on-premise provision. There are advantages related to cloud computing but also disadvantages that discourage leadership from adopting cloud. These are considered as barriers which influence negatively the adoption of cloud. Understanding both of these factors ensures that leadership takes the informed decision in adopting this technology for their enterprises.

2. Dimensions of Leadership

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The leadership traits including competency skills and characteristics as defined in the literature influence the adoption of new technologies for the improvement of the enterprise. The leadership style also contributes to the perception and the adoption thereof. Associating the type of leader and traits may contribute to understanding the likelihood the enterprise will embrace the adoption of cloud.

3. Organisational Factors

The enterprise's way of work, values, and expectations that guide how the employees work and behave within the organisation contributes to the openness to new technologies and innovation. This culture shift is expected from leaders in order to drive organisations towards greater operational efficiency by infusing digital innovation. Furthermore, integrating learning as part of the organisational core promotes the cloud adoption by ensuring that employees are upskilled and trained on digital technologies as well as being able to manage the services deployed. The type of organisation will also have influence with regard to the leaders adopting cloud.

2.7 CONCLUSION

An extensive literature search was done to obtain the views of cloud adoption from different authors. These sources of information were drawn on to investigate the slow adoption rate of cloud computing in South African enterprises. The conceptual model was formulated providing guidance on how and what data should be collected. Different propositions were outlined and linked to the research questions as discussed in Chapter 1.

Proposition 1.1

The cloud computing technology has compelling features to influence the positive adoption of cloud within enterprise.

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Proposition 1.2

There are factors that impede the ability of enterprise to buy-in to cloud computing which are deemed as the major concern by the leadership.

Proposition 2

The leadership skill competencies, including the characteristics, have a strong influence on the adoption of cloud computing technology.

Proposition 3

For the enterprise to fully adopt cloud, there are central factors that the business needs to embrace as part of the overall organisational strategy.

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CHAPTER THREE: RESEARCH METHODOLOGY

3.1 RESEARCH APPROACH

This study utilised the qualitative research method to understand and explore the factors that impacted on the leadership in choosing the adoption of cloud computing for their enterprise. Qualitative research is aimed at adding contributions to the understanding of the person's conditions in a given context of an observed situation (Bengtsson, 2016). Furthermore, it can be characterized as a paradigm for providing interpretations of the subjective experiences and the meanings they pose to the individual (Starman, 2013).

The selected research methodology approach is based on discovering the perceptions of leadership in driving the technology adoption and the influence they have on the cloud digital strategy of their enterprises. For the successful execution of the study, it was assumed that the enterprise leadership would be available as required for interviews and would have a strong understanding of the cloud computing concept.

3.2 RESEARCH DESIGN

The qualitative research design was used to understand the various factors influencing the leadership in the process of technology adoption for enterprise. This design method assisted in investigating the perceptions that leaders have about cloud computing which in turn translated into the slow adoption of cloud computing in the South African enterprise and the perceptions about it. According to (Worthington, 2013) the purpose of qualitative research design is to examine the following:

i. Experience of the participants;
ii. The participants' knowledge assigned to the experience; and

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iii. The process of adopting new technologies in the enterprise.

3.3 DATA COLLECTION METHODS

The data was collected through interviews with the senior leadership of the selected enterprise in Johannesburg, South Africa. The choice of this method was to gather detailed information from the participants, taking advantage of their adaptability to uncover and expand on the questions to learn more based on the participants' experience.

3.4 POPULATION AND SAMPLE

3.4.1 Sample

The sample drawn on for this study was the senior leadership of selected enterprise in Johannesburg, South Africa. The targeted leadership was expected to fulfil the strategic role, preferably as the CIO/CTOs rather than the tactical role. A maximum of 11 interviews was conducted with the selected participants. A total number of 15 requests was sent out to the potential participants, leveraging existing relationships, both directly and indirectly. The purpose was to gather perceptions from individuals who have cloud computing knowledge and experience from diverse levels within diverse industries. Moreover, these were expected to assist the researcher to access a diverse range of views and not be based on a single industry, but to draw ondiverse thinking and how different industries operate, to contribute to the study to ensure credibility and transferability.

3.4.2 Sampling Method

Snowballing sampling method was used. Fifteen senior leaders from different enterprise in the Johannesburg area were approached to participate in the interview. This followed exponential discriminative snowball sampling which is the sampling tool where the recruited participant

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is not expected to recruit another participant (Etikan et al., 2016). The final number of interviewees was eleven.

3.5 RESEARCH INSTRUMENTS

The data was collected through scheduled interviews with the participants that were conducted through online channels (Zoom/Microsoft Teams) depending on the preference of the participants. The average length of the interview was 30 minutes, and this followed the semi-structured interview data collection method. Semi-structured interviews are intended to reveal the individual responses regarding the experience of the participants by employing the detailed interview guide to be used when objective knowledge is sufficient (McIntosh & Morse, 2015). This method was chosen because it provided the opportunity to expand on the set question with the participants by engaging and asking follow-up questions. This contributed to a two-way communication that could explore and identify additional information about the research.

3.6 PROCEDURE FOR DATA COLLECTION

Using the existing relationships directly or indirectly through colleagues, the initial requests were sent through email directly to the potential participants to introduce the research and request an appointment. The email provided the different options available for the mode in which the interview could be conducted, based on the convenience, availability, and preference of the participant.

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3.7 DATA ANALYSIS STRATEGIES AND INTERPRETATION

The data collected was analysed using the thematic inductive approach. (Alhojailan & Ibrahim, 2012) defines thematic analysis as qualitative analysis that seeks to discover using intepretation and present themes or patterns. From the transcript data, first-hand observations were made to identify the patterns emerging from those observations and thereafter the theory explaining the patterns was developed.

3.9 QUALITY ASSURANCE

3.9.1 Transferability

Transferability is concerned with the application of information, assessing if the reader is able to transfer the findings into their own settings (Korstjens & Moser, 2018). The study will be transferable in building the literature for future studies.

3.9.2 Credibility

To achieve credibility, one of the provisions that should be made by the researcher, according to (Chowdhury, 2015), is the description of background, the experience possessed in the study, and qualifications of the researcher. This study conformed to the test of credibility because the researcher is a cloud specialist by profession, understands the technology well and can leverage the engagement by asking follow-up questions.

3.9.3 Dependability

This refers to the consistency of the research findings and how the procedure of research is documented (Moon et al., 2016). This study conformed to the dependability requirement of trustworthiness by ensuring

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data and methods were documented properly as well as the comprehensive presentation of findings.

3.10 ETHICAL CONSIDERATIONS

To ensure that this research conformed to ethical standards, the following factors applied:

i. Informed consent: Before the commencement of the interview, the participants gave informed consent agreeing to participate in the study. The consent was recorded and kept safely.
ii. Anonymity and confidentiality: The participant details including the name of the enterprise they worked for, were anonymized. The analysis were discussed as Participant 1, 2, 3, to ensure the confidentiality of the information.
iii. Voluntary participation: No incentive was offered to participate in this study. The participants volunteered and agree to their engagement in advance.
iv. Introduction and instructions: Concise introduction was given explaining the process and requesting permission to record the session.
v. Data storage: The anonymized transcripts with all the personal identifying information removed will be stored in digital form on a password-protected computer and be destroyed after one year.

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3.11 CONCLUSION

This chapter outlined the research method to be followed for the study. Qualitative research method was used and data was collected through interviews. Eleven partcitipants were interviewed and the interviews were conducted through online channels, either Microsoft Teams or Zoom. Exponential discriminative snowball sampling method was used to select the participants. Upon completion of data collection, thematic inductive approach was used to analyse the data. Thorough ethical consideration was utilised to assure the anonymity and confidentiality of the parctipants.

Table 3-1: Consistency table: research questions, propositions, data collection and data analysis

RQ #	Research Question	Prop #	Proposition	Data Collection	Data Analysis
1	What are the business drivers of cloud computing?	1.1	The cloud computing technology has compelling features to influence the positive adoption of cloud within enterprise	Interview guide question 2; 3; 7	Thematic Inductive Approach
2	What are the barriers faced by leaders that are causing a slow cloud computing adoption rate in enterprise?	1.2	There are factors that impede the ability of enterprise to buy-in to cloud computing which are deemed as the major concern by the leadership.	Interview guide question 6; 9; 10; 11	Thematic Inductive Approach

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3	What are the dimensions of leadership that influences cloud computing adoption?	2	The leadership skill competencies, including the characteristics, have a strong influence on the adoption of cloud computing technology.	Interview guide question 1; 5; 8; 12	Thematic Inductive Approach
4	What factors of enterprise influence the adoption of cloud computing?	3	For the enterprise to fully adopt cloud, there are central factors that the business needs to embrace as part of the overall organisational strategy.	Interview guide question 4; 3; 14; 15	Thematic Inductive Approach

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CHAPTER FOUR: PRESENTATION OF FINDINGS

4.1 INTRODUCTION

This chapter provides the analysis of the research findings on Leadership and Cloud adoption for enterprise in Johannesburg. The data was collected through interviews following the qualitative approach methodology, and the findings were analysed using an inductive thematic analysis approach to identify and code emergent themes within the data. All the findings gathered from participants are discussed in this study and consolidated into themes.

This section presents the demographics of the participants and their related participant pseudonyms followed by key themes derived from the participant interviews agreeing to the propositions tabled in Chapter 2. The findings pertaining to each proposition were examined based on the feedback received. The overall summary of the analysis was discussed to conclude the chapter.

4.2 INTERVIEW PARTICIPANTS

The interviews were conducted using the Microsoft Teams platform, and all the interviews were audio-recorded. The interviews were concluded after the 11th participant due to similar patterns and codes coming out repeatedly resulting in no new themes being discovered. The researcher was therefore confident that the study has reached the saturation point.

Total time spent interviewing the 11 participants was approximately 3.5 hours, with 45:49 minutes being the longest interview held with one participant. The overall interviews averaged 19 minutes. The detailed time schedule is provided in Table 4-1 below.

Table 0-1: Total time spent on the interviews

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Description	Quantity
Total Interviews conducted	11
Total time spent on interviews	213:48 Minutes
Shortest time spent per interview	16:01 Minutes
Longest time spent per interview	45:49 Minutes
Average Time Spent per interview	19:41 Minutes

4.3 DESCRIPTION OF PARTICIPANTS

Seniority

All participants held senior leadership roles in their respective organisations in the Johannesburg area. These are a combination of Chief Executive Officers from different organisations; the Chief Information Officers; Executive Heads and Directors; as well as Enterprise Architects. These were individuals who occupied the senior leadership roles in their organisations and contribute to the overall organisational strategy. Pseudonyms were created to represent the participants to ensure that the participants' personal information remains anonymous and confidential.

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Table 0-2: Participants' Codes and Job Titles

Interview Participants	Pseudonyms	Position Held
Participant 1	P01	Chief Information Officer
Participant 2	P02	Director ICT
Participant 3	P03	Executive Director ICT
Participant 4	P04	Chief Information Officer
Participant 5	P05	Chief Executive Officer
Participant 6	P06	Chief Executive Officer
Participant 7	P07	Managing Director
Participant 8	P08	Executive Head: Cloud Security
Participant 9	P09	Enterprise Architect
Participant 10	P010	Enterprise Architect
Participant 11	P011	Executive Head: Digital Transformation

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Industry

The participants interviewed represented different industries in which their enterprises operate. Telecommunications industry participants contributed the majority in the study with 34%; followed by Public Sector and ICT consulting firms with 25% respectively; and lastly manufacturing and insurance sectors contributed the fewest participants with 8% each. The grouping of the participants is depicted in Figure 4-1 below.

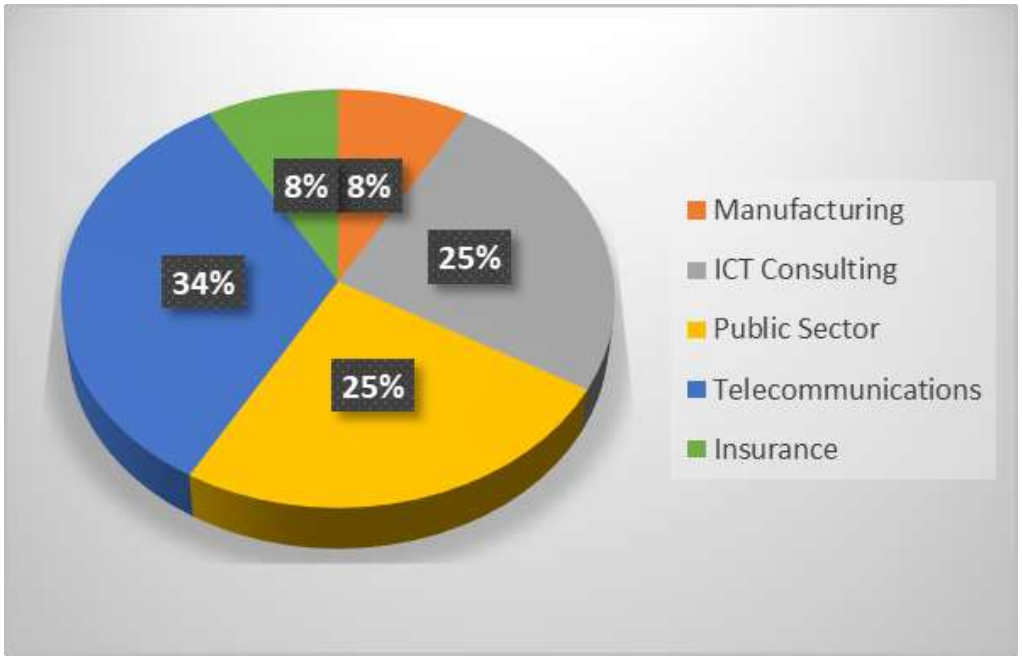

Figure 0-1: Participants' Industry and related percentages

The direct responses of the participants is discussed below in response to propositions.

4.4 RESULTS PERTAINING TO PROPOSITION 1.1

Proposition 1.1: Cloud computing technology has compelling features to influence the positive adoption of cloud within the enterprises

Research question 1 asked: What are the business drivers of cloud computing? The question was meant to examine the perception of leaders in cloud adoption as well as the drivers and motivation to adopt the cloud

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technology. From the participant interviews, the various codes have been picked up which resulted in the below themes emerging from the data.

Responding to the changing environment and innovation:

The leaders have mentioned that the adoption of the cloud has made it easy for enterprises to adapt to the continuous changing environment in order to remain relevant. They can release the product faster to test and respond to the competition.

"You know, innovation, I think you can respond quite quickly when you have invested your weight in the field of such technologies."(P06)

Participant 6 added:

"...with cloud, you can leverage new technologies to innovate and save costs, to be effective, respond quickly in the market and things like those. So those are some of the drivers." (P06)

Participants 10 and 8 agreed with the statement below:

"Mostly it's the, the IT leadership or the business leadership obviously gaining, insights in terms of like technology and how they can leverage technologies to save costs, to be effective to, you know, respond quickly in the market and things like those". (P010)

"Um, the other thing is, just in terms of agility, right? So I mean, if the IT staff can pretty much outsource a lot of the maintained tasks to the service provider, they can focus on more strategic initiatives and innovate, right?" (P08)

High Availability:

The enterprise leaders explained that their motive behind the adoption of the cloud is its high availability and ensuring that there is no single point of failure. Furthermore, the enterprise can operate remotely as it allows the employee flexibility to work anywhere to get the job done. Participant 3 emphasized this:

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"., but quite a lot of the risk in terms of availability as well. Now all of a sudden this application is available 24/7, on any device, and you don't need to even be on-site to access it as long as you have access to the internet or data, you, you've got access to your system irrespective of where you are or what time of day it is."(P03).

Participant 11 mentioned that: *"lots of people moved into public cloud purely because to continue the business to run without interruption."(P011)*

Participant 9 raised an issue currently experienced by South Africa of power supply loss and how operating on the cloud can benefit the enterprises:
"ICT means when there's load shedding, people must continue working. So if your servers are not on the cloud and they're on premise that means when load shedding hit, everyone stops working."(P09)

Being different from the competition:
Adoption of cloud has kept the enterprise relevant in the industry by being able to release the products that differentiate them in the market faster.
"So the level of differentiation is quite, you can differentiate yourself because if you are all using, um, I'm just making an example. If you are all using Office 365, you get in the same". (P01)
"Um, but definitely from a leadership perspective the decisions that are being taken right now with regard to very key strategic decisions is to keep the business operational, but more so to innovate and differentiate yourself from your industry, your sector." (P03)
"And they didn't adopt the mentality to say, look, we try things to be flexible and, you know, we'll adopt newer technologies as we go along to differentiate ourselves. So some of them are not there. So I think there needs to be existential, uh, places that you bring into your talk to say, guys, we can't continue like this if we are going to be sustainable." (P06)

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"...you want to be quick to innovate, it starts to give you a competitive advantage when in the cloud, instead of waiting for a budget for a server to try something, and you can quickly spin a VM and try it if it works." (P010)

4.5 RESULTS PERTAINING TO PROPOSITION 1.2

Proposition 1.2: There are factors that impede the enterprise from buy-in into cloud computing which is deemed as the major concern by the leadership

Research question 2 asked about the barriers that are faced by leaders in enterprises to adopt the cloud. Participants shared various barriers inhibiting the enterprises to adopt the cloud technologies. The following themes emerged.

Cloud Costing Expenditure:

The variable cost appeared to be the most pressing matter that impeded South African enterprises from moving the services to the cloud and the majority of the participants alluded to the fact that operating on the cloud is expensive.

"Um, if I move into the cloud, then the cloud services are consumption-based and they're built in US dollars. And that is impacted by the fluctuation of the exchange rate especially if the Rand is losing against the dollar. Then if it loses value, then they're going to basically pay a lot. So that's uncertainty in terms of like how much they're going to pay, which also comes into play."(P10)

Participant 11 emphasized the USD/ZAR conversion as an impediment to operating their services on the cloud, noting:

"Everything is linked to RoE. If RoE goes south, guess what? Your bill goes up and you have services in the backend operationally, if you fail to produce

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a purchase order or payment in due time, your services are switched off."(P011)

Participant 1 added the following regarding the cost implications:
"However I do understand why my colleagues would have reservations about the move to that cloud. I think first of all the original business case of why the cloud was always cost, cost, cost. This cost and the other. And I think the more and more people begin to move to the cloud, we begin to realize that that's actually not true, right? It's, it's not, and it's not any cheaper. So I think maybe if the original messaging was not around their cost savings because now people are beginning to realize, I mean if you just move your exchange environment to Office 365, and you're beginning to see that actually this is not cheap." (P01)

However, Participant 4 argues that cost should not be the barrier to enterprises moving their services into the cloud and said the following:
"There's actually no evidence to suggest that putting your things on the cloud makes it more expensive. It just makes high-performance workload perform faster as a result cost is aligned to the service and efficiency being delivered."(P04)

Data Sovereignty:

The location of where data is situated appears to be the main concern hindering the adoption of the cloud. They are still a number of issues, especially in public enterprises, where the participants alluded to their data residency and who owns the data. The participants observed:
"Because for instance, we have legislation that governs, mhm South African data especially. So in our case, we have what we call a national register for verification. So for instance, if you're saying, this is a learner, and this is the ID number, it has to verify that this is a learner, and this is for real a citizen in this country or somebody that we are accounting for in the country. So the national register, the minute you take it and you pose it to AWS, we

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know as much as we saying it's hosted here and it's sitting here in SA, but you know because it's on the cloud you don't have full control of the residency of your data so uh you're basically exposing that data to the world. (P05) He further alluded to *"… the question that is always posed is who is owning the data?"(P05)*

"And you find, you hear that with a lot of companies where they're like, where is our data sitting? Right? Where is it sitting in the cloud? But behind that cloud, there's a server somewhere. Where is that server sitting? So, then that's when now issues of legislative framework come in. You've got what is called data sovereignty, which governs where the data sits, right? (P07)

"Sovereignty. Yes, you don't cede your sovereignty to other parties, so if you'll give your data to another party outside your environment, you're actually diminishing your own sovereignty as a state, the Republic of South Africa."(P04)

Data Security Challenges:

Data security in the cloud was identified as a major hindrance in enterprises adopting cloud computing. The participants raised concerns with regard to the policies and controls of their environment since it is accessed through the internet. Participants noted as follows about the security concerns:

"Uh, I think people are much more in control when it's in their dc. Um, when you move to the cloud, there's a lot of security, there's a lot of responsibility for securing your environment and that lies with the service provider. Um, so there's a whole lot of planning and due diligence that needs to take place around security". (P08)

"Um, and also the security that you need to take into consideration, the policies that you need to update and your access mechanisms because take SharePoint for instance, in the past, you knew you have to be on the intranet to be able to access SharePoint. Now with SharePoint online, you can access it anywhere from any device. So now all of a sudden you're forced

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to implement the other layers on your security because people are able to go directly to those repositories without coming through your LAN." (P01)

"They believe that when they have their IT workloads or infrastructure running OnPrem, it's more secure than in the cloud. So they basically believe that if you move stuff to the cloud, they don't have control of the security of the, yeah."(P10)

"And the last part was security. Security. Um, because you don't, you can't physically touch and see your data centre anymore. There's always a concern that you are passing that responsibility to a third party provider to do as what you have done in your existing data centre."(P011)

Legacy Applications:

The software being used is custom-made and outdated, and modifying it would cost the organisation a large amount of expense. The applications cannot be deployed and run in the cloud due to their rigid coding.

"Some of them have kicked off digital projects, but stopped because of application legacy that they had within the environment. And that was a huge inhibitor in terms of, you know, why public cloud wasn't adopted."(P011)

"You can't really block into some of the FIFA systems when you are sitting on a massive legacy install base. In other words, when most applications are written in old languages, and the reason why that is the case is varied."(P04)

"So what that means is all the existing legacy systems, when they get broken, when the time to replace them comes, uh, we would first look at cloud solutions for that." (P03)

Lack of connectivity to the cloud:

Connectivity remained a challenge in South Africa, as fibre is not accessible everywhere and data is expensive, and not accommodating of everyone.

"There's hardly so much rollout of fibre or microwave connectivity in the township. So another impeding factor is the availability of connectivity. You

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know, when you have to pull things through the cloud it requires the stable connection". (P09)

"Part of it was connectivity. You know, you are connecting to an internet space service, so your connectivity needed to be the latest and greatest. And at that time it came at a high cost."(P011)

The issue of connectivity appeared to apply not only in South Africa but in Africa as a continent. This impacted the organisation that is multinational to easily adopt the cloud strategy for their enterprises.

"And also a fact of the matter is that we in South Africa, we operate in Africa as well, and connectivity outside of the metropolitan areas is not always the most stable and most persistent. Um, and with the cloud you know, you need a stable bandwidth and connectivity. So all of those you know, add to your cost stack to get the stable connectivity into the rural areas means you have to spend a lot of money with the likes of Vodacom to make sure that you get that connectivity going."(P01)

Lack of Cloud Awareness:

There was consensus that the cloud services providers (CSP) do not sell the value of the cloud but are pushing the technology. The majority of enterprises are not familiar with the practicality of what cloud computing could potentially deliver; it is only the theoretical knowledge known, therefore the CSPs are lacking in educating the decision-makers on the true value to be realized.

"We also don't want to be vulnerable and say, I don't understand this cloud term. Yeah, true. Can you tell me about it? How does it work? We pretend to know yet we don't know. Uh, and so we can't make those bold decisions and say, my organisation is going cloud, I'm going to close all the branches. It took a while for the banks to move onto that decision to close some of their branches. So yeah I would say the top of the list is lack of knowledge and fear of the unknown. And um, yeah, those are ranking top, and excuse

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me, awareness, change management education is key to resolving that." (P03)

"The education needs to be all-encompassing in a way that, you know, even if you are speaking to a financial director because remember the financial director also is easy when they say our capital expenditure is X. So, you know, for that fiscal year, that's your expenditure. But now when we say it's usage-based, so meaning it can go up and down. So even in their heads, it's like you saying this thing is cheap, but I don't know when I need more, I pay more. Do you know? So it becomes a variable cause that they cannot and it becomes tough for them not to budget around. It was very, but if you know exactly that it's fixed at X. So, as I'm saying the education needs to bring everyone who is a decision maker, not only even just the CIO trying to sell the technology and the benefits, and also the people in finance understanding." (P06)

"So proper teaching plays an important role, I think due to a lack of understanding, sometimes either a decision is going to just remain on site because that's what they know. But those who've made the move or those who actually have been educated that understand that you know, there are ways to secure your data." (P08)

"Being informed right around technology is more than just listening from your suppliers. As a CIO of an organisation you need to basically roadmap exactly where you are going to take the company to in terms of maturity, in terms of scaling parts of competitors."(P011)

4.6 RESULTS PERTAINING TO PROPOSITION 2

Proposition 2: Leadership skills competency including the characteristics have a strong influence on the adoption of cloud technology

Research question 3 enquired about the leadership traits and dimensions that influence the adoption of the cloud. Participants shared some of the

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traits the leaders who embrace cloud adoption possess. The themes below emerged from the participant interviews.

Exploration and Curiosity:

Leadership who shows interest in what is available and tries new technologies that can improve the business appears to be the number 1 trait required for the leader to influence the adoption of the cloud.

"Because in the world of cloud, there's a lot to explore and you could explore certain aspects of technology, you know that when you pull them together could unlock new business value for you, right? So I would say being curious is definitely a benefit, and a trait that these transformational leaders need to have and really drives, uh, transformation as well." (P08)

"If your stakeholder base is also on the same page, they understand the pressures they need to move, but they also are willing to experiment and bend their fingers and explore new things out." (P03)

"Things must change. And the only way for things to change is if the leaders themselves are ready to change and explore the new technologies available to grow their businesses."(P05)

Visionary:

Foresight was noted by the majority of the participants, 85% who agreed that a leader who thinks ahead and is future-oriented about where he wants to see the enterprise heading is capable of driving it to become a 21st-century organisation and adopt cloud technologies. Participants observed:

"Um, but as I say, those visionaries that actually have got like foresight into where they want to take the organisations, those are the kind of leaders that basically are needed in taking organisations into transformation changes."(P10)

"So if leadership is not willing to embrace change and explore what's next, if leadership is not dynamic and have no vision, organisations are not going to go anywhere."(P09)

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"Presenting my vision with a team, right? Where I see the business, right? And then the question is how do you, how can you help me get there? Right? What can you do as an individual, as different departments? What can you do to help me get there? That's very important." (P07)

Continuous Learning:

Being open to learning and absorbing new knowledge, was mentioned by 90% of the participants, noting that a leader should be open to criticism and re-learn old habits.

"Yeah. I, I think for me, continuous learning, you need to continuously be at the, you know, cutting edge of what's out there."(P06)

"You need to have someone that has a much more open and positive outlook in terms of open to learning, because it starts with that, right." (P07)

"One is open-mindedness. Um you know, being teachable. So if a leader decides that they really know it all right? Um, and that means they're not really open to exploring new technologies that could actually benefit fit them, right" (P08)

"You know when you fail fast and then you learn from your mistake and then you learn quickly and then you recover from that, you move forward so you can easily innovate." (P010)

4.7 RESULTS PERTAINING TO PROPOSITION 3:

Proposition 3: For the enterprise to fully adopt the cloud there are crucial factors that the business needs to embrace as part of the overall organisational strategy

The research question 4 probed factors of enterprise that influence the adoption of cloud computing. Two main emerging themes from the interviews are outlined below.

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Culture of Learning:

Company culture appeared to be the most crucial factor that impacts the adoption of the cloud. This speaks mostly to the organisation's learning culture. The participants commented that:

"Yeah. One of the biggest pillars of digital transformation is organisational culture. You know, without the right organisational culture you're not going to, a digital transformation, right? So the people inside need to be bought into it and have the right culture so that you collaborate because you are not going to get it right."(P06)

"But if the culture is not right you'll not get the benefit of what you want to bring in the form of technology. So that culture has to be right as one of the key pillars. Um, and, and culture is about behaviours. Culture is about commitment to trying new things and not punishing when you fail, as an example."(P03)

More emphasis was placed on the learning culture that the organisation has to embrace and the following was noted:

"Um, and you need to be a learning organisation. You need to get that right, you know, making sure that, you know what, when we are moving in a certain direction, build the expertise internally and your people need to have, also the culture is such an important piece because if the people have bought into it, then the learning part becomes easier." (P06)

"Um, organisations that have got a culture of learning would easily adopt cloud because obviously, they'll embrace technology and if they, for example, run dev and test environments on the cloud will release the right platform or fit for purposes platform that they can use to perform those functions." (P10)

Participant 10 agreed with the points on culture: "*I think the culture especially the culture of learning in an organisation is very key." (P10)*

Participant 1 indicated that if the culture is not right, adoption of cloud technology becomes very difficult for the enterprises:*"Um, you know if your*

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organisation is like they always say there's the born in the cloud organisations and the organisations that are trying, that are not digital natives. And unfortunately, my organisation is 130 years old, so the culture is 130 years old. So to change that culture towards a more cloud-based culture is much more difficult, right? Um, yeah so culture plays a significant role and can either make it easy or difficult depending on where the culture of your organisation is." (P01)

Change Management:

The transition or transformation process is beneficial in ensuring the enterprises are successful after adopting the new technologies. Change management is highlighted by the participants as the critical gap the enterprise must close to ensure the success of cloud adoption. This is supported by the participants below:

"And business can only go at a certain pace, which is slower than the technology pace, right? Um, so you deploy a cloud solution and you know, in 18 months only then that people are beginning to get used to it. But you'd have spent a sizable amount of money, a significant amount of money actually in that 18 months while you're getting your business through the change journey and the change management process that is required."(P01)

"Yeah. So, but the change management might not necessarily be about the cloud, but it might be about, um, implementing new systems or doing that". (P03)

"And, um, in that there, there lies a key area of change management and ensuring that your people, they buy in, they have the right, uh, skills, competencies, attitude, there's no fear of failing because when you bring in technology, you going to yeah, not getting right the first time". (P04)

"So change needs to be the new normal. It really needs to be the new normal. And again, that type of leadership is, is people will embrace change, is people who are in the know." (P06)

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"We need to become an explanation organisation, but we also need to change how we do things. You can't put the same red tape on telco and you still want to be competitive in the technology space." (P07)

Skilling appeared to be a significant factor in change management that enterprises need to get right. Various participants observed that:

"The people's capabilities, competencies, the readiness, thereof. Um, so you obviously have to do some assessment of your people. Where your people are in relation to what you want to introduce, uh, and take them along with you, make them part of the process. But what is key is really to empower them, equip them, train them, risk skill, upskill, uh, and make them own the change with you." (P03)

"So if you think of it along those lines, there should be an excitement among people to adopt these things and to upskill themselves, right?" (P08)

"So if you are going to have a huge transformation drive around how your application is going to be consumed, you need to educate the people below to say, guys, we actually moving from X to Y and this is what it means. It's going to mean we are going to be undergoing some sort of training to get you trained on the new way that you'll access the applications, change management is required." (P011)

4.8 SUMMARY OF THE RESULTS/FINDINGS

Chapter 4 analysed a complete view of the findings obtained from the various participants of this study. The data was collected through one-on-one interviews and analysis through the inductive thematic analysis. Various participants from the different industries were interviewed to obtain their perspectives. Key themes emerged from the data, and these were discussed in accordance with each proposition of the study. These themes are used in the following chapter to discuss the findings.

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The summary of themes is depicted in Table 4-3 below as they emerged from each proposition.

Table 0-3: Propositions vs. Emerging Themes

Proposition	Themes
Proposition 1.1: Cloud computing technology has compelling features to influence the positive adoption of cloud within the enterprises	Responding to the change environment and innovation
	High availability
	Being different from the competition
Proposition 1.2: There are factors that impede enterprise from buy-in into cloud computing which is deemed as the major concern by the leadership	Cloud costing expenditure
	Data sovereignty
	Data security challenges
	Legacy applications
	Lack of connectivity to the cloud
	Lack of cloud awareness
Proposition 2: Leadership skills competency including the characteristics have a strong influence on the adoption of cloud technology	Exploration and curiosity
	Visionary
	Continuous learning
Proposition 3: For the enterprise to fully adopt the cloud there are central factors that the business needs to embrace as part of the overall organisational strategy	Learning culture
	Change management

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CHAPTER FIVE: DISCUSSION OF THE FINDINGS

5.1 INTRODUCTION

This chapter presents the detailed discussion of the research main findings outlined in Chapter 4. The discussion is based on the themes that emerged per proposition in relation to the conceptual framework, and thereby responds to the research questions. These insights and findings are linked to the literature review in chapter 2 to reaffirm the study.

The conceptual framework for this study elucidates the relationship between the factors influencing leadership towards cloud adoption for their enterprise. Multiple factors of leadership contribute to the decision being taken to adopt the cloud. This commences from understanding the cloud technology on the part of leaders as split into two main categories: namely benefits of cloud technology for enterprises and determinants of adopting cloud by enterprises. This further illustrates the dimensions of leadership examining the characteristics and traits of the leader influencing easy adoption of cloud, and lastly discusses the organisational factors contributing to the likelihood of cloud adoption being accepted.

5.2 DISCUSSION PROPOSITION 1.1

Proposition 1.1: Cloud computing technology has compelling features to influence the positive adoption of cloud within the enterprises

Responding to the changing environment and innovation:

In accordance with the literature, the adoption of cloud makes the innovation strategy of the organisation easier without having to address concerns related to infrastructure procurement which may delay the projects (Lin & Chen, 2012). Cloud adoption introduces innovation opportunities for the

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enterprises. This introduces the cost advantage whereby the enterprise is able to pay for the compute resource they require at the time instead of a once-off capital expense (Lin & Chen, 2012).

Becoming relevant to the market and responding to the shifting needs of the customers is regarded as one of the compelling features as highlighted by the participants. Providing and delivering the right products with substantial value is the core in every enterprise to remain competitive and satisfy their customers. Customer demands have increased and evolve rapidly based on their needs at the time. The enterprises are expected to respond quickly to these needs to maintain the customer experience and not lose share in the market.

Enterprises can leverage cloud technology to test new products in the market before the full release. This allows for minimal viable products to be produced to allow for the trial phase of new solutions and augmentation based on customer feedback. With cloud adoption, the enterprise mitigates the risk of purchasing the infrastructure upfront which might have extensive specifications for the immediate need. The non-dependency on the infrastructure enables the organisations to release the solution faster to the market and provide the flexibility to fail fast which is a compelling incentive for the organisation to achieve its goals.

High Availability:

Cloud technology can help the organisations circumvent the single point of failure architectures. Placing the infrastructure in two separate data centres can assist with high availability requirements. In the case where one data centre goes offline the services can continue being operational on the other data centre in near to zero timelines. As noted by (Khajeh-Hosseini et al., 2012), high availability ensures that the enterprise's infrastructure functionality and access can be regained through deploying redundant nodes to continue with IT operations.

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Always-on services has become the critical success measure for every organisation to deliver their services. Providing the redundancy of the environment for business continuity is necessary. Being able to address customer queries and support them amidst the various drawbacks that may arise is critical. The participants highlighted the advantages of operating in cloud as being able to access the infrastructure whenever required, even after the impacts of excessive power failures that are regularly experienced in South Africa. Adopting cloud technology reduces the risk of losing the IT infrastructure in the case of national power outages by outsourcing these infrastructure services from cloud service providers. In cloud deployment, utilities such as electricity, water and gas are used by customers and charged per consumption (Firdhous et al., 2014). Using cloud technology to circumvent downtime is very positive for enterprises for business continuity purposes.

Being different from the competition:

According to (Adendorff & Smuts, 2019), adoption of information and communication technologies innovation helps enterprises to be more effective and achieve their competitive advantage. This study confirms that enterprises adopt cloud computing to meet their customer demands faster and also to be flexible enough to release the products in an efficient manner.

As per the participants' feedback, cloud adoption offers a compelling competitive advantage to the enterprises to enable them to respond quickly to the customer needs. There is no dependency on the infrastructure budget before the release of new products into the market whereby the servers are yet to be procured which might delay the product release. In today's market the enterprises are expected to respond with speed in servicing the needs of their customer, otherwise they will lose the customer to the competitor.

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5.3 DISCUSSION PROPOSITION 1.2

Proposition 1.2: There are factors that impede enterprise from buy-in into cloud computing which is deemed as the major concern by the leadership

Cloud Costing Expenditure:

Though cloud computing has introduced more cost-effective approaches, there is a need for the business transition process to take place from one solution to another; as a result this impacts the cost-benefit equation (Avram, 2014).

Costing models of cloud computing provide advantages as much as there are disadvantages. Participants are mostly concerned that cloud technology should not be sold as a cost saver from cloud service providers because the experience once running the workloads there is different. The Operating Expenditure vs. Capital Expenditure cost model is well understood by the participants, but it is the fluctuation of costing that presents a challenge and discourages the leaders from adopting this technology.

The current public cloud providers charge clients in United States Dollars, and this is impacted by rate of exchange for South African enterprises. The enterprises are unable to budget properly for the IT expenditure since the costs are variable and fluctuating. Furthermore, the public enterprises follow the strict regulations and governance for procuring the services from a third party. There are processes followed, budgets allocated and approved, therefore the costing model provided by the cloud service providers does not align with the existing procurement framework.

Data Sovereignty:

Data residency appears to be a concerning matter especially on the public enterprises. There are rules governing the government institutions in

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ensuring that the South African data does not leave the country. Migration into the cloud continues to be the concern for public enterprises as they need to have certainty that data residency policy is adhered to.

Data sovereignty is the main agenda more especially impacting the public enterprise industry. This has discouraged the adoption of cloud because the enterprises need to adhere to the principle that they should have control over their own data and the data should remain geographically secure. Though the major cloud service providers have deployed their data centres in South Africa, the concern persists that the data is indeed not replicated to the borders outside South Africa to achieve their Service Level Agreements. (De Filippi & McCarthy, 2012) observe that many of the organisations are discouraged from adopting cloud due to the fact that they cannot ensure sovereignty over their own data as the minimum standard.

Data Security Challenges:

The security has proven to be the main concern across enterprises and discourages the adoption of cloud. (McGeogh & Donnellan, 2013) attest to this concern due to infrastructure features falling outside the enterprise's control.

Placing the infrastructure in the cloud means the accessibility to that is through public network internet. There were concerns highlighted by participants as to how they can ensure the security of their data sitting in the cloud. Because this is exposed to the web, there are concerns about cyber threats like man-in-the middle that might intercept with the data. There was greater assurance if the infrastructure is hosted on premises in the enterprise-owned data centre where they ensure their security responsibility end-to-end.

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Legacy Applications:

Moving legacy applications that are not cloud-native can be expensive, attracting significant storage costs. This will become more costly than running the services on-premises due to not being optimized application architecture. As confirmed by (Mann, 2019) optimisation plays a significant role in cloud and fog computing.

The enterprises are still challenged by the applications that are customised and cannot run in the cloud. These are applications that are mostly vendor-specific and have been coded for a specific enterprise. The participants raised this as an issue, alluding to the fact that the support services related to such application software had lapsed therefore it will cause concerns and instability by moving to the cloud.

Lack of connectivity to the cloud:

Access into cloud requires stable internet connection. This is easy when the IT infrastructure is hosted on-premise because access into the environment is through local area network. However, different topology is introduced when hosting happens in the cloud because the access to the environment is now through the wide area network. Some of the participant enterprises operate in the deep rural areas and getting connectivity into such areas continues to be a challenge and is not cost-effective.

Connectivity in South Africa continues to present challenges. As much as fibre is rolled out to the majority especially in the urban areas, there are still areas with little to no connectivity and that causes communication delays. This results in enterprises opting to continue running their infrastructure on-premises for reasons of efficiency. (Firdhous et al., 2014) shares similar sentiments, in that the limitations of cloud adoption include the reliable internet connectivity with high speed to avoid high latency.

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Lack of Cloud Awareness:

It is easy to assume that strategic leaders of the enterprises by virtue of being leaders understand what cloud computing is. As explained by participants, lack of knowledge around the topic of cloud computing also contributed to slow adoption in the country. As a consequence there are still uncertainties from enterprise leaders to fully embrace this emerging technology.

Cloud service providers appear to provide limited education to enterprises on the value that this technology can offer to their enterprises. They are more focused on selling technology without proven applications that will resonate with the individual customer within an industry. As a result, the decision leaders are not persuaded to try cloud technology and prefer to continue to operate comfortably with what they know best. (Mohlameane & Ruxwana, 2014) attest to the fact that the majority of technologies are not adopted due to leaders not fully understanding their potential and value to the enterprises.

5.4 DISCUSSION PROPOSITION 2

Proposition 2: Leadership skills competency including the characteristics have a strong influence on the adoption of cloud technology

Exploration and Curiosity:

The leaders who are open to innovative ideas from wherever they may arise are essential to the success of cloud adoption in their organisations. Leaders who lead with purpose, trust the team members, and encourage collaboration to inspire participation, are transformational leaders that contribute to organisational success. (Ford et al., 2021) observes that the leaders who are able to augment and change as new information arises are more able to lead their organisation towards success.

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Leaders who are open-minded find the adoption of new technologies relatively easy. The participants observed that leaders who show a willingness to explore and try new technologies, and who are curious about technologies easily adopt cloud as part of the enterprise strategy.

Visionary:

Cloud adoption requires a charismatic leader who remains resolute in the face of challenges and is open to exploring alternative options to achieve the strategic plan. Leaders who are visionary are more likely to lead more effective organisations (Taylor et al., 2014).

Having the ability to forecast the better future of an organisation is an important trait that the leader willing to grow the competitive advantage should have, according to the views of participants. The leader that plans and can implement the plan for the organisation needs to show discipline, focus and specialised action to attain the goals. Furthermore, the leader who can inspire all stakeholders to follow the vision of the organisation they are driving is more likely to achieve the identified goals.

Continuous Learning:

Leaders who are open-minded and who welcome new information are more able to perceive the adoption of new technologies because of their research around the subject and can make informed decisions quickly. These are leaders who always seek new ways and ideas to grow the organisation (Korejan & Shahbazi, 2016).

The participants revealed that leaders who continuously improve their knowledge to align with new technologies, who are teachable and aspire to lifelong learning are more open to the adoption of cloud. Participants emphasised continuous learning as an attribute the leader should possess to lead a successful organisation.

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5.5 DISCUSSION PROPOSITION 3

Proposition 3: For the enterprise to fully adopt the cloud there are crucial factors that the business needs to embrace as part of the overall organisational strategy

Culture of Learning:

For an organisation to achieve competitive advantage they should be willing to infuse learning as part of their DNA. This comprises creating new knowledge, transferring as well as retaining the knowledge within the enterprise. Moreover, this encourages collaboration within the teams to learn new skills and create together, which results in innovation. Improving performance of the enterprise by embracing different knowledge concepts describes the learning organisation (Kieser, 2017).

The participants referred to a learning organisation as the factor that enterprises need to embrace in order to be successful in digital transformation journeys. The organisation should be current with the new technologies and align their people capabilities by upskilling them. Participant 10 agreed with this phenomenon, observing that the "*organisations that have got a culture of learning would easily adopt cloud because obviously, they'll embrace technology". (P10)*

Change Management:

Planning for the organisational change is critical to ensure the organisation and its people are aligned. This is because the people are the executors of strategy once the organisation has adopted it. Ensuring that these people are inculcated about the change, understand why the change is necessary and support its values becomes the dominant factor that the enterprise leaders should drive. (Fernandez & Rainey, 2017) observe that the

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successful implementation of the organisational change is the combination of both the low level employees' and the leader's direction.

Every new technology comes with its own requirements, and as a result change management is necessary for the success of cloud adoption within the enterprise. Involving the people and assuring their commitment to the technology being adopted is essential, as emphasised by the participants.

5.6 CONCLUSION

Chapter 5 discussed the findings of the research, based on information obtained from participants during the one-on-one interviews. These findings were further linked to the literature review from chapter 2 confirming the literature and conceptual framework as summarised below.

Discussion of Proposition 1.1:

This study confirmed that the leaders' understanding of cloud and its contribution towards their enterprises influences the cloud adoption. Leaders have exemplified that enterprises that embrace innovation to respond to the market needs, business continuity and holding the competitive advantage are some of the drivers for the enterprise leaders to adopt the cloud computing technology.

Discussion of Proposition 1.2:

Despite all the rewards that adopting cloud computing provides to the enterprises, there are many reservations as to why the leaders may be reluctant to adopt this technology. These range from data sovereignty issues and data security policies as enterprise leaders are keen to safeguard their data end-to-end and this is possible with on-premise datacentres. Some of the unexpected findings like cloud technology awareness has proven to be the barrier to adopting cloud from the perspective of leaders. This highlighted the area of improvement required

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by both the cloud service providers and enterprises to collaborate in training and creating the enterprise value of this technology.

Discussion of Proposition 2:

The leader's traits and characteristics have power in influencing others to adopt cloud computing for their business. This was indicated in the study that the character of the leader assists to make the decision easy and simple. Leaders who show willingness to explore the new technology, who are visionary and continuously research new methodologies to improve their business, are transformational and prime their enterprises for success.

Discussion of Proposition 3:

There are organisational factors that make it easy for the leaders to adopt the cloud technology. This is indicated by the literature studies from different researchers. The culture of the organisation indicates the importance of values and behaviours of the organisation to guide and inform the actions for all people of the organisation. Change management is necessary to ensure the people who are responsible for executing the organisational strategy are fully committed to the processes.

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CHAPTER SIX: CONCLUSIONS & RECOMMENDATIONS

6.1 INTRODUCTION

With regard to cloud adoption by leaders in Johannesburg-based enterprises, South Africa is not moving at a fast rate although some improvements have been realised in the last two years due to the emerging demands of the Covid-19 pandemic. Enterprise leaders often demonstrate some reservation in fully adopting cloud for their enterprises due to both macro and micro limitations as revealed and analysed in this research study.

The research study aimed at investigating how IT leaders perceived cloud computing and the concerns regarding the adoption of cloud services for their enterprises. This chapter summarises the conclusions of the research study and provides recommendations for how both the enterprise organisation and its leaders can improve the adoption of cloud computing for day-to-day operational use as well as presenting recommendations that can be implemented by cloud service providers.

Finally, based on the gaps identified in the course of the research, suggestions are made to expand on this research topic in order to provide further insights into how to effectively adopt cloud while maintaining great organisational outcomes and minimising negative impact.

6.2 CONCLUSIONS REGARDING RESEARCH QUESTION 1

RQ 1: What are the business drivers of cloud computing?
The research question aimed to identify what the enterprise leaders deem to be the drivers and motivation to adopt cloud computing for their organisation. This study revealed that understanding of this technology and

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its business drivers of cloud computing makes it easier for the enterprise leaders to adopt this technology. Positive technology features were identified that have motivated enterprises business to adopt cloud. The compelling drivers indicated by the research study includes enabling the business to respond faster to the market needs and making innovation easy within the enterprise. Due to limited capital expenditure investments the participants emphasized that using cloud computing technology allows the organisation to satisfy customer needs when needed by leveraging the latest technologies competently while saving costs.

A high degree of availability was identified as a driver of cloud adoption due to redundant architecture capabilities it provides. No single point of failure which allows business to continue operating despite the resource's failure caused by human error or natural disaster impacted on the IT infrastructure. In addition, easy access into the services allows the users to access them at any time and wherever they are to ensure business continuity. Furthermore, the ability to provide the competitive advantage for the organisation ensures that they differentiate themselves by putting the organisation in a favourable position amongst competitors.

The enterprise leaders indicated that they are aware of the compelling features of cloud computing that influence cloud adoption for organisations. The literature review pertaining to the drivers of cloud speaks to cost advantage where the enterprises can benefit significantly due to the pay-per-use costing model. However, this study was not able to identify this as the main advantage. The enterprise leaders suggested that the high costs as a driver of cloud adoption was of significance, as these had previously been considered to be high. Though cloud computing was seen as providing a positive boost with flexibility in both cost and scalability, the literature should expand on the synergies between these factors and their influence on costs. With cloud infrastructure, performance can be easily achieved because the infrastructure is able to scale in accordance with the

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demand while on the other hand it can escalate the costs and result in the organisation exceeding the allocated budgets.

6.3 CONCLUSIONS REGARDING RESEARCH QUESTION 2

RQ 2: What are the barriers faced by leaders that are causing a slow cloud computing adoption rate in the enterprise?

South Africa has a slow adoption rate of cloud, and the enterprise leaders prefer operating in hyper converged infrastructure (Nutanix, 2021). The research question aimed at identifying the constraints and barriers that impede the adoption of this technology despite its compelling features. This research study established the reservations that leaders have regarding the adoption cloud. Higher cost influenced the sentiments shared by all the participants, that operating on the cloud is not as cost-effective as purported to be. To ensure improved performance and efficiency was expensive when operating on the cloud infrastructure because the environment can scale per demand. This has resulted in reservations from the enterprise leaders due to escalating cost that are not easy to control. Data sovereignty and security is also a concern in the South African enterprises, especially in the public enterprises. There are regulations that the country is governed by that require a high degree of adherence. The concern appears to the lack of assurance of the data residency and the level of control that the enterprise has on their data since it is hosted in the cloud.

Some of the applications used by the enterprises are customised and programmed using the legacy source codes. This is one of the more pressing matters where the right skills are not available to re-factor the application to be cloud-ready as noted by the participants' comments which related to the lack of technology readiness. In addition, the lack of awareness for most leaders also appeared to be a barrier to adopting cloud technology. The sentiments shared around this were that the knowledge shared by cloud providers is more theoretical than practical. Moreover, the

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connectivity in the country continues to present a challenge, since internet connectivity is not available everywhere. This made the decision harder for the leaders to adopt cloud computing strategy since access to the cloud services requires the internet. Improved performance experience would thus require not only internet connectivity but fast connection which in turn requires increased budget to procure adequate bandwidth from the internet service providers.

The barriers that were highlighted in the research are valid and acknowledged for the South African landscape. However, there was a gap between previous studies relating to the barriers of cloud computing versus the sentiments shared by the participants. Education around the cloud topic should be further examined and explored in detail to accommodate end-to-end understanding, aligning both service providers and potential customers, which in implementation is enterprise leadership that takes these decisions.

6.4 CONCLUSIONS REGARDING RESEARCH QUESTION 3

RQ 3: What are the dimensions of leadership that influence cloud-computing adoption?

The type of leader in place as well as skills competency and characteristics can drive the organisation towards success. The research question intended to examine the types of leadership styles as well as capabilities that influence the organisational leaders to adopt cloud computing. Transformational leadership has demonstrated that it is the leadership style that resonated with most participants. Such a leader is open-minded and willing to explore outside the norm to find better solutions that can improve the organisation. Such a leader would be continuously seeking to identify better alternatives to deliver improved services to the customer, and would be open to continuous learning so that they remain current with what the technology has to offer.

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The leader's traits and characteristics hold power in influencing the leaders to adopt cloud computing for their business. The character of the leader makes the decision easy and simple. Leaders who show willingness to explore the new technology, who are visionary and continuously research new methodologies to improve their business are transformational and prime their enterprises for success. This research study therefore supported the literature which indicates that the leaders who have these traits are more likely to adopt cloud for their enterprise organisations.

6.5 CONCLUSIONS REGARDING RESEARCH QUESTION 4

RQ 4: What factors of enterprises influence the adoption of cloud computing?

There are different dynamics that enable organisations to adopt new technologies. The research question was aimed at understanding the factors of organisations that influence the adoption of cloud computing. The industries that the organisations are operating in as well as geographies have an impact on enterprises adopting cloud. Two main factors emerged from this study, namely organisational culture and change management. The organisational culture in this context refers to the values and behaviours of the organisation to guide and inform the actions for all the people of the organisation. The organisation should be open to upskilling the employees as well as re-learning alternative ways to deliver the service. As the organisation considers the adoption of cloud technology, there is a requirement to upskill the employees, therefore change management becomes a key factor. Adaptability of the organisation to change by aligning its people and bringing them along as part of change is highlighted as a factor influencing the organisation to adopt cloud.

This research study is aligned with the literature from previous research which indicated that organisational factors have a key influence on the adoption of cloud. It is the mechanism of how to successfully implement

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cloud that requires further examination in order to contribute to the development of more feasible processes that the leadership can follow for more comprehensive cloud adoption.

6.6 LIMITATIONS

Any research will have some limitations. The selection criteria from the leadership participants was limited to executives with a good understanding of IT background and as a result this narrowed the sample of these results. The report focused on public cloud deployment rather than private and hybrid cloud deployment. In terms of leadership literature, the study focused on transformational leadership style which attributes positively in the adoption of new technologies. With regard to organisational factors, not all the factors were explored in the study and the literature that was examined indicated a clear relationship between the factors and the adoption of cloud technologies.

Lastly the scope of this study is limited to the leadership working on enterprises around Johannesburg, Gauteng, which would not necessarily be reflective of the rest of the country.

6.7 RECOMMENDATIONS

Cloud adoption in South Africa is slow as enterprise leaders resist the shift to operating in cloud and prefer implementing their IT solutions through HCI. This research study discovered that multiple factors impact the leadership to adopt cloud computing for their enterprise, resulting to slow adoption. To increase the adoption rate, the recommendations below are made for leaders and organisations to consider in order to achieve successful implementation of cloud computing. These range from introducing the cloud first corporate strategy; intentional personalised training programmes; and ensuring the technology readiness assessments are properly conducted to realise value.

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6.7.1. Technology Readiness Assessments

A major change to be addressed before attaining successful cloud adoption is the assessment of current legacy applications and systems used in the enterprise. For the successful implementation of cloud technology and for leaders to realise the value that cloud brings a proper cloud readiness assessment needs to be conducted. The technology readiness assessments assist in assessing all the current IT infrastructure and data suitability for the cloud. According to (Abdollahzadegan et al., 2013), organisations that have technology readiness are likely to adopt cloud computing easily for their organisations. This assessment identifies the challenges and impacts of moving into cloud and how these can help the organisation in making the correct decision. The worst mistake being made is to assume all the infrastructure workloads can be migrated as is to the cloud and this assumption has resulted in excessive costs impacting the organisations negatively. Therefore, a proper technology assessment tool needs to be invested in by the organisation so that proper budget can be allocated and agreed before the migration journey begins.

The assessments should cover the portfolio analysis, analysing every application within the organisation and its relation to other systems to satisfy it needs; followed by the infrastructure analysis reviewing the current server's landscape, related security posture, performance and data governance that need to be taken into considerations as well as the dependency between different applications and functions. The second most crucial factor to consider before migrating to cloud is the suitability assessment to ascertain whether the applications can operate efficiently on cloud, what migration strategy to use, the return on investment for all the applications migrated into cloud versus running these applications on-premise. This reveals the total cost of ownership to determine the indirect and direct cost of operating in cloud.

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6.7.2. Digital Mindset

To drive the high rate of adoption of latest technologies, leaders of the enterprises need to shift their thinking from only adopting technologies to solve for existing crises and shift the thinking towards leaning into cloud technology as the core of the enterprise model and incorporating cloud computing as part of the daily routine to achieve greater value from it. According to the Harvard Business Review, the leaders with digital mindset are more likely to build a strong workforce across the organisation and set up their enterprise for success (Neeley & Leonardi, 2022).
To develop this mindset across the organisation, the investment is required on the existing talent pool together with systems and process alignment to take advantage of digital expertise.

The organisational strategy driven by the executive leadership should implement the following components:

- **Continuous Learning Culture**

As part of the corporate study, a global training programme should be introduced amongst all the employees in the organisation. These trainings should be tailored to onboard everyone around the enterprise to familiarise themselves with the cloud computing technology. Different levels can be introduced from entry to expertise level catering for all employees irrespective of the role they are fulfilling. This is the preferred way to onboard the employees into cloud computing while gaining new relevant skills, and is also a a quick way to obtain buy-in. The training programme should be facilitated through the organisation's learning and development division and sufficient budget allocated.

To encourage participation from all the stakeholders, effective measures should be put in place formalising this learning programme. A contractual agreement should be in place between the employer and employee through

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the personal development programme. In this way it will encourage everyone to participate knowing it has an impact on the overall individual performance. Another way to encourage employees would be to introduce an incentive programme to reward every level attained by the employees in achieving the goals. To be made more exciting, the training should be made personal in order for employees to be more receptive. This includes clearly defining how the technology will improve each person's workload and personalise the training to keep it interesting while also educational.

- **Leadership alignment**

Cloud should form part of the overall enterprise strategy and not be a feature of technology strategy only. This strategy should be owned by all the leadership executives of the organisation from chief executive to chief human resources and not only reside within the remit of the chief information officers. All the leaders should embrace the growth mindset and need to hold the Key Performance Indicators for successful adoption of cloud in the organisation. For every new product launched, cloud first strategy should be followed before considering other infrastructure deployment methods. Thorough measures should be put in place to conduct proper assessments, as this will encourage all leaders to position cloud as part of everyone's agenda.

With cloud agenda driven by every leader in the organisation, promoting buy-in from employees will be easier. Leaders with a unified voice can drive the messaging that emphasises the importance of the cloud transformation as the critical frontier for the company. This could be through internal marketing campaigns to portray how the company can improve by adopting cloud computing and in turn focusing this on the employees as positive contributors to reach this goal. Communicating with clear vision and transparency to employees will not only promote buy-in but will promote confidence amongst employees knowing they are key contributors to the success of the organisation and positive change.

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- **Aligning processes and systems**

To ensure successful digital mindset and execution, the internal processes and systems need to align to drive the change. To achieve optimal results during the digital transformation era, significant shifts are necessary. With the impetus towards training programmes to upskill employees the organisation needs to ensure the content is easily accessible and without challenges. The change should make the employees comfortable without inconvenience, ensuring the integration between the as-is process and to-be is seamless and without frustration.

Organisations can invest in the enterprise content management, more like an internal learning management system, where all the data around cloud computing can be easily accessed by every employee in the organisation. The access into this system should be seamless in order to encourage participationfrom all the stakeholders. It is important to introduce collaboration amongst stakeholders to share reviews and experiences around the processes as this will improve morale and ensure greater participation.

6.7.3. Cloud Awareness

Developing cloud computing is essential for enterprise leaders who should be familiar with the theory of cloud and the benefits it provides but where the practical application may not be fully aligned. This indicates the need for proper cloud awareness campaigns to be established by every service provider to ensure proper educational messages are shared amongst the leadership. The marketing campaigns should avoid being generic because cloud technology is not a one-size-fits-all, therefore a solution that works for a manufacturing company is different from the banking or public enterprises solutions. Each industry has specific business cases that need to be satisfied. For example, the cloud awareness campaigns that should be

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driven by cloud service providers to public enterprises must be centred around data security and sovereignty knowing that is the important agenda in the state with regard to sensitive data protection. Meanwhile, the retail industry business case could be data analytics as there is interest in the insights of what consumers are interested in. Making these personalised training interventions that resonate with each enterprise leader can enhance the adoption of cloud because the use cases address the individual business problem. Cloud service providers should shift from selling cloud as a product and should focus more on selling the value that the technology brings and how it can assist the organisation to address the specific business pain point.

While presenting these individualised use cases related to each industry vertical, cloud service providers should introduce the training programmes in collaboration with the enterprises to enhance the skills of the individuals in the organisation to help drive the adoption. In this way it shows they are not only interested in making profits but are willing to invest back by sharing the knowledge on how to further improve the organisation.

6.8 SUGGESTIONS FOR FURTHER RESEARCH

This research study is limited to the South African enterprises within the Johannesburg area. South Africa is a developed country and amongst the top five digital countries within Africa. Further study should undertake research on the impact of cloud adoption in the developing countries in Africa and how new technology innovations impact them.

High operating costs on cloud has been the most common impediment for leaders to fully adopt cloud technology. With this being the issue there is a gap to conduct further research on how improved performance and optimised cloud costs can be achieved.

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APPENDICES

APPENDIX A: PARTICIPANT INFORMATION SHEET

Dear Sir / Madam,

My name is Palesa Lephoto, and I am a Master of Management student in the field of Digital Business at the University of the Witwatersrand, Johannesburg. As part of my studies, I have to undertake a research project, and I am investigating the impacts that influence leadership to adopt cloud computing for their enterprise under the supervision of Dr. Manamela Matshabaphala. The aim of this research project is to understand the influence leadership has in embracing new technologies to transform their enterprise.

As part of this project, I would like to invite you to take part in an interview. This activity will involve a single scheduled interview and will take 30 minutes of your time. With your permission, I would also like to audio record the interview using a digital device. This recording including the data collected will be retained in a cloud storage platform with multifactor authentication for security. Only the researcher and supervisor will have access to this recording. It will be destroyed after 1 year

There will be no personal costs to you if you participate in this project, you will not receive any direct benefits from participation but there are no disadvantages or penalties if you do not choose to participate or if you withdraw from the study. You may withdraw at any time or not answer any question if you do not want to. The interview will be completely confidential and anonymous. I will be using a pseudonym to represent your participation in my final research report. If you experience any distress or discomfort at

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any point in this process, we will stop the interview and/or resume another time.

Should you have any questions during or afterwards about this research, feel free to contact me on the details listed below.

Kind Regards,

Palesa Lephoto
1084357@students.wits.ac.za
0823224940

Supervisor:
Dr. Manamela Matshabaphala
Manamela.matshabaphala@wits.ac.za
011 717 3668

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APPENDIX B: PARTICIPANT CONSENT FORM

Research Study

Leadership and the adoption of Cloud Computing for enterprises in Johannesburg; South Africa

Name of Researcher: Palesa Lephoto

I ……. Voluntarily agree to participate in this research project. The purpose of the research study has been explained to me and understand what my participation will involve.

I agree to the following terms:

- I agree my participation will remain anonymous YES NO
- I agree that all the information I provide in this study will be treated with confidentiality YES NO
- I understand that I can withdraw the permission to participate in the study and/ or use my data within two weeks after the interview YES NO
- I agree that I will not benefit directly from participating in this study YES NO
- I agree that my interview will be audio recorded YES NO
- I agree that the disguised extracts from my interview may be quoted in the research report YES NO
- I understand that the copy of the consent form and the audio recording will be retained in a cloud storage platform with multifactor authentication for security. Only the researcher and supervisor will have access to this recording. It will be destroyed after 1 year. YES NO

Research Participant

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Name of Participant …….

Signature ……...

Date ……....

Researcher

Name of Researcher …….

Signature …….

Date ……..

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APPENDIX C: INTERVIEW GUIDE

1. How would you describe your leadership style? Why?
2. What is your understanding of cloud computing and innovation?
3. Based on your understanding of cloud computing and innovation, what do you believe to be the business drivers of cloud computing and innovation?
4. Based on your exposure what are factors of enterprises that influence the adoption of cloud computing and innovation?
5. In your understanding what are the dimensions of leadership that influences cloud computing adoption?
6. Is cloud computing adoption rate slow, moderate and fast in your organisation? Please provide the reason why?
7. Do you believe cloud computing technology has compelling features to influence the positive adoption of cloud within enterprise? Please provide the reason why and what are those features?
8. Do you believe leadership has role in the adoption of Cloud Computing for enterprises? Please provide the reason why?
9. Based on your experience what are the barriers faced by leaders that are causing a slow cloud computing adoption rate in enterprise?
10. In your understanding what are factors that halt the enterprise to buy-in into cloud computing which are deemed as the major concern by the leadership?
11. What can leadership do to minimize the barriers that are causing a slow cloud computing adoption rate?
12. Do you believe in leadership skill competency including the characteristics have a strong influence on the adoption of cloud computing technology? Provide a reason?
13. Do you believe technology readiness can influence cloud computing adoption rate? Provide a reason?
14. Do you believe organisational culture can influence cloud computing adoption rate?

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15. Lastly, do you believe enterprise should make cloud computing adoption as part overall organisational strategy implementation will increase adoption? And why?

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APPENDIX D: ETHICS APPROVAL

Graduate School of Business Administration
University of the Witwatersrand, Johannesburg

Wits Business School Ethics Committee
Constituted under the University Human Research Ethics Committee (Non-Medical)

Ethics Clearance Certificate

Ethics protocol number: WBS/DB1084357/714
This certificate is only valid with a legitimate ethics protocol number and signed by the Researcher (belo

Project title	Leadership and the adoption of cloud computing by enterprises in Johannesburg
Investigator / Researcher	Ms Palesa Irene Lephoto
Nature of Project	MM (Digital Business)
Decision of the Committee	Approved, provided stakeholders and participants are guaranteed confidentialty.
Issue Date of Certificate	2022-10-26
Expiry date	Date of submission of the project / research report
Chairperson	Prof Anthony Stacey ☎ +27 11 717 3587 +27 82 880 4531 anthony.stacey@wits.ac.za

Declaration by Researcher

One copy must be signed by the Researcher and returned to the Chairperson of the Wits Business School Ethics Committee.

I fully understand the conditions under which I am authorized to carry out the abovementioned research and I guarantee to ensure compliance with these conditions. Should any departure to be contemplated from the research procedure as approved I undertake to resubmit the protocol to the Committee.

Lephoto
Signature

26-10-2022
Date:

C2 General

C2 General